Stock Picking and Firm Performance

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Abstract

This paper finds that firms owned by stock pickers perform better. We create an index that gauges how concentrated shareholders' portfolios are in each firm and find that the average shareholders' portfolio weight is significantly positively related to operational firm performance and valuation. These findings support the idea that smaller shareholders, lacking significant control rights, affect firm performance through their impact on firm investments and consequently market value. Furthermore, we find that higher shareholders' portfolio concentration levels are associated with higher stock returns, consistent with the idea that shareholders' portfolio concentration correlates with private information.

JEL classification: G3
Key words: stock picking; private information; ownership; profitability; stock returns.

1. Introduction

This paper empirically explores the relation between informed shareholdings and firm performance. Previous literature has focused on institutional shareholdings and block size as proxies for incentives to gather information about firms (Brockman and Yan, 2009; Edmans, 2009). We depart from prior governance research by offering another approach to measure private information: shareholders' portfolio concentration. Shareholders that concentrate their portfolios, commonly known as "stock pickers", have strong incentives to collect information and profit from trading. We then ask how shareholder informativeness affects firms' operational performance and valuation, how shareholder informativeness adds to the largest shareholders' monitoring interest through intervention, and finally whether a higher average shareholders' portfolio concentration predicts future stock returns.

Ownership rights as well as the portfolio concentration of shareholders affect a firm's incentive structure and its information environment. Recent research shows that trading by shareholders that have both information and incentives will significantly affect the firms' information environment (Brockman and Yan, 2009). As Edmans (2009) notes, the problem of smaller blockholders is primarily the separation of ownership and information rather than the separation of ownership and control. Accordingly, our paper focuses on shareholders' information and their incentives arising from the concentration of their stock portfolio. Recently, theoretical papers have proposed a channel through which informed shareholdings could affect firm performance. These studies, including Edmans (2009) and Admati and Pfleiderer (2009), argue that informed shareholders' trading will improve market efficiency and thus reduce managerial agency problems

related to investments. Specifically, trading by informed shareholders will make prices reflect intrinsic value more precisely, which will induce managers to pursue investments that enhance long-term value even if such investments would lower profits in the short term (Edmans, 2009). As we have complete portfolio holdings data for each individual shareholder active in the Finnish equity market, the impact of informed shareholders on operating performance is directly testable. Furthermore, Maug (1998) considers the monitoring and trading by a large shareholder with the aim to profit from value increases from their monitoring activity. To investigate the role of large shareholders, we interact large shareholders' ownership rights with portfolio concentrations, and explore the performance impact of ownership structures that combine incentives and control. Finally, we investigate how shareholders' portfolio concentration is related to future stock returns in order to assess the possible information advantages of shareholders who choose to take on firm-specific, and thereby diversifiable, idiosyncratic risk (e.g. Grossman and Stigliz, 1980).

We use a unique data set representing all the more than 1.3 million different shareholders active in the Finnish stock market during the years 1995-2006 in order to calculate each shareholder's year-end holdings in virtually every listed stock. These data allow us to explore the performance consequences of shareholder incentives arising from individual shareholders' portfolio concentrations in specific stocks. To measure incentives, we calculate the average portfolio weight for each firm's shareholders, which we refer to as the Average Weight Index (AWI). As a separate ownership measure, we use a Herfindahl index (HFI) based on the size of all the firm's 5% blockholders.

Our principal result is that the degree of shareholders' portfolio concentration is positively related to firm performance. More specifically, we find that shareholders' average portfolio weight is positively related to firms' operational performance and valuation in the next year. The results are robust to controls for unobservable firm-specific effects using the firm-fixed effects model as well as robust to endogeneity of ownership using an instrumental variables regression specification. The results support the interpretation that shareholders with concentrated holdings play a governance role through their trading that increases market efficiency. To be more specific, concentrated stakes seem to make prices better reflect fundamental value and thereby positively affect real efficiency and firm performance. Moreover, the positive impact of informed shareholdings is stronger for smaller portfolios, consistent with the idea that the governance through "exit" relies on shareholders that can trade in an unconstrained way. We also find that large shareholders appear to perform a different governance role through their decision power ("voice"). In particular, our results show that the interaction of firm ownership concentration (decision power) and the average portfolio concentration is more strongly positively related to firm performance than ownership concentration alone, which is consistent with the idea that control has to be coupled with incentives.

We also find that investors' portfolio concentration is significantly positively related to risk-adjusted stock returns. The obtained positive relation is robust to controlling for factors that have been shown to affect stock returns including size, value, momentum, and liquidity. The return predictability is found to be stronger for smaller concentrated shareholders, which is consistent with the view that smaller investors face lower legal and institutional restrictions on their trading.

Our paper joins a growing number of studies that consider the monitoring role of informed investors (Edmans, 2009; Brockman and Yan, 2009; Admati and Pfleiderer, 2009). While previous studies have focused on subsets of shareholder portfolios, including insiders' portfolio concentrations (Kallunki et al., 2009) and smaller samples of individual shareholder portfolios (Ivkovic et al., 2008), our study can measure the portfolio incentives of all shareholders both small and large. More specifically, our main contribution comes from offering a direct test of the predictions in Edmans's (2009) model regarding the role of blockholders that hold concentrated stakes, and to our knowledge the present paper is the first to show a causal relation between smaller shareholders' portfolio concentrations and firm performance. Furthermore, our results from interacting shareholders' average portfolio concentration with control rights, holdings that are of a more stable nature, are related to the positive performance impact obtained for founders, founding families, and entrepreneurial investors (Fahlenbrach, 2009; Anderson and Reeb, 2003; and Brav et al., 2008, respectively). Our measure of portfolio concentration appear to measure the value enhancing incentives found for specific owner types more generally. Finally, our measure of shareholder informativeness enables a test of the Grossman and Stigliz (1980) framework predicting that shareholders expending resources on information collection, and furthermore taking on idiosyncratic risk, should obtain higher future stock returns gross of expenses. Therefore our paper is also related to the information advantages documented for short-term institutions (Yan and Zhang, 2007), concentrated insider portfolios (Kallunki et al., 2009), and individual investors (Ivkovic et al., 2008) in stock trading.

The remainder of the paper proceeds as follows. Section 2 discusses previous

literature and presents our research questions. Section 3 presents the data set and variable definitions. Section 4 presents the empirical findings. Section 5 provides further analysis and offers robustness tests. Section 6 concludes the paper.

2. Ownership, information, and firm performance

2.1. Portfolio concentration and firm performance

Larger block size is often viewed as a proxy for better information, higher trading profits, and more efficient stock prices (e.g., Edmans, 2009). Holdernes and Sheehan (1985) suggest that entrepreneurial investors may have better skills at interpreting public firm information than passive investors. Larger shareholders may also be represented on the board or management and have access to inside information (Demsetz, 1986). More generally, large investors face higher institutional and legal constraints in their trading and thus their holdings tend to be more stable, which is consistent with a trade-off between liquidity and control (Bolton and von Thadden, 2000). Edmans (2009) argues that blockholders conceptually should be viewed as informed investors. Accordingly, our paper focuses on portfolio concentration as a measure of shareholder informativeness.

Causative theories claim that the ownership structure should affect firm performance. Agency theory posits that a firm's ownership structure is related to the classical agency problem between shareholders and managers (Jensen and Meckling, 1976) as well as the agency problem between controlling shareholders and outside investors (La Porta et al., 1999). Edmans (2009) argues that blockholders with concentrated stakes will reduce the classical agency problem by increasing price efficiency even if they do not exercise control rights. In his model, trading by

blockholders will induce managers to pursue investments that enhance long-term value instead of maximizing short-term profits. Without blockholder trading, stock prices will tend to reflect current earnings, whereas stock prices will reflect fundamental value more precisely when blockholders trade. Edmans (2009) also shows that the causal channel works when blockholders can buy and sell shares without institutional and legal constraints, which implies that smaller blockholders will perform a governance role (governance through "exit"). Futhermore, Edmans and Manso (2010) theoretically demonstrate that multiple small blockholders that compete for trading profits will impound information into stock prices faster. Relatedly, Khanna and Sonti (2004) show that informed trading can have a positive impact on firm performance even if agency problems are low (or absent). In their framework, the feedback effect from trading will improve managers' investment decisions.

Large blockholders can perform a corporate governance role by using their decision rights (Shleifer and Vishny, 1986). Large shareholders may also have more control power through their representation on a firm's board of directors and by holding managerial positions. Controlling shareholders can directly monitor the firm and its management by influencing operational efficiency, such as strategic and organizational decisions, as well as financial efficiency, which may include decisions concerning payout policy and top management compensation. To obtain efficient outcomes, the decision rights by large owners should be matched with significant interest in the firm's residual returns (e.g., Hart, 1995). Further, smaller blockholders with concentrated portfolios may also be value enhancing by forming coalitions to obtain significant control rights to monitor insiders such as controlling shareholders and managers (e.g., Zwiebel, 1995). Large shareholders

and smaller blockholders may interact in their monitoring with beneficial performance effects (Maury and Pajuste, 2005; McConnell and Servaes, 1990). Thus, theory predicts that concentrated ownership coupled with concentrated owner portfolios should improve monitoring and consequently firm performance.

Ownership structures may also be endogenously determined. Demsetz and Lehn (1985) and Demsetz and Villalonga (2001) find that ownership concentration is determined by firm size, control potential (such as firm risk), the regulatory environment, amenity potential, and firm performance itself. After controlling for these factors, they fail to find a significant relation between ownership concentration and firm performance. Taken together, analyses of the ownership-performance relation should take into account the potential endogeneity of ownership.

2.2. Portfolio concentration and stock returns

Grossman and Stiglitz (1980) argue that active investors should be able to collect private information that leads them to invest in stocks producing higher risk adjusted returns, in order for them to be compensated for the costs that they incur for collecting the private information, and consequently for market equilibrium to be maintained. As Fama (1972) shows that investors need to concentrate their portfolios in order to benefit from private information, the Grossman and Stiglitz (1980) framework consequently predicts that firms which are owned by more concentrated investors should produce higher risk adjusted stock returns, gross of information costs. In equilibrium, the stock return premium will exactly offset the costs associated with collecting private information. Furthermore, Demsetz (1986) and Easley et al. (2002) argue that firms with

more concentrated shareholders should produce higher stock returns in order to compensate uninformed shareholders for the systematic risk of trading against more focused - and probably more informed - shareholders. Again, in equilibrium, the higher stock returns will exactly offset the costs that uninformed shareholders incur when trading against more informed shareholders.

Evidence consistent with these predictions is offered by Easley et al. (2002) and Yan and Zhang (2009), who empirically find that information-based trading is associated with higher expected stock returns. Kacperczyk and Seru (2007) find that U.S. equity mutual fund portfolio managers who rely less on public information perform better. Also, Kacperczyk et al. (2005) as well as Cremers and Petajisto (2009) find that U.S. equity mutual funds whose holdings are more concentrated outperform their peers that hold less concentrated portfolios. Furthermore, Ivkovic et al. (2008) investigate the trading activity of a large U.S. discount broker's clients and conclude that individual investors who hold more concentrated portfolios achieve better performance. Finally, Brands et al. (2005) conclude that Australian equity mutual funds that hold more concentrated positions perform better. In total, prior empirical evidence documents a positive correlation between portfolio concentration and stock returns, in line with the predictions of Grossman and Stiglitz (1980).

3. Data sources and definitions of ownership variables

Our main data source is the unique shareholder register of publicly listed Finnish firms, also employed by Grinblatt and Keloharju (2000). Below, we provide a short description of the distinct characteristics of our data sample, whereas a comprehensive

review of the general properties of the shareholder register can be found in Grinblatt and Keloharju (2000).

3.1. The Finnish Central Securities Depository (FCSD)

The FCSD shareholder register contains entries of virtually all transactions in the shares of publicly traded Finnish firms from the 2nd of January 1995 and onwards, as well as the balance of the register as of the 1st of January 1995. Grinblatt and Keloharju (2000) report that the register covers approximately 97% of the total market capitalization of all publicly traded Finnish firms as of the beginning of this time period. Our FCSD data sample consists of 121,888,418 entries registered during the time period from the 1st of January 1995 to the 31st of May 2007, expanding the dataset used by Grinblatt and Keloharju (2000) by more than 10 years and 115 million entries. More specifically, our FCSD data sample includes entries for 1,367,181 unique shareholders: 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. We restrict our sample to shares of publicly traded Finnish firms.[1] In addition, since our focus lies on outside shareholdings, we use ownership data from the low voting share class, which typically is the more traded class.

3.2. The Average Weight Index

We calculate an Average Weight Index (AWI) for each share and year by first

[1] The register includes a relatively small fraction of foreign securities, as well as other securities than shares.

compiling the portfolio value in Euros individually for each shareholder on the 31st of December:[2]

$$V_{X, T} = \Sigma (H_{X, S, T} * P_{X, T}), \quad (1)$$

where $V_{X, T}$ equals the value in Euros of shareholder X's portfolio at time T, $H_{X, S, T}$ equals the number of shares S that shareholder X holds at time T, and $P_{S, T}$ equals the Euro price of share S at time T. Next, we compile the Average Weight Index for each share and year:[3]

$$AWI_{S, T} = \Sigma (H_{X, S, T} * P_{S, T} / V_{X, T}) / N_{S, T}, \quad (2)$$

where $AWI_{S, T}$ equals the Average Weight Index for share S at time T, $H_{X, S, T}$ equals the number of shares S that shareholder X holds at time T, $P_{S, T}$ equals the Euro price of share S at time T, $V_{X, T}$ equals the value in Euros of shareholder X's portfolio at time T, and $N_{S, T}$ equals the total number of shareholders in share S at time T.

The Average Weight Index equals the average weight of a certain stock in the shareholders' portfolios at a certain point in time. We calculate the AWI measure for categories of shareholders: all investors and investors with at least 0.1% of shares in a

[2] We calculate the value of more than 1.3 million unique portfolios multiplied by 12 years, or in total more than 15 million individual portfolios.

[3] $P_{S, T}$ equals the Volume Weighted Average Price (VWAP) for share S at time T. We compile VWAP for each share and day from the FCSD securities register. Using the VWAPs instead of the closing prices arguably give us more reliable estimates of the true value of the shares - especially for more illiquid shares - as we avoid problems known to be associated with closing prices, as reported for instance by Felixson and Pelli (1999).

firm. We consequently expect the Average Weight Index to reflect how important a share is for its average shareholder..

3.3. The Herfindahl Index

We compile a Herfindahl Index (HFI) for each share and year by calculating each blockholder's number of shares in a firm divided by the total number of shares in that firm as of December 31, and summing up the quotient raised to the power of two:

$$HFI_{S,T} = \Sigma ((H_{X,S,T} / \Sigma H_{X,S,T}) \wedge 2), \quad (3)$$

where $HFI_{S,T}$ equals the Herfindahl Index for share S at time T, and $H_{X,S,T}$ equals the number of shares S that shareholder X holds at time T. Following previous research on blockholdings (e.g. McConnell and Servaes, 1990), we calculate the Herfindahl Index for shareholders that hold at least 5% of the total number of shares in a firm at a certain date, respectively. The Herfindahl Index expresses ownership concentration, and we consequently expect it to correlate positively with the control power of large shareholders in a firm.

3.4. Accounting and valuation data

Complete historical records of accounting data for Finnish non-financial publicly traded firms for the fiscal years 1995 to 2006 are provided by Balance Consulting.[4] We

[4] Balance Consulting is a part of Kauppalehti Ltd, which is the leading financial news provider in Finland.

use Return on Assets (ROA) as our measure of operational firm performance.[5] ROA is defined as net income divided by total assets. Extraordinary items are excluded from the definition of net income. As an alternative performance variable, we use Tobin's q defined as the book value of total assets minus shareholders' equity plus market value of equity all divided by the book value of total assets. We also include several firm- and year-level variables into our data set: incorporation year, industry group, long-term debt, sales, tangible assets and total assets.

3.5. Return data

Dividend and split adjusted daily stock and index returns for firms on the Main List of the NASDAQ OMX Helsinki Stock Exchange for the calendar years 1995 to 2006 are provided by the Department of Finance at Hanken School of Economics. We use the OMX Helsinki Cap index as our proxy for the market portfolio.[6] We furthermore retrieve daily observations for the 12 months Euro Interbank Offered Rate (EURIBOR[7]) from 1999 to 2006 and the 12 months Helsinki Interbank Offered Rate (HELIBOR) from 1995 to 1998 from Kauppalehti Ltd.

4. Empirical findings

4.1. Descriptive statistics

Panel A through C of Table I displays summary statistics for the ownership

[5] As an alternative operational performance measure, we use Return on Investments (ROI), defined as net income divided by invested capital. Since the results are very similar using ROA and ROI, we only report results based on ROA.

[6] The weight of each individual share is capped to 10% in this index, in order to account for the dominant position of Nokia Plc at OMX Helsinki.

[7] The EURIBOR was introduced on the 4th of January 1999.

variables used in the analysis. Panel A shows that the mean Average Weight Index equals 0.16 while the Herfindahl Index is 0.26 on average. Using the 0.1% shareholder threshold, the Average Weight Index has a mean of 0.27, and a standard deviation of 0.19.[8] These figures mean that the average shareholder in the sample firms has about one quarter of his stock wealth in a single firm. Panel A also shows that the mean Average Weight Index is higher if it is computed for 1% or 5% shareholder thresholds. Thus, larger blockholders have on average higher concentrations in their stock portfolios than smaller blockholders. In addition, Panel A displays descriptive statistics for yearly changes in the Average Weight Index using data on all investors. The standard deviation of changes in the Average Weight Index equals about 0.04, which indicates the presence of large yearly changes in control and incentives in the sample.

The mean of the Herfindahl Index equals 0.16 (Panel B). As displayed in Appendix 1, the correlation between the AWI and the HFI variable is only about 0.07, which indicates that the average portfolio concentration of individual shareholders and the corporate ownership concentration capture distinct dimensions of a firm's ownership structure. Summary statistics of financial and control variables are displayed in Panel C of Table I.

[INSERT TABLE 1 HERE]

4.2. The Average Portfolio Weight Index and firm performance

We use the most efficient firm fixed effects regression specification as the main

[8] The average (median) number of owners equals 60 (56) using the 0.1% ownership threshold, and 11 (11) using the 1% ownership threshold.

model for estimating the relation between ownership variables and operating returns.[9] The main benefit with the fixed effects model is that we can assume unobservable firm characteristics to be fixed over time.[10] Himmelberg et al. (1999) and Cronqvist and Nilsson (2003) provide discussions of potential problems with cross-sectional models when the averages of the performance variable may be different for each cross-sectional unit. Generally, our results are robust to using both random effects and pooled OLS models (see Table 5). The firm fixed effects performance model we employ can be expressed as follows:

$$\text{Firm performance}_{it+1} = \alpha + \beta_1 \log(\text{HFI})_{it} + \beta_2 \log(\text{AWI})_{it} + \beta_3 \text{Control Variables}_{it} + \beta_4 \text{Year Dummy variables}_t + u_i + \varepsilon_{it.} \quad (4)$$

Firm performance is measured by Return on assets (ROA) and Tobin's q, respectively. To reduce potential endogeneity problems, we measure firm performance at time *t+1*, while the independent variables are measured at time *t*. We take the logarithm of ownership variables HFI and AWI to reduce skewness. The firm-level control variables include firm size, defined as the logarithm of sales; firm age, number of years since incorporation; leverage, measured as long-term debt divided by total assets; and tangibility, defined as tangible assets to total assets. Year dummies are included to control for time-specific effects affecting firm performance. A time-invariant firm fixed

[9] The Hausman test rejects the null hypothesis that the fixed effects and the random effects model are equal suggesting that the firm fixed effects model is more efficient.

[10] Since the firm fixed effects model measures changes in ownership variables within firms over time, the omitted variables problem that can occur in cross-sectional models is reduced. The official ownership register we use is also very accurate, which reduces the concerns with potential measurement errors in the firm fixed effects specification (e.g. Zhou, 2001).

effect is denoted by u_i, and ε is the error term.

Table 2 shows the results of the relation between ownership variables and firm performance in the next year using the firm fixed effects specification. The Average Portfolio Weight index (hereafter AWI), measuring the average portfolio weight of shareholders, is positively and statistically significantly related to ROA and Tobin's q for all investors (AWI_all) as well as 0.1% holdings (AWI_0.1%). The coefficient for the log of the AWI_all index implies that a, say, 10% increase in portfolio concentration increases ROA by 0.24 (5.89 * log(1.1) = 0.24) and, respectively, Tobin's q by 0.04. For 0.1% holdings (logAWI_0.1%) a 10% increase in portfolio focus implies a 0.1 increase in ROA and a 0.01 increase in Tobin's q. The interaction between AWI and firm ownership concentration measured by the Herfindahl index of owners (hereafter HFI) with at least 5% stakes is positive and statistically highly significant, indicating that ownership concentration matched with incentives improves performance through control rights. When measured separately, HFI is positively related to firm performance, but significantly so only for Tobin's q. Taken together, the results in Table 2 show that the average portfolio weight by shareholders is significantly positively related to firm performance both measured independently and coupled with ownership concentration. Thus, these results support the prediction in Edmans's (2009) model by showing that concentrated holdings can serve a governance role even without control rights.

[INSERT TABLE 2 HERE]

Table 3 shows the results from a firm fixed effects instrumental variables regression model using 2SLS that controls for endogeneity of ownership (see Demsetz and Villalonga, 2001, on endogeneity). In the first stage of the model, the ownership variables are modeled as a function of current performance (ROA or Tobin's q), 1-year lagged performance, firm size (log of total assets), and firm risk measured by the standard deviation of the firm's profit rate over the 5 previous years. The first-stage results are displayed in Appendix 2. HFI is positively related to current performance (ROA and Tobin's q) and positively related to lagged ROA but insignificantly related to lagged Tobin's q, as well as insignificantly related to risk and firm size. Both specifications of AWI are positively related to current ROA and Tobin's q. AWI is positively related to lagged ROA, while the AWI for 0.1% investors is unrelated to lagged ROA. Both AWI measures are significantly negatively related to lagged Tobin's q. AWI is significantly positively related to risk and significantly negatively related to size. Though not reported in Appendix 2, the interaction of AWI and HFI is significantly positively related to current performance and significantly positively related to risk, but unrelated to lagged performance and size.

[INSERT TABLE 3 HERE]

Table 3 shows the second-stage results from the instrumental variables regression model. AWI is positively and statistically significantly related to operational firm performance (ROA) using data on all investors and 0.1% investors (significant at the 5% level). AWI is significantly positively related to Tobin's q for 0.1% holdings, but

unrelated to performance for all investors. The interaction between HFI and AWI is positively related to ROA and Tobin's q for both definitions of AWI. HFI measured separately is unrelated to ROA but significantly positively related to Tobin's q. Overall, the results from the instrumental variables model indicate a positive and causal relation between shareholders' average portfolio concentration and operational firm performance both independently and combined with decision power through ownership concentration. Hence, the results in Table 3 largely confirm the results reported in Table 2 using the firm fixed effects model.

4.3. The Average Portfolio Weight Index and stock returns

We explore the relation between private information and stock returns by regressing abnormal stock returns on firm shareholder concentration.[11] Our analysis differs from previous research in two principal ways: 1) it provides a firm perspective, as opposed to the portfolio perspective, and 2) it is performed on all investors in an economy, as opposed to a limited group of investors, such as mutual funds.

We control for the Fama and French (1993) risk factors by adding the firm and year specific market capitalization and book to market ratio to the equation. Furthermore, we include the Jegadeesh and Titman (1993) momentum factor in our analysis by adding the one year lagged Jensen (1968) alpha to the equation. Finally, Pagano (1989), Campbell et al. (1993), Brennan and Subrahmanyam (1996), Chordia and Swaminathan (2000), and Chordia et al. (2001) highlight the importance of liquidity as a determinant of stock returns. We control for liquidity risk by adding the

[11] We measure a stock's abnormal stock return by estimating Jensen (1968) alphas for each share and year: $R_t - R_f = \alpha + \beta_t (R_m - R_f) + \varepsilon_t$, where R_t is the return on the firm's share on day t, R_f is the risk-free rate, and Rm is the market portfolio return.

annual trading volume in Euros as a factor to the equation:

$$\alpha_{i,t} = \beta_1 \log(HFI_{it}) + \beta_2 \log(AWI_{it}) + \beta_3 \log(\text{Market Capitalization}_{it}) + \beta_4 \log(\text{Book to Market}_{it}) + \beta_5 \alpha_{i,t-1} + \beta_6 \log(\text{Trading Volume}_{it}) \quad (5)$$

, where $\alpha_{i,t}$ is Jensen's alpha, $HFI_{i,t}$ is the Herfindahl Index, $AWI_{i,t}$ is the Average Weight Index, Market $\text{Capitalization}_{i,t}$ is the market capitalization, Book to Market_{it} is the book to market ratio, $\alpha_{i,t-1}$ is the lagged Jensen's alpha, and Trading Volume_{it} is the trading volume.

[INSERT TABLE 4 HERE]

Table 4 shows our principal regression results on the relation between shareholder portfolio concentration (AWI) and abnormal stock returns using a sample of 109 non-financial firms' most traded share class listed on the Main List of the NASDAQ OMX Helsinki Stock Exchange over the period 1995-2006. Columns 1 and 2 show that there is a very significant positive relation between AWI and abnormal stock returns for all shareholders and $\geq 0.1\%$ shareholders, respectively. We note that these findings correspond very well to the ones for AWI and operating performance. Furthermore, as for operating performance, we do not document a significant relationship between HFI and stock returns, which adds to the credibility of our findings. Finally, we note that the explanatory power of AWI is higher when estimated for $\geq 0.1\%$ shareholders, which we hypothesize to be a function of these shareholders being large enough to be truly active

investors, but small enough to represent the majority of all investors. We also note that the Fama and French (1993) risk factors and the Jegadeesh and Titman (1993) momentum factor seem to play a fairly small role in our sample, as the parameter estimates mostly are insignificant. The consistently significantly negative liquidity risk parameter estimate, on the other hand, bears witness of a liquidity risk premium being present in our sample.

Taken together, we conclude that there is a robust relation between shareholder portfolio concentration and abnormal stock returns, which is not explained by systematic risk. Our results hence lend strong support to the framework set forth by Grossman and Stiglitz (1980), as well as Demsetz (1986) and Easley et al. (2002), as they suggest that there is a robust relation between private information and stock returns.

5. Further analysis and robustness tests

5.1. Alternative regression estimation techniques

Table 5 shows results on the relation between our ownership variables and firm performance using alternative econometric techniques: the random effects model and a time series-cross sectional OLS model. Panel A of Table 5 shows that the results using the random effects specification that control for industry and year effects yields are in line with the firm fixed effects model. The results from the time series-cross sectional pooled OLS model that controls for firm clusters (Panel B) are also in line with the firm fixed effects and the random effects models. We conclude that our main results on the positive effect of the Average Weight Index on firm performance holds using alternative panel data regression methods.

[INSERT TABLE 5 HERE]

5.2. Alternative specifications of ownership variables

To further explore the relation between shareholder incentives and operating returns, we calculate the Average Weight Index and Herfindahl Index using a sub-sample of private investors (physical persons). Private investors are principals by definition, and thus have an intrinsic interest in monitoring their investments. When private investors hold a significant stake in a firm and take an active role, they fit the Pound (1992) definition of entrepreneurial investors, which may play a valuable monitoring role in firms. The coefficients of the AWI and HFI indices for private investors (not reported in a table) are similar to the coefficients for all investors reported in Table 2. The findings suggest that the AWI and the HFI indices capture the information and control effects across private and other owner types.

We furthermore address the potential nonlinearity in the relation between shareholder concentration and operating performance. Morck et al. (1988), McConnell and Servaes (1990) and McConnell et al. (2008) find a roof shaped relation between ownership concentration and firm performance, which they interpret as an incentive effect for low levels and an entrenchment effect for high levels. High levels of portfolio concentration may also be associated with risk aversion.

[INSERT TABLE 6 HERE]

In Table 6 we include squared terms of the AWI and HFI, respectively, to allow for a nonlinear effect in the firm fixed effects regression specification. We find a weakly significant nonlinear effect for the AWI using Tobin's q as the performance metric, with an inflection point at about 0.66.[12] Since the median AWI is about 0.23 and the 95th percentile is about 0.53, the performance effect of portfolio concentration typically is linear, and nonlinear only in the case of very large changes in ownership. Moreover, Appendix 3 displays averages of performance variables in different AWI quartiles. Appendix 3 confirms the linear relation for the relation between ROA and AWI as well as the weakly nonlinear relation for Tobin's q and AWI.

We focus on the role of outside shareholders and thus analyze the more traded low voting share class in the main empirical analysis. However, we re-estimate the main results in Table 2 using a sample of firms with only a single share class traded in order to test if dual-class firms (N=21) affect our results. Though not reported in a table, we find that the results for single-class (N=114) firms are effectively equal to those for the full sample (N=135). A more detailed analysis of ownership and control structures by large shareholders can be found in Maury and Pajuste (2005).

5.3. Robustness analysis

We also explore the robustness of our main results with respect to influential observations. Although we use winsorized the ROA and Tobin's q measures at the 1st and 99th percentiles to reduce the impact of outliers in the main analysis, we also consider winsorizing the performance measures using the 5th and 95th percentiles as well as using

[12] As an alternative nonlinear specification, we replaced the AWI variable with the AWI for only 5% blockholders. This specification yielded a similar statistically weak nonlinear relation between AWI and Tobin's q but an insignificant relation for ROA.

unwinsorized performance variables and find similar results as in the main analysis. As another robustness check, we omit observations that exhibit very large yearly changes (more than +/-0.05) in the AWI (using the 0.01% holdings threshold) from the main fixed effects regression analysis and find that the results are not driven by the largest changes in AWI.

6. Summary and conclusions

In this paper, we investigate informed shareholders' role in firm value creation. We hypothesize that a higher level of investor informativeness, measured by the average shareholder portfolio weight and commonly referred to as stock picking, should be positively related to a firm's operational performance and valuation. The channel through which informed shareholdings should have a causal impact on firm performance is offered in Edmans (2009): Trading in stocks by shareholders that hold concentrated stakes will improve market efficiency and consequently enhance real efficiency because managers will be more inclined to pursue valuable long-term projects although such projects would generate lower short-term earnings. In addition, we examine to what extent high levels of portfolio concentration together with large shareholdings can be beneficial. Finally, we test whether firms owned by more concentrated shareholders also are associated with higher future stock returns.

Using data on more than 1.3 million unique investors over a 12-year period, we find an economically and a statistically positive causal impact of investors' average portfolio concentration on operational firm performance and valuation. The relation is evidence of a governance role played by informed shareholders. We also find that

ownership structures that combine high portfolio concentrations and significant control rights add value. Furthermore, we find that higher average investor portfolio concentration is associated with higher stock returns, which indicates that stock pickers possess valuable private information. Our results show that stock pickers play a governance role even though they do not seek control, which is consistent with the predictions in Edmans's (2009) model. The findings indicate that the governance role played by smaller stock pickers complement the monitoring role of large shareholders that can use control rights to discipline managers. Taken together, our analysis indicates that more attention should be given to investor informativeness in further empirical research.

Appendix 1. Correlations between the main variables for the 135 Finnish listed firms over the period 1995-2006 as used in the regression tables.* indicates that correlations with Jensen's alpha are based on a reduced sample of 109 firms traded on the main list. Variables are defined in Table 1.

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	ROA $_{(t+1)}$	1.00													
2	Tobins'q $_{(t+1)}$	0.42	1.00												
3	Jensen's alpha $_{(t)}$ *	0.33	0.15	1.00											
4	Log(HFI)	0.04	0.05	0.04	1.00										
5	Log(AWI)	0.19	0.05	0.12	0.07	1.00									
6	Log(AWI_0.1%)	0.02	0.15	0.18	-0.20	0.27	1.00								
7	Log(AWI_1%)	0.00	0.14	0.15	-0.03	0.15	0.73	1.00							
8	Log(AWI_5%)	0.02	0.10	0.11	0.14	0.03	0.38	0.62	1.00						
9	Log(Sales)	0.11	-0.03	-0.02	0.09	0.22	-0.39	-0.35	-0.28	1.00					
10	Firm age	0.06	-0.10	0.03	-0.29	0.11	0.01	-0.10	-0.21	0.26	1.00				
11	Leverage	-0.09	-0.27	-0.01	0.14	-0.01	-0.16	-0.09	-0.05	0.04	-0.04	1.00			
12	Tangibility	0.01	-0.31	0.05	0.15	0.14	-0.14	-0.12	-0.07	0.03	0.01	0.54	1.00		
13	Firm risk	-0.22	0.30	-0.17	-0.02	-0.21	0.22	0.27	0.21	-0.36	-0.23	-0.19	-0.35	1.00	
14	Log(Total assets)	0.06	-0.11	0.00	0.16	0.26	-0.41	-0.38	-0.31	0.92	0.24	0.17	0.21	-0.39	1.00

Appendix 2. Determinants of ownership and portfolio concentration

This table presents firm-level fixed effects regressions on the determinants of ownership and portfolio concentration for a sample of 135 Finnish listed firms (excluding banks and insurance companies) during 1995-2006. The displayed results are obtained from first-stage regressions in an instrumental variables model presented in Table 3. In Panel A, the dependent variable is HFI, the Herfindahl Index using data on the firm's shareholders at year-end. In Panel B, the dependent variable is the Average Weight Index, the average weight of the shareholders in a firm at year-end calculated on all investors (columns 3-4) and at least 0.1% investors (columns 5-6). The independent variables are: Return on Assets (ROA), defined as net income divided by total assets winsorized at the 1st and 99th percentiles, respectively; Tobin's q, defined as market value of equity plus book value of debt all divided by book value of total assets winsorized at the 1st and 99th percentiles, respectively firm risk, the standard deviation of the ROA over the last five years (*t-4 - t*); and total assets. *t*-statistics, based on standards errors that control for clustering at the firm level, are in parentheses below the coefficient estimates. ***,**,* denote statistical significance at the 1%, 5%, and 10%, respectively.

	Panel A.		Panel B.			
	$Log(HFI)_t$		$Log(AWI)_t$		$Log(AWI\_0.1\%)_t$	
Variable	(1)	(2)	(3)	(4)	(5)	(6)
ROA_t	0.0046**		0.0065***		0.0034***	
	(2.09)		(9.35)		(2.63)	
ROA_{t-1}	0.0035		0.0020***		9.23E-05	
	(1.85)*		(3.37)		(0.08)	
Tobin's q_t		0.0583***		0.0411***		0.0347****
		(3.39)		(7.74)		(3.54)
Tobin's q_{t-1}		-0.0035		-0.0098***		-0.0235****
		(-0.29)		(-2.64)		(-3.43)
$Log(Total\ assets)_t$	0.0051	-0.0004	-0.0003	-0.0055***	0.0040	0.0030
	(1.06)	(-0.07)	(-0.22)	(-3.72)	(1.44)	(1.08)
Firm $risk_{t-4\ -\ t}$	0.0139	0.0668	0.0345**	0.0676***	-0.0372	-0.0194
	(0.27)	(1.24)	(2.12)	(4.05)	(-1.23)	(-0.63)
Constant	-2.9716***	-3.4889***	-0.4840**	-0.5875***	-0.6798*	-0.7629**
	(-4.82)	(-5.44)	(-2.52)	(-2.97)	(-1.90)	(-2.09)
Control variables	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included
Firm effects	Included	Included	Included	Included	Included	Included
R^2	0.07	0.08	0.35	0.32	0.16	0.17
Observations	1116	1074	1116	1074	1116	1074

Appendix 3. AWI quartiles and firm performance

The table displays means for performance variables for different degrees of portfolio concentration. Quartile 1 covers the 25% of observations with the lowest Average Weight Index (AWI), while quartile 4 covers observations with the highest AWI. The sample covers 135 Finnish listed firms over the period 1995-2006. The AWI variable is lagged one year. The performance variables are winsorized at the 1st and 99th percentiles.

	Quartile 1	Quartile 2	Quartile 3	Quartile 4
ROA	5.40	9.00	9.53	10.37
Tobin's q	1.45	1.59	1.63	1.58
Observations	284	285	285	285

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Table 1. Summary statistics

This table presents summary statistics of main variables for a sample Finnish listed firms during 1995-2006. The variables are: the AWI, Average Weight Index, the average weight of shareholders in a firm at year-end; the HFI, the Herfindahl Index using data on the firm's 5% shareholders at year-end; Return on Assets (ROA), net income divided by total assets winsorized at the 1st and 99th percentiles, respectively; Tobin's q, defined as market value of equity plus book value of debt all divided by book value of total assets winsorized at the 1st and 99th percentiles, respectively; alpha, the intercept coefficient from the CAPM regressions using daily returns for each firm each year; sales in thousands euros; total assets in thousands euros; firm age, years since incorporation; tangibility, tangible assets divided by total assets; leverage, long-term debt divided by total assets; firm risk, the standard deviation in ROA over the last five years. The main sample consists of 135 firms (excluding banks and insurance companies), and the sample using stock returns consists of 109 firms traded on the main list (excluding banks and insurance companies).

Variable	Observations	Mean	Median	Standard deviation	25th percentile	75th percentile
Panel A: Portfolio concentration						
AWI(all)	1139	0.264	0.230	0.132	0.176	0.313
AWI (0.1%)	1139	0.273	0.222	0.185	0.133	0.362
AWI (1%)	1139	0.351	0.291	0.246	0.159	0.535
AWI (5%)	1127	0.432	0.396	0.321	0.146	0.668
ΔAWI	1008	-0.006	-0.004	0.035	-0.024	0.014
Panel B: Ownership concentration						
HFI	1127	0.153	0.100	0.146	0.048	0.226
Panel C: Financial and control variables						
Return on assets % (ROA)	1139	8.578	8.200	9.527	4.300	13.400
Tobin's q	1139	1.563	1.241	0.941	1.011	1.744
Jensen's alpha	656	0.00007	0.0001	0.001	-0.0007	0.0009
Sales ('000 euros)	1139	1144014	106708	3286975	42937	650392
Total assets ('000 euros)	1139	1121013	118000	3200614	44100	674000
Trading volume (euro)	656	2.10e+09	6.69e+07	1.40e+10	1.04e+07	3.02e+08
Firm age (years)	1139	48.524	35	51.397	14	67
Tangibility	1139	0.339	0.308	0.237	0.152	0.507
Leverage	1139	0.168	0.154	0.135	0.052	0.251
Firm risk	1128	5.833	3.653	7.309	2.039	6.7044

Table 2. Portfolio concentration and firm performance

This table presents firm-level fixed effects regressions of firm performance on measures of ownership structure for a sample of 135 Finnish listed firms (excluding banks and insurance companies) during 1995-2006. The dependent variable is the Return on Assets (ROA), defined as net income divided by total assets winsorized at the 1st and 99th percentiles, respectively, in Panel A, whereas the dependent variable is Tobin's q, defined as market value of equity plus book value of debt all divided by book value of total assets winsorized at the 1st and 99th percentiles, respectively, in Panel B. The independent variables are: the Herfindahl Index (HFI) using data on the firm's 5% shareholders at year-end; the AWI index, the average weight of the shareholders in a firm at year-end; ln(sales), the logarithm of sales in thousand euros; firm age, years since incorporation; tangibility, tangible assets divided by total assets; and leverage, long-term debt divided by total assets. *t*-statistics, based on standards errors that control for clustering at the firm level, are in parentheses below the coefficient estimates. ***,**,* denote statistical significance at the 1%, 5%, and 10%, respectively.

	Panel A. ROA_{t+1}				Panel B. Tobin's q_{t+1}			
	Average Weight Index for all investors		Average Weight Index for 0.1% shareholders		Average Weight Index for all investors		Average Weight Index for 0.1% shareholders	
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(HFI) $_t$	0.6019		0.8758*		0.1270**		0.1738***	
	(1.35)		(1.82)		(2.18)		(2.97)	
Log(AWI) $_t$	5.8897***				0.8922***			
	(3.81)				(3.91)			
Log(AWI_0.1%) $_t$			2.3797**				0.2233**	
			(2.55)				(2.07)	
Log(HFI) $_t$ * Log(AWI) $_t$		1.3648***				0.2374***		
		(3.04)				(4.39)		
Log(HFI) $_t$ * Log(AWI_0.1%) $_t$				1.2811***				0.1871***
				(2.92)				(3.79)
Ln(sales) $_t$	0.8309	1.0029	1.0660	1.0570	-0.0926	-0.0677	-0.0558	-0.0561
	(0.88)	(0.98)	(1.05)	(1.03)	(-1.64)	(-1.32)	(-1.10)	(-1.11)
Firm age $_t$	0.1395	0.0026	-0.0236	-0.0300	0.0397***	0.0199**	0.0138	0.0136

	(0.93)	(0.02)	(-0.16)	(-0.21)	(3.60)	(2.32)	(1.49)	(1.50)
Tangibility $_t$	-7.0132	-8.1755	-7.2218	-7.9189	-0.7828*	-0.9510**	-0.8428*	-0.8657*
	(-1.33)	(-1.54)	(-1.33)	(-1.48)	(-1.87)	(-2.15)	(-1.76)	(-1.93)
Leverage $_t$	-4.1005	-4.8250	-4.2902	-4.6189	-0.5760*	-0.6809**	-0.6576**	-0.6685**
	(-1.08)	(-1.24)	(-1.14)	(-1.21)	(-1.90)	(-2.11)	(-2.02)	(-2.04)
Constant $_t$	5.7020	6.4375	6.7924	6.9523	2.6654***	2.7718***	2.7137***	2.7190***
	(0.56)	(0.59)	(0.61)	(0.62)	(3.52)	(3.47)	(3.49)	(3.51)
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included
Firm effects	Included	Included	Included	Included	Included	Included	Included	Included
R^2	0.136	0.133	0.147	0.133	0.133	0.133	0.180	0.146
Observations	1127	1127	1127	1127	1127	1127	1127	1127

Table 3. Portfolio concentration and firm performance using instrumental variables regressions

This table presents firm-level fixed effects instrumental variables regressions using 2SLS of firm performance on measures of ownership structure for a sample of 135 Finnish listed firms (excluding banks and insurance companies) during 1995-2006. The dependent variable is the Return on Assets (ROA), defined as net income divided by total assets winsorized at the 1st and 99th percentiles, respectively, in Panel A, whereas the dependent variable is Tobin's q, defined as market value of equity plus book value of debt all divided by book value of total assets winsorized at the 1st and 99th percentiles, respectively, in Panel B. The independent variables are: the Herfindahl Index (HFI) using data on the firm's 5% shareholders at year-end; the AWI index, the average weight of the shareholders in a firm at year-end; ln(sales), the logarithm of sales in thousand euros; firm age, years since incorporation; tangibility, tangible assets divided by total assets; and leverage, long-term debt divided by total assets. The first-stage regressions in which HFI and AWI are modelled as functions of current and past performance, firm risk, and firm size are shown in the Appendix. *t*-statistics, based on standards errors that control for clustering at the firm level, are in parentheses below the coefficient estimates. ***,**,* denote statistical significance at the 1%, 5%, and 10%, respectively.

	Panel A. ROA_{t+1}				Panel B. Tobin's q_{t+1}			
	Average Weight Index for all investors		Average Weight Index for 0.1% shareholders		Average Weight Index for all investors		Average Weight Index for 0.1% shareholders	
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(HFI) $_t$	-37.5744		-10.8731		4.3703**		2.6020***	
	(-1.34)		(-0.51)		(2.00)		(3.22)	
Log(AWI) $_t$	57.8700**				-1.7723			
	(2.34)				(-0.56)			
Log(AWI_0.1%) $_t$			86.7512**				3.4439**	
			(2.19)				(2.22)	
Log(HFI) $_t$ * Log(AWI) $_t$		13.2834***				1.8820***		
		(5.25)				(6.53)		
Log(HFI) $_t$ * Log(AWI_0.1%) $_t$				20.7460***				2.8382***
				(3.86)				(4.87)
Firm age $_t$	1.4829**	0.4755***	0.6956	0.3080	-0.0336	0.0619***	0.0355	0.0315
	(2.24)	(2.85)	(1.42)	(1.39)	(-0.38)	(3.28)	(1.22)	(1.14)

Tangibility $_t$	43.3985	-25.2248***	20.1333	-32.2625***	-6.8346**	-3.3307***	-3.6954**	-4.1536***
	(1.10)	(-4.02)	(0.56)	(-3.22)	(-2.04)	(-4.35)	(-2.23)	(-3.34)
Leverage $_t$	-3.8022	1.2319	30.1077*	9.7134	0.2653	0.2427	1.3902	1.2322
	(-0.41)	(0.32)	(1.73)	(1.48)	(0.27)	(0.51)	(1.55)	(1.51)
Constant $_t$	-87.8402	45.2195***	57.8662	82.8474***	13.7709**	6.7511***	11.9464***	12.0678***
	(-1.17)	(4.50)	(1.29)	(3.82)	(2.12)	(5.31)	(4.42)	(4.50)
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included
Firm effects	Included	Included	Included	Included	Included	Included	Included	Included
Observations	1116	1116	1116	1116	1074	1074	1074	1074

Table 4. Portfolio concentration and stock returns

This table presents OLS regressions of Jensen (1968) alphas on measures of ownership structure for a sample of 109 non-financial firms' most traded share class listed on the Main List of the NASDAQ OMX Helsinki Stock Exchange over the period 1995-2006. The dependent variable is the Jensen (1968) alpha estimated as the intercept coefficient from the CAPM regressions using daily returns for each firm, each year. The independent variables are: the Herfindahl Index (HFI) of 5% shareholders in the firm at year-end, the Average Weight Index (AWI) of shareholders in the firm at year-end, market capitalization of the firm's common stock at year-end (winsorized at the 1st and 99th percentiles, respectively), book to market value of the firm at year-end (winsorized at the 1st and 99th percentiles, respectively), the Jensen (1968) alpha lagged one year, and yearly trading volume of the firm's common stock in Euros (winsorized at the 1st and 99th percentiles, respectively). Absolute *t*-statistics based on robust standard errors are in parentheses below the coefficient estimates. ***,**,* denote statistical significance at the 1%, 5%, and 10%, respectively.

Variable	(1)	(2)
Log(HFI)	0.0001	0.0001*
	(1.21)	(1.85)
Log(AWI)	0.0004***	
	(3.07)	
Log(AWI_01%)		0.0004***
		(4.49)
Log(Market Cap)	0.0001	0.0002**
	(1.23)	(2.15)
Log(Book to Market)	-0.0000	0.0000
	(-0.56)	(0.33)
Jensen's alpha$_{t-1}$	0.0841*	0.0673
	(1.77)	(1.43)
Log(TradingVolume)	-0.0001**	-0.0001**
	(-2.42)	(-2.15)
Constant	0.0007*	0.0004
	(1.81)	(1.50)
Observations	647	647
R^2	0.045	0.067

Table 5. Owner incentives and firm performance using alternative regression techniques

This table presents random effects regressions (Panel A) and pooled OLS regressions (Panel B) of firm performance on measures of ownership structure for a sample of 135 Finnish listed firms (excluding banks and insurance companies) during 1995-2006. The dependent variable is either Return on Assets (ROA), defined as net income divided by total assets winsorized at the 1st and 99th percentiles, respectively, or Tobin's q, defined as market value of equity plus book value of debt all divided by book value of total assets winsorized at the 1st and 99th percentiles, respectively. The independent variables are: the Herfindahl Index using data on the firm's 5% shareholders at year-end; the Average Weight Index, the average weight of the shareholders in a firm at year-end; ln(sales), the logarithm of sales in thousand euros; firm age, years since incorporation; tangibility, tangible assets divided by total assets; and leverage, long-term debt divided by total assets. Industry dummies are included in the models but not displayed. *t*-statistics, based on standards errors that control for clustering at the firm level, are in parentheses below the coefficient estimates. ***,**,* denote statistical significance at the 1%, 5%, and 10%, respectively.

	Panel A. Random effects		Panel B. OLS	
	ROA_{t+1}	Tobin's q_{t+1}	ROA_{t+1}	Tobin's q_{t+1}
Variable	(1)	(2)	(3)	(4)
Log(HFI) $_t$	0.6101*	0.1386***	0.7291	0.1689**
	(1.66)	(4.00)	(1.29)	(2.60)
Log(AWI) $_t$	5.5590***	0.7326***	4.6616***	0.2981*
	(5.45)	(7.56)	(3.31)	(1.81)
Ln(sales) $_t$	1.0219**	-0.0493	1.2033***	0.0256
	(2.57)	(-1.30)	(3.13)	(0.61)
Firm age $_t$	0.0176	-0.0067**	0.0198	-0.0040
	(0.53)	(-2.00)	(1.24)	(-1.56)
Tangibility $_t$	-6.0238*	-0.8494***	-3.0138	-0.9639**
	(-1.88)	(-2.80)	(-0.99)	(-2.46)
Leverage $_t$	-4.2685*	-0.6052***	-4.1035	-0.4455
	(-1.74)	(-2.63)	(-1.22)	(-1.57)
Constant $_t$	-0.0825	3.4419***	-3.7315	2.1479***
	(-0.01)	(4.95)	(-0.66)	(2.87)
R^2	0.501	0.493	0.506	0.521
Observations	1127	1127	1127	1127

Table 6. Nonlinearity in ownership variables

This table presents firm-level fixed effects regressions of firm performance on measures of ownership structure for a sample of 135 Finnish listed firms (excluding banks and insurance companies) during 1995-2006. The dependent variable is the Return on Assets (ROA), defined as net income divided by total assets winsorized at the 1st and 99th percentiles, respectively, in Panel A, whereas the dependent variable is Tobin's q, defined as market value of equity plus book value of debt all divided by book value of total assets winsorized at the 1st and 99th percentiles, respectively, in Panel B. The independent variables are: the Herfindahl Index using data on the firm's 5% shareholders at year-end; the Average Weight Index, the average weight of the shareholders in a firm at year-end; ln(sales), the logarithm of sales in thousand euros; firm age, years since incorporation; tangibility, tangible assets divided by total assets; and leverage, long-term debt divided by total assets. *t*-statistics, based on standards errors that control for clustering at the firm level, are in parentheses below the coefficient estimates. ***,**,* denote statistical significance at the 1%, 5%, and 10%, respectively.

	ROA_{t+1}	Tobin's q_{t+1}
Variable	(1)	(2)
HFI_t	1.3008	-0.2344
	(0.15)	(-0.15)
$(HFI_t)^2$	10.2959	2.2889
	(0.76)	(0.82)
AWI_t	35.6681**	6.3741***
	(2.46)	(3.14)
$(AWI_t)^2$	-23.9975	-4.8203*
	(-1.25)	(-1.91)
$Ln(sales)_t$	0.9427	-0.0773
	(0.98)	(-1.38)
$Firm\ age_t$	0.1353	0.0406***
	(0.88)	(3.41)
$Tangibility_t$	-7.5227	-0.8019*
	(-1.44)	(-1.91)
$Leverage_t$	-4.3505	-0.6183**
	(-1.15)	(-1.99)
$Constant_t$	-13.0081	-0.4526
	(-1.13)	(-0.62)
Year dummies	Included	Included
Firm effects	Included	Included
R^2	0.149	0.188
Observations	1127	1127