Why Managers Hold Shares of Their Firms: An Empirical Analysis

Abstract

We examine the relationship between CEO ownership and stock market performance. Firms in which the CEO voluntarily holds a considerable share of outstanding stocks outperform the market by more than 10 percent p.a. after controlling for traditional risk factors. The effect is most pronounced in firms that are characterized by large managerial discretion of the CEO. The abnormal returns we document are one potential explanation why so many CEOs hold a large fraction of their own company's stocks. We also examine several potential explanations why the existence of an owner CEO is not fully reflected in prices but leads to abnormal returns.

I.   Introduction

CEOs often own a significant fraction of the outstanding stocks of the firms they work for. In 2000, 18 percent of the CEOs of S&P 1500 firms voluntarily held 5 percent or more of their company's stocks. These holdings of own company stocks usually constitute a dominant fraction of the CEO's personal wealth. This pronounced voluntary portfolio concentration is puzzling, as it entails costs in terms of foregone diversification (Lambert, Larcker and Verrecchia [1991] and Kahl, Liu and Longstaff [2003]).

We offer a simple new explanation for this puzzle: Managers invest in their own firms because it is a good (long term) investment for them. To test this explanation, we empirically examine the following question: do stocks of firms in which the CEO holds a large fraction of the firms' outstanding shares (owner CEOs) generate positive abnormal returns?

We analyze this question by examining the returns of S&P 500 and S&P 1500 firms for the periods 1994 to 2005 and 1996 to 2005, respectively. Our paper departs from the literature in that it documents that portfolios consisting of firms with owner CEOs significantly outperform the market.[1] For example, a value-weighted portfolio consisting of all S&P 500 (S&P 1500) firms in which the CEO holds more than 10 percent of the company's stocks delivers abnormal returns of 13 percent p.a. (12 percent p.a.). This result holds after controlling for the influence of the three Fama and French [1993] factors as well as the Jegadeesh and Titman [1993] momentum factor. These findings are robust to several specifications. We also find similar evidence in a stock-level multivariate analysis that takes into account other firm-specific characteristics that might drive returns. Our findings help to explain why CEOs invest in their own firms.

The question why CEOs are invested in their own firms has been discussed elsewhere in the literature, and several other answers are suggested. One prominent explanation is based

on asymmetric information. Insiders of firms are often better informed as far as firm value is concerned than other investors. Hence, it may be in the interest of the CEO to trade in her firm's stock if she has access to private information. For example, evidence in Lakonishok and Lee [2001] and Lin and Howe [1990] suggests that insider transactions are profitable. However, our trading strategy does not make use of any private information. Our strategy uses public information concerning ownership, and this ownership information should be priced. Possibly the most prominent explanation for managerial ownership is based on the idea of private benefits of control (see, e.g., Jensen and Meckling [1976], Grossman and Hart [1980], Jensen [1986], and Morck, Shleifer and Vishny [1988]). If a CEO owns a significant fraction of her firm's shares, she can become entrenched and eventually consume private benefits of control. Thus, it may be in her self interest to invest in her firm. Following this argument, firm value should decrease if a CEO is substantially invested in a firm. Finally, Malmendier and Tate [2005] show that CEOs are often prone to overconfidence. If they are overconfident with respect to their own ability to increase firm value, they may heavily invest in their own firms. However, overconfident CEOs also undertake too risky or even negative NPV projects. This reduces firm value. The private benefits of control argument as well as the overconfidence argument should lead to lower firm value. However, these arguments do not imply that this effect cannot be priced: the value decreasing effect of the CEO should be anticipated, the shares should be priced at a discount, and the long term abnormal returns for these firms should eventually be zero. Even if this effect would not be anticipated by market participants, it would lead to negative rather than positive abnormal returns. All alternative explanations for high managerial ownership discussed above are not consistent with higher returns of owner CEO firms.

While our results may help to understand why managers invest in their own firms, it is far more puzzling to understand why the market does not (or cannot) price the existence of an owner manager. The share of stocks owned by top executives is public information and easily observable for market participants. So, why is this information not immediately priced? There are three main potential explanations for this finding. First, the abnormal

2

returns we document might be a compensation for a high loading of managerial ownership firms on a systematic risk factor that is yet unknown. Second, the market may be inefficient and not able to correctly interpret managerial ownership information. Third, recent theoretical models of the stock market that depart from Walrasian equilibrium concepts can also explain such abnormal returns. In traditional models that examine Walrasian equilibria, it is assumed that the stock market is perfectly competitive. In these models the existence of an owner manager would be priced (see, e.g., Admati, Pfleiderer and Zechner [1994], and more recently DeMarzo and Urosevic [2006]). Von Lilienfeld-Toal (2006) and Blonski and von Lilienfeld-Toal (2006) give up the assumption of perfectly competitive stock markets and model strategic interactions between non-atomistic investors in a game-theoretic setting.[2] In this case, equilibrium prices do not necessarily reflect expected value enhancing activities of owner managers (see also Gorton and He [2006]). If they would reflect the future effort of a CEO in a perfectly liquid market, this CEO could profit from the price increase right away by selling her stocks even before carrying out the value increasing activity and bearing the effort costs associated with this. Obviously, this cannot be a rational equilibrium. However, there exist rational equilibria with CEO ownership in which stock prices do not fully reflect future CEO effort, i.e., in which stocks should earn positive abnormal returns. In this sense, managerial ownership and abnormal returns are jointly and endogenously determined.

Irrespective of whether the market is inefficient in the sense of being unaware of the value increasing effect of a CEO with high managerial ownership, or whether abnormal returns are a compensation for managerial effort in a rational equilibrium, one necessary assumption has to hold: CEOs have to have some influence on firm policies and eventually performance. Consequently, we expect abnormal returns to be higher among firms with high managerial ownership and in which managerial discretion is high. We do indeed find that the difference between returns of firms with and without managerial ownership is mainly driven by firms in which managerial discretion is high: abnormal returns of owner-CEO firms are most pronounced for firms from industries that have been shown, e.g., in Wasserman,

Nohria and Anand [2001], to be characterized by high managerial latitude of action, and in young firms, high-growth firms, and firms in which CEO tenure is high.

The structure of this paper is as follows. In Section II. we introduce the data and detail our methodology. Section 3 presents our main results, while Section 4 contains a discussion of these results. Section 5 explores the role of managerial discretion, and Section 6 concludes.

II. Empirical Study

A. Data

Our primary data sources are the Center of Security Prices (CRSP) monthly stocks database,[3] the Compustat database, and the Standard and Poor's Execucomp Database. Security prices and stock returns are taken from CRSP and accounting data are from Compustat. Additionally, we use the Execucomp data to gather information on shareholdings of the highest paid executives in each firm.[4]

Execucomp provides information on the highest paid officers for each firm that has been in the S&P 1500 index since the end of 1994. For S&P 500 firms, the history goes back to 1992. Execucomp backfills data of firms that enter the S&P 1500 index for the first time. As a result, using the entire Execucomp database would create a survivorship bias. To avoid this problem, we limit ourselves to those firms that were members of the historical constituency lists of the S&P 500 and the S&P 1500 for the end of each year as taken from Compustat. Compustat provides the constituency lists for the S&P 1500 index for the end of each year starting in 1994. Our data ends in 2003. We also employ subsamples where we only examine S&P 500 firms. In these cases we can use all firms that were members of the S&P 500 at the end of the years 1992 to 2003.

Matching the Execucomp data with the CRSP and the Compustat universe gives us ownership information for 15,600 firm years (97.5 percent of the theoretically maximum

firm years – the remaining firm years are missing due to matching problems)[5] from a total of 2,405 different firms.

The relevant data item in the Execucomp database is *Shrownpc*, which gives the percentage of the firm's shares owned by an officer.[6] Table 1 describes the distribution of the fraction of the company's shares owned by the largest shareholder among the officers covered by Execucomp.

+ + + Please insert TABLE 1 about here + + +

Approximately one out of five S&P 500 firms have an officer who owns a positive amount of shares (Panel A). The fraction of S&P 500 firms that have a CEO who owns more than 5 percent of the firm's outstanding shares ranges from a low of 7 percent in 1992 to nearly 10 percent in 1999. There are substantially more owner CEOs within the S&P 1500 firm universe (Panel B). Approximately every second firm has a CEO who is invested in the firm, and well above 10 percent of firms have a CEO who owns more than 5 percent of the firm in each sample year. There are only a few CEOs that own more than 50 percent of a S&P 1500 firm, and there is only one instance in which a manager owns more than 50 percent of a S&P 500 firm.

B.   Construction of Portfolios

We construct portfolios based on ownership data in order to test whether or not these portfolios would have earned abnormal returns. Portfolios are constructed based on publicly available information about managerial ownership and are reset at the beginning of each year. For each year t, our initial full universe to choose firms from is the constituency list of the S&P 1500 (or S&P 500) at the end of year $t - 2$. For example, a firm qualifies to be in a portfolio in the year 1994 if it was a member of the S&P 500 index at the end of

1992. Firms that were members of the S&P 500 at the end of 1992 filed their ownership data during 1993. We only start to invest at the beginning of 1994. This ensures that the ownership information for the universe of investable firms is public information. Thus, all portfolios are constructed using public information only. This ensures that our results are not driven by announcement effects.

Using the methodology described above, we construct value-weighted portfolios consisting of firms in which the manager with the highest ownership owns more than a specific cutoff fraction of the company's stocks. We use 5 percent, 7.5 percent, 10 percent, 12.5 percent, and 15 percent of managerial ownership as alternative cutoffs to define our test portfolios.

C.   Factor Model

In estimating abnormal returns, we use the Carhart [1997] four factor model to adjust for the influence of the systematic risk factors of Fama and French [1993] and Jegadeesh and Titman [1993]:

$$
\begin{aligned}
R_{i,t} - R_{b,t} \;=\; & \alpha_i + \beta_{i,M} \cdot (R_{M,t} - R_{F,t}) + \beta_{i,SMB} \cdot SMB_t \\
& + \beta_{i,HML} \cdot HML_t + \beta_{i,WML} \cdot WML_t + \varepsilon_{i,t},
\end{aligned}
$$

(1)

where the dependent variable is the excess return of portfolio i in month t, $R_{i,t}$, over the return of some benchmark in the same month, $R_{b,t}$. In our basic tests we will use the risk-free asset as benchmark, i.e., $R_{b,t} = R_{F,t}$. $R_{M,t} - R_{F,t}$ denotes the excess return of the market portfolio over the risk-free rate. SMB is the return difference between small and large capitalization stocks. HML is the return difference between high and low book-to-market stocks. WML is the return difference between stocks with high past returns and stocks with low past returns.[7]

The market portfolio and the SMB, HML, and WML factors are based on the entire CRSP universe of stocks. We first want to make sure that Model (1) captures the relevant risk factors for our universe of investable stocks, which consists of all S&P 500 and S&P 1500 stocks, respectively. Therefore, we analyze whether it correctly prices portfolios containing all of these stocks. If the model is correctly specified, the intercept α_i in (1) should not be statistically significant different from zero.

The S&P 1500 stock returns start at the beginning of year 1996. In contrast, the S&P 500 stock returns are reported for the time period starting at the beginning of 1994. Both end in December 2005, because the last ownership information we have available is from the end of 2003. Our last one-year investment based on this information starts at the beginning of 2005. The asymmetric treatment of S&P 500 firms and S&P 1500 firms is due to data availability (see Section A.) and is maintained throughout the paper. Estimation results for portfolios consisting of all S&P 500 and S&P 1500 stocks, respectively, are presented in Table 2.

+ + + Please insert TABLE 2 about here + + +

They show that regressing value-weighted portfolio returns on the four factors yields no abnormal returns if our entire firm universe is used. This suggests that Model (1) generally captures all relevant and priced factors for our universe and it can be used to analyze portfolios consisting of stocks that belong to this universe.

III. Managerial Ownership and Stock Market Performance

To test for the relationship between the percentage share of stocks owned by the manager and stock market performance, we examine portfolios that only include firms in which the percentage of firms held by officers exceeds a certain threshold. We then explore the

7

robustness of our results by employing different methodological approaches, by looking at alternative samples, and by conducting a multivariate examination.

A. Portfolio Evidence

Table 3 reports the estimation results using portfolios with various cutoffs for managerial ownership.

$+++$ Please insert TABLE 3 about here $+++$

In Panel A, the results for value-weighted portfolios of S&P 1500 firms for various cutoffs of managerial ownership over the period 1996 to 2005 are presented. For a cutoff of 5 percent, we find a positive estimate for α_i that is statistically significant at the 5 percent level. We find economically significant abnormal monthly returns of 0.68 percent, which translates into an annual abnormal return of 8.52 percent. This result is even stronger if we examine portfolios with higher cutoffs for managerial ownership. It increases to abnormal returns of 12.1 percent p.a. for a cutoff of 10 percent and to over 16 percent for a cutoff of 15 percent.[8] For these higher cutoffs, abnormal returns are statistically significant at the 1 percent level.

These results carry over to the S&P 500 firm universe, where we can examine the longer period from 1994 to 2005 (Panel B). In this case, we find abnormal returns of 9.73 percent p.a. for the 5 percent cutoff and abnormal returns of 13.2 percent p.a. for the 10 percent cutoff. With the exception of the 15 percent cutoff, the effect is always stronger than for the S&P 1500 firms in Panel A.

Overall, these results are highly significant in economic as well as statistical terms. They suggest that one would have earned abnormal returns of well above 10 percent p.a. by investing in firms with high managerial ownership solely based on public information.

8

B. Robustness Checks

We employ several robustness checks to test the stability of our results. The empirical results for all of these robustness checks can be found in Table 4.

+ + + Please insert TABLE 4 about here + + +

B.1. Difference Portfolios

Instead of looking at long-only portfolios, we now examine a strategy of going long in managerial ownership portfolios and at the same time short in non-managerial ownership portfolios. Thus, we re-estimate Model (1), where we set $R_{b,t}$ equal to the return of a value-weighted non-managerial ownership portfolio. Although the results for the long-only strategy presented above are already significant, we examine difference portfolios because this is a standard approach in empirical asset pricing, allowing us to test the stability of our results and to relate them to comparable studies also using long-short portfolios. Results are presented in Panel A of Table 4.

They confirm our results for the long-only portfolios. Going long in the 5 percent cutoff (10 percent cutoff) portfolio and short in the non-managerial ownership portfolio delivers abnormal annual returns of 7.81 percent (11.31 percent) that are statistically significant at the 5 percent (1 percent) level. The extent of the abnormal returns is very similar to that of the long-only strategies. This shows that investors who are not allowed to short-sell could also fully profit from the abnormal returns of managerial ownership firms in the past.

9

B.2. Industry Adjusted Returns

It is possible that the abnormal returns we document are not caused by managerial ownership but rather by an unequal industry distribution of firms with high managerial ownership and firms with low managerial ownership. As managerial ownership indeed is not equally distributed across all industries, adjusting firm returns by industry returns will capture some of the positive effect of managerial ownership on stock returns. However, we still expect positive albeit smaller abnormal returns for our managerial ownership portfolios even after industry adjustment, because not all firms in the respective industries will be characterized by high CEO ownership. Results for the industry-adjusted portfolios based on Fama-French industry classifications are presented in Panel B of Table 4.[9] For 5 percent and 10 percent managerial ownership portfolios we still find statistically significant abnormal returns of 7.9 percent p.a. and 11.5 percent p.a., respectively. This supports the idea that industries capture some of the managerial ownership effect on returns. However, even after taking this effect into account, we can still document significant abnormal returns.

B.3. Temporal Stability

Our sample period contains the years of the technology bubble. To examine whether our results are driven by the building up of the bubble or its bursting, we split our sample in two parts. The first part contains observations from 1996 to February 2000, the month in which the markets peaked, and the second part contains observations from March 2000 till the end of 2004.[10] Results are presented in Panel C. They show that our results are not driven by a specific time period like the building up or the bursting of the high-tech bubble.[11]

B.4. Alternative Sample

While merging our different data sources, some firms could not be matched (see Section A.). Although the number of non-matched firms is very small, this could still create some kind

of selection bias. To control for this, we alternatively use data from Dlugosz, Fahlenbrach, Gompers and Metrick [2006] (DFGM).[12] They provide ownership information on 7,873 firm years over the time period from 1996 to 2001. Their database is drawn from the universe of firms covered by publications of the Investor Responsibility Research Center (IRRC). DFGM provide information on all blockholders, i.e., large shareholders of firms that own more than 5 percent. Apart from the name and the shareholdings, DFGM also characterize the blockholders as officers, if they were officers of the corresponding firms in the respective year. We also use the information of ownership and whether or not the blockholder is also an officer of the firm. We construct portfolios similar to the procedure employed above.[13] Since the DFGM data covers a substantially shorter sample period, we consider two different time periods. The first short time period is 1996 to 2001, which is also used by DFGM. As findings based on such a short time period might not be reliable, we also analyze the longer time period from 1996 to 2004. To do so, we simply assume that ownership levels stay constant from 2001 to 2004.

Panel D of Table 4 shows results based on this alternative sample. They are similar to the ones presented above using our sample. For example, the 10 percent cutoff portfolio now generates abnormal returns of 15.17 percent p.a. for the period from 1997 to 2005. This number is even higher at 23.70 percent p.a. for the 1997 to 2002 period. Although statistically significant at the 1 percent level, this very large number has to be treated with some caution as it is based on a very short investment horizon. Nevertheless, these results suggest that the abnormal returns documented before are not due to data problems and carry over to other data sources.

B.5. Equal-Weighted Returns

Our results presented so far are based on value-weighted portfolios. Thus, it is possible that they are driven by a small number of large firms. To examine this possibility, we also investigate the returns of equal-weighted managerial ownership portfolios. Results are presented

11

in Panel E. We find similar, albeit somewhat weaker, effects than for value-weighted portfolios. The abnormal returns we document are still economically and statistically significant. Consequently, the abnormal returns of high managerial ownership portfolios shown above are not solely driven by a few firms with a very high market capitalization.

B.6.   No Rebalancing

Our results are based on a strategy that requires annual rebalancing of the portfolio. Naturally, this causes some trading costs. However, S&P 1500 stocks are usually quite liquid (and S&P 500 stocks even more so). This suggests that the profits documented above do not vanish when taking trading costs into account. Nevertheless, as an alternative approach, we also examine the returns of a completely passive buy and hold strategy. We consider a portfolio that buys into all 1996 firms with an owner manager who owns more than 10 percent without any additional readjustments in the following years. The monthly (annual) abnormal return of this portfolio amounts to approximately 0.91 percent (11.44 percent) and 0.44 percent (5.35 percent). Significance drops to the 5 percent level (Panel F). Similar results are obtained for the 5 percent cutoff for managerial ownership. This shows that even a simple low-cost buy and hold strategy based on managerial ownership in 1996 would have earned abnormal returns that are significant in statistical as well as in economic terms.

B.7.   Treatment of Missing Returns

Shumway [1997] argues that some asset pricing anomalies could be caused by problems due to missing returns for some months and firms in the CRSP database. Firms with missing returns are usually excluded when constructing portfolios. To check whether the abnormal returns we find are due to these exclusions, we replace every missing return with -1 and include the respective stock in our portfolio if it qualifies. Results using this extreme assumption to calculate portfolio returns are presented in Panel G of Table 4. They show

12

that the critique of Shumway [1997] does not apply in our case. Our results are not driven by the influence of missing return observations.

B.8. Constant Portfolio Size

The incentives of a manager to work hard and increase a firm's value are primarily determined by the absolute value of her shareholdings.[14] This is the reason why we mainly focus on portfolios in which thresholds of shareholdings are used as the most important selection criterium. Nevertheless, some objections may be raised about using specific thresholds since this creates portfolios that differ over time with respect to the number of firms included. To counter these objections, we also construct portfolios using the rank of firms with respect to the shareholdings of the officer with the highest managerial ownership. Panel H in Table 4 shows that these portfolios also produce similar abnormal returns to the ones using percentage shareholdings as cutoff. However, the statistical significance is slightly reduced to the 5 percent level. With abnormal returns of 12.0 percent p.a. and 8.8 percent p.a. for the rank 1–100 and rank 1–250 portfolios, respectively, these results are still highly economically significant.

C. Multivariate Analysis

Brennan, Chordia and Subrahmanyam [1998] report several individual firm characteristics that can drive returns and are not captured by the four factor model employed above. In order to explore whether such firm characteristics might drive returns of firms with high managerial ownership and thus explain our results, we also run multivariate Fama and MacBeth [1973] regressions. In these regressions we relate monthly raw and industry-adjusted returns of firms to managerial ownership and further firm-specific characteristics.

We estimate the following regression separately for each month in our sample of S&P 1500 firms:

$$(2) \qquad R_{i,t} \;=\; \alpha_i + \beta_{i,1} \cdot Shrown + \beta_{i,2} \cdot D(10) + \beta_{i,3} \cdot F_{i,t} + \varepsilon_{i,t},$$

where $R_{i,t}$ denotes the return (raw or industry adjusted) of firm i in month t, $Shrown$ is the maximum share of the company's stock owned by an officer, $D(10)$ is a dummy variable that takes on the value 1, if $Shrown$ is larger than 10 percent, and $F_{i,t}$ is a vector of firm characteristics. It includes the firm characteristics examined in Brennan et al. [1998], and additionally the Gompers, Ishii and Metrick [2003] G-index, five-year sales growth, and S&P 500 inclusion.[15] Final parameter values are given by the mean and statistical significance of the time series statistics of these monthly estimates. Table 5 summarizes the results.

+ + + Please insert TABLE 5 about here + + +

Panel A presents results for raw returns. Column (1) gives the results of an estimation where we do not include the dummy variable $D(10)$. The influence of managerial ownership is positive, but not statistically significant. This may be due to the large number of firms where the officer with the highest managerial ownership only owns a very small fraction of the company's stocks (see Table 1). In these instances, incentives to engage in value-enhancing efforts might be too small. Including the dummy variable delivers more meaningful results; its influence is large in economic terms. The point estimate of 0.65 (together with the estimate of -0.02 for the linear influence of $Shrownpc$) indicates that firms where one officer owns at least 10 percent of the company's shares deliver annual abnormal returns of 5.5 percent. The influence of the 10 percent dummy is significant at the 5 percent level. The last two columns summarize results using industry adjusted returns as dependent variables. Consistent with the results from the portfolio approach, abnormal returns

14

are slightly lower now, as indicated by the point estimate of 0.6 for the influence of the 10 percent dummy. They are still statistically significant at the 5 percent level. Overall, these results show that firms with a manager who owns a large fraction of the company's stocks outperform other firms even after controlling for the influence of other firm characteristics. This confirms our results from the portfolio strategies.

IV.   Discussion of Results and Potential Explanations

Based on our empirical findings, we will now discuss several potential explanations for the reported abnormal stock returns.

A.   Liquidity and Liquidity Risk

Liquidity and liquidity risk are important factors determining asset prices. Amihud and Mendelson [1986a] show theoretically, that illiquid stocks should deliver higher returns. There is broad empirical evidence supporting this prediction (see, e.g., Amihud and Mendelson [1986b], Brennan and Subrahmanyam [1996], and Brennan et al. [1998]). Moreover, as shown by Pástor and Stambaugh [2003], not only the level of liquidity but also systematic liquidity risk is priced. While the size factor captures most of the effect of the level of liquidity on asset prices, it is likely that the four-factor model used in this paper does not fully capture the influence of liquidity risk. However, Pástor and Stambaugh [2003] report that liquidity risk is more important for smaller firms. Thus, if the abnormal returns documented above would be a remuneration for low levels of liquidity or for liquidity risk, we would expect that abnormal returns are more pronounced for the smaller firms in our samples. However, the abnormal returns we find in the portfolio analysis are usually more pronounced for S&P 500 firms than for S&P 1500 firms. This suggests that the abnormal returns are not (only) caused by illiquidity or liquidity risk, because the stocks in the S&P 1500 are clearly smaller than those

15

in the S&P 500.[16] Furthermore, in our multivariate analysis we control for firm size and trading volume which can be interpreted as proxies for liquidity. While it would be preferable to add more elaborate proxies for liquidity and liquidity risk as control variables in our multivariate examinations, lack of data availability refrains us from doing so. However, the level of the abnormal returns we document seems to be too high to be explained by a renumeration for liquidity or liquidity risk, especially in the case of S&P 500 stocks, which are generally assumed to be some of the most liquid stocks available.

B.   Limits to Arbitrage

It is possible that market participants are aware of the abnormal returns we document but cannot profit from this anomaly due to limits of arbitrage (Shleifer and Vishny [1997]). In that case, the anomaly can persist although market participants are aware of its existence. However, this is not likely to explain our findings, as it is not even necessary to short sell stocks in order to profit from the abnormal returns offered by firms with high managerial ownership (see Section B.1.).

C.   Systematic Risk Factors

Traditional asset pricing theory argues that abnormal returns must be a compensation for bearing some additional risk. While we control for the standard systematic risk factors identified in the empirical literature, there might be some additional risk of investing in firms with high CEO ownership. By definition, the fate of a firm in which the CEO matters a lot depends on the personality of the CEO. There is some risk related to this, e.g., in the case of a sudden CEO death. However, to the extent that such events like CEO deaths are probably not strongly correlated across firms, this risk is idiosyncratic. Since our

16

portfolios are large (depending on the thresholds, more than 100 or 200 firms), idiosyncratic risk is not crucial and only systematic risk factors should matter. Of course, it is still possible that other systematic risk factors drive our results. To offer an explanation for the abnormal returns we document, such factors would have to be highly correlated with the very characteristics firms with high CEO ownership have (and that we do not control for yet). While this is, of course, possible, we are not aware of a likely candidate for such a factor.

D.   Market Inefficiency

The abnormal returns may be a sign of a market inefficiency. Market participants might not be aware of the positive effect of managerial ownership on stock returns. Our results are based on a long term investment strategy. This would imply that the market is not only inefficient in the short run, but also that the market does not learn from the mistakes it once made. We do not know any prior studies that investigate returns of firms with high managerial ownership. Thus, investors might indeed not be aware of this effect. Given that information on managerial ownership was easily available to investors during our sample period and the abnormal returns we document are quite substantial, this is surprising.

E.   Compensation for Effort

It is also possible that the abnormal returns are a remuneration for effort costs of CEOs. Blonski and von Lilienfeld-Toal (2006) and von Lilienfeld-Toal (2006) depart from the traditional Walrasian equilibrium concept employed in earlier studies, e.g., Admati et al. [1994] and DeMarzo and Urosevic [2006]. They discuss the implications of a large and value increasing shareholder for asset pricing. The novel idea in these papers is that the existence of a value increasing CEO who is at the same time a large shareholder is not fully priced in

17

equilibrium. The basic intuition driving this effect is as follows: by exerting value increasing effort, the owner manager produces a kind of public good for all other investors in this firm. While all outside investors profit from the value increasing activity the owner manager may undertake, it is the owner manager alone who has to bear the (private) effort costs. Moreover, owner managers typically bear additional private costs due to holding an undiversified portfolio. As a result, the owner manager has strong incentives to sell shares whenever the share price anticipates the equilibrium level of her value increasing effort. In this case, selling the shares would be optimal for the manager: she can benefit from the increased stock price—which would then already reflect her future value-increasing effort—without having to bear the costs of exerting this effort. Clearly, this situation cannot be an equilibrium.

In contrast, it may constitute a Nash equilibrium if shares trade below the expected equilibrium value (see, e.g., von Lilienfeld-Toal (2006)). In this equilibrium, outside investors fear to bid up the share price to its expected equilibrium value because bidding up the price will trigger the owner manager to sell her shares.[17] Consequently, it may be in the interest of investors not to bid up the share price but to trade below this value. Long run positive abnormal returns are the natural consequence. This line of reasoning hinges on three main assumptions:

1. Non-atomistic stock market

    In order for underpricing equilibria to exist, not all investors in the stock market can be atomistic price takers (see, e.g., Gorton and He [2006] and von Lilienfeld-Toal (2006)). Stock market participants are assumed to be price takers in traditional asset pricing models. This assumption might be questionable in modern stock markets. In recent years there is an increasing trend towards institutional stock ownership. Sias and Starks [1998] report that institutional ownership in U.S. equities rose from 24.2 percent in 1980 to nearly 50 percent in 1994. More recent numbers provided by the Conference Board suggest that by the end of 2005 nearly 70 percent of the 1,000 largest U.S. companies were held by institutions.[18] Many of those hold significant shares of

the companies they invest in. Consequently, it seems plausible that not all investors are price takers. While the market microstructure literature has long recognized that not all market participants are price takers (see, e.g., Kyle [1985]), this idea is relatively novel to the asset pricing literature. Given that the share of institutional investors is higher in S&P 500 firms than in S&P 1500 firms, our finding of stronger abnormal returns of firms with high managerial ownership among the first is in line with this argument.

2. Rational equilibrium behavior

The empirical prediction of the argument is that firms with a value increasing large shareholder will be characterized by abnormal returns in a *rational equilibrium*, because her existence cannot be fully priced. Institutional investors are viewed as more rational than retail investors (see, e.g., Boehmer and Kelley [2005]). Given that institutional investors mainly invest in large, liquid stocks like the ones we examine, it is likely that participants in these markets are rational. However, demands on investors' rationality are very high for this equilibrium to emerge: investors have to be aware of their actions and the consequences of their potential selling to an owner CEO in a relatively complex strategic setting. Thus, the requirements with respect to the rationality of market participants might be too demanding and not fulfilled in existing stock markets.

3. Value increasing large shareholder

Most importantly, it is assumed that owner managers can increase the value of their firm. While there was some debate in the management science literature whether CEOs can actually influence the policies and performance of their firms (see, e.g., Hannan and Freeman [1989] and Finkelstein and Hambrick [1996]) for several years, this view is now widely accepted in the more recent economics and finance literatures (see, e.g., Bertrand and Schoar [2003]). Hence, interpreting CEOs as *value increasing* large shareholders is in line with findings of previous empirical studies.

If the abnormal returns we find are really due to value increasing CEOs, we should find a stronger effect in such firms where CEOs have more discretionary power to influence firm policies and eventually firm performance. The effect should be stronger irrespective of whether it is explained by market inefficiency or by compensation for effort in a rational equilibrium. We will now take a closer look at this issue.

V.   The Role of Managerial Discretion

It is likely that managerial discretion varies across industries and across firms depending on firm characteristics. The literature provides some guidance where to expect larger CEO effects. Several studies try to identify specific industries in which CEOs seem to matter most for firm value and operational performance (see, e.g., Hambrick and Abrahamson [1995] and Wasserman et al. [2001]). We expect managerial ownership portfolios to outperform most in these industries. Johnson, Magee, Nagarajan and Newman [1985] find that executives are relatively more important in firms with strong past sales growth, while Bennedsen, Pérez-González and Wolfenzon [2007] find a positive impact of a CEO's tenure on her power within the firm. Finally, it is also reasonable to assume that CEOs have more discretion in younger firms than in very old firms with long-standing and eventually rigid organizational cultures. Consequently, we expect greater outperformance also among firms with strong past sales growth, firms with high CEO tenure, and among younger firms. Table 6 shows the abnormal returns of managerial ownership portfolios consisting of firms in which we expect high CEO discretion.

+ + + Please insert TABLE 6 about here + + +

For easy comparison, in the first line the abnormal returns for managerial ownership portfolios from the whole sample are repeated. In the second and third line, managerial

20

ownership portfolios are constructed from a sample of firms that belong to industries in which CEOs matter most for Tobin's Q and for returns on assets (ROA), respectively. Wasserman et al. [2001] rank two-digit SIC industries according to the impact of the CEO on these measures. We concentrate on firms that belong to industries with an above-median value for the impact of the CEO according to their numbers. Monthly abnormal returns are 1.43 percent (1.62 percent) for managerial ownership above 5 percent (10 percent) in the case of high CEO impact on the firm's Tobin's Q, and 1.28 percent (1.46 percent) for managerial ownership above 5 percent (10 percent) in the case of high CEO impact on the firm's ROA. The last three lines contain results for portfolios drawn from firms with above median sales growth in the past five years, above median CEO tenure, and below median firm age, respectively.[19] Monthly abnormal returns for the 5 percent cutoff (10 percent cutoff) of managerial ownership for these firms are 0.82 percent, 1.04 percent, and 1.02 percent (1.10 percent, 1.26 percent, and 1.32 percent), respectively. All of these abnormal returns are larger than those for managerial ownership portfolios based on the whole sample. This supports the idea that managerial ownership is more important for abnormal returns in firms where CEOs matter more than in firms where CEOs have little managerial discretion.

It is possible that our results are driven by abnormal returns of firms with these very characteristics or from the very industries for which CEOs seem to matter most. As argued above, these characteristics possibly reflect a systematic risk factor that we do not control for yet. This could be the case if managerial ownership would be particularly high for such firms in which CEOs matter most, which is not unlikely: CEOs are probably more keen to invest in their firms if they think they can increase firm value. To examine this possibility, we also compute the abnormal returns of firms where we believe CEOs to have a large impact, but where we do *not* observe managerial ownership of CEOs at the same time. These results are presented in the last column of Table 6. In all cases, we find no abnormal returns of these portfolios. This shows that the power of CEOs to impact firm value leads to abnormal returns only in combination with managerial ownership. This also suggests that it

is unlikely that our results are driven by an additional systematic risk factor, as that factor would then have to be unrelated to the characteristics of firms with high CEO discretion.

Overall, the above discussion shows that the abnormal returns we document are most likely due to one of two remaining potential explanations: they are either a sign of market inefficiencies, or they are explained by recent theories where abnormal returns emerge in equilibrium as a compensation for managerial effort. While the latter explanation is assuming a possibly unrealistically high level of investor rationality, the first explanation assumes quite limited rationality in the sense that investors do not learn about profitable trading opportunities. At this stage, we are not able to decide which view about investor rationality is more appropriate and which explanation eventually is most likely to explain our findings.

VI. Conclusion

We examine the abnormal returns of portfolios constructed based on public information about managerial ownership. We find that value-weighted portfolios consisting of S&P 500 stocks in which the CEO holds more than 5 percent or 10 percent of the firm's outstanding shares generate statistically and economically significant abnormal returns of 9.7 percent p.a. and 13.2 percent p.a., respectively. For S&P 1500 firms the effect is only slightly smaller, with abnormal returns of 8.5 percent p.a. and 12.1 percent p.a. for a 5 percent and 10 percent cutoff of managerial ownership, respectively.

These abnormal returns are achieved after controlling for factors known to drive asset returns like size, book-to-market, and momentum. Our results are robust and also hold after controlling for further firm-specific characteristics in a multivariate setting. The outperformance is most pronounced for firms with high CEO discretion.

On the one hand, these findings provide a rationale for the puzzling observation that CEOs often hold a large fraction of their own firms despite the costs of the underdiver-

sification of their personal portfolios this often implies: they are compensated for this by abnormal positive returns earned on their investments.

On the other hand, the results presented in this study give rise to a new puzzle. Namely, why are abnormal returns of firms with high CEO ownership persistent? We discuss several possible explanations for this. Potentially, they are driven by an additional systematic risk factor that we do not control for. However, given that we find no abnormal returns in firms with the very characteristics of firms with high managerial ownership that have no owner CEO, and given that CEO individual risk is idiosyncratic, this explanation seems to be less likely. Rather, the abnormal returns might either be an indication that markets are not fully informationally efficient, or they might emerge as compensation for managerial effort in a rational equilibrium (von Lilienfeld-Toal [2006] and Blonski and von Lilienfeld-Toal (2006)). Depending on whether we assume investors to be very rational in a strategic sense, or whether we assume them to be of limited rationality in the sense of being unable to correctly interpret publicly available information, one or the other explanation seems to be more likely. Other potential explanations for abnormal returns of owner CEO firms, like limits to arbitrage or liquidity concerns, appear to be less likely.

References

Admati, Anat R., Paul Pfleiderer, and Josef Zechner, "Large Shareholder Activism, Risk Sharing, and Financial Market Equilibrium," *Journal of Political Economy*, 1994, *102*, 1097–1130.

Amihud, Yakov and Haim Mendelson, "Asset Pricing and the Bid-Ask Spread," *Journal of Financial Economics*, 1986, *17*, 223–249.

— **and** — , "Liquidity and Stock Returns," *Financial Analysts Journal*, 1986, *42* (May-June), 43–48.

Bennedsen, Morten, Francisco Pérez-González, and Daniel Wolfenzon, "Do CEOs Matter?," 2007. Working Paper.

Bertrand, Marianne and Antoinette Schoar, "Managing with Style: The Effects of Managers on Firm Policies," *Quarterly Journal of Economics*, 2003, *118*, 1169–1208.

Boehmer, Ekkehart and Eric Kelley, "Institutional Investors and the Informational Efficiency of Prices," 2005. Working Paper.

Brennan, Michael J. and A. Subrahmanyam, "Market Microstructure and Asset Pricing: On the Compensation for Illiquidity in Stock Returns," *Journal of Financial Economics*, 1996, *41*, 441–464.

— , **Tarun Chordia, and Avanidhar Subrahmanyam**, "Alternative Factor Specifications, Security Characteristics, and the Cross Section of Expected Stock Returns," *Journal of Financial Economics*, 1998, *49*, 345–375.

Carhart, M. M., "On Persistence in Mutual Fund Performance," *Journal of Finance*, 1997, *52*, 57–82.

DeMarzo, Peter and Branko Urosevic, "Optimal Trading and Asset Pricing with a Large Shareholder," *Journal of Political Economy*, 2006, *forthcoming.*

Dlugosz, Jenniger, Rüdiger Fahlenbrach, Paul Gompers, and Andrew Metrick, "Large Blocks of Stock: Prevalence, Size, and Measurement," *Journal of Corporate Finance*, 2006, *12*, 594–618.

Fama, Eugene F. and James MacBeth, "Risk, Return, and Equilibrium: Empirical Tests," *Journal of Political Economy*, 1973, *81*, 607–636.

— **and Kenneth R. French**, "Common Risk Factors in the Return on Bonds and Stocks," *Journal of Financial Economics*, 1993, *33*, 3–53.

Field, Laura C. and Jonathan Karpoff, "Takeover Defenses of IPO Firms," *Journal of Finance*, 2002, *57*, 1857–1889.

Finkelstein, Sydney and Donald C. Hambrick, *Strategic Leadership: Top Executives and Their Effects on Organizations*, St Paul: South Western College Publishing, 1996.

Gompers, Paul, Joy Ishii, and Andrew Metrick, "Corporate Governance and Equity Prices," *Quarterly Journal of Economics*, 2003, *118*, 107–155.

Gorton, Gary and Ping He, "Agency-Based Asset Pricing," 2006. NBER Working Paper.

Grossman, Sanford and Oliver Hart, "Takeover Bids, the Free Rider Problem, and the Theory of the Corporation," *Bell Journal of Economics*, 1980, *11*, 42–69.

Hambrick, Donald C. and Eric Abrahamson, "Assessing Managerial Discretion Across Industries: A Multimethod Approach," *Academy of Management Journal*, 1995, *38*, 1427–1441.

Hannan, Michael T. and John Freeman, *Organizational Ecology*, Cambridge: Harvard University Press, 1989.

Hermalin, Benjamin E. and Michael S. Weisbach, "The Effect of Board Composition and Direct Incentives for Firm Performance," *Financial Management*, 1991, *20*, 101–112.

Jegadeesh, Narasimhan and Sheridan Titman, "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency," *Journal of Finance*, 1993, *48*, 65–91.

Jensen, Michael C., "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers," *American Economic Review*, 1986, *76*, 323–329.

— **and William Meckling**, "Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure," *Journal of Financial Economics*, 1976, *3*, 305–360.

Johnson, W. Bruce, Robert P. Magee, Nandu J. Nagarajan, and Harry A. Newman, "An Analysis of the Stock Price Reaction to Sudden Executive Deaths: Implications for the Managerial Labor Market," *Journal of Accounting and Economics*, 1985, *7*, 151–174.

Kahl, Matthias, Jun Liu, and Francis A. Longstaff, "Paper Millionaires: How Valuable Is Stock to a Stockholder Who Is Restricted from Selling It?," *Journal of Financial Economics*, 2003, *67*, 385–410.

Kyle, Albert S., "Continuous Auctions and Insider Trading," *Econometrica*, 1985, *53*, 1315–1335.

Lakonishok, Josef and Immoo Lee, "Are Insider Trades Informative?," *Review of Financial Studies*, 2001, *14*, 79–111.

Lambert, Richard A., David F. Larcker, and Robert E. Verrecchia, "Portfolio Considerations in Valuing Executive Compensation," *Journal of Accounting Research*, 1991, *29*, 129–149.

Laughran, Tim and Jay R. Ritter, "Why Has IPO Underpricing Changed Over Time?," *Financial Management*, 2004, *33*, 5–37.

Lilienfeld-Toal, Ulf von, "Why Managers Hold Shares of Their Firms: Theory," 2006. Working Paper.

Lin, Ji-Chai and John S. Howe, "Insider Trading in the OTC Market," *Journal of Finance*, 1990, *45*, 1273–1284.

Malmendier, Ulrike and Geoffrey Tate, "CEO Overconfidence and Corporate Investment," *Journal of Finance*, 2005, *60*, 2661–2700.

McConnell, John J. and Henri Servaes, "Additional Evidence on Equity Ownership and Corporate Value," *Journal of Financial Economics*, 1990, *27*, 595–612.

Morck, Randall, Andrei Shleifer, and Robert Vishny, "Alternative Mechanisms for Corporate Control," *American Economic Review*, 1988, *79*, 842–852.

Pástor, Lubos and Robert F. Stambaugh, "Liquidity Risk and Expected Stock Returns," *Journal of Political Economy*, 2003, *111*, 642–685.

Shleifer, Andrei and Robert Vishny, "The Limits of Arbitrage," *Journal of Finance*, 1997, *52*, 35–55.

Shumway, Tyler, "The Delisting Bias in CRSP Data," *Journal of Finance*, 1997, *52*, 327–340.

Sias, R. and Laura T. Starks, "Institutional Investors in Equity Markets," 1998. Working Paper.

Wasserman, Noam, Nitin Nohria, and Bharat N. Anand, "When Does Leadership Matter? The Contingent Opportunities View of CEO Leadership," 2001. Working Paper.

Notes

[1]There are many studies that examine the impact of CEO ownership on firm value and operational performance (see, e.g., Morck et al. [1988], McConnell and Servaes [1990], and Hermalin and Weisbach [1991]).

[2]Recent figures from the Conference Board show that up to 70 percent of all U.S. equities are now held by institutional investors, suggesting that the U.S. stock market is not atomistic and that not all investors are price takers.

[3]Source: CRSP^{TM}, Center for Research in Security Prices. Graduate School of Business, The University of Chicago. Used with permission. All rights reserved (crsp.uchicago.edu).

[4]This is usually the CEO. In rare cases, the highest paid executive is not the CEO. In order to avoid confusion and complexity of expressions, we use the term owner CEO and owner manager as synonyms for the officer with the highest fraction of firm ownership.

[5]To make sure that our results are not influenced by matching problems, we also employ the dataset described in Dlugosz et al. [2006], which provides ownership information for 7,873 firm years between 1996–2001 from the Investor Responsibility Research Center (IRRC). Our main results using this alternative data source are very similar (see Table 4, Panel D).

[6]Our results are unaffected if we restrict our analysis to non-restricted shares. We construct a measure of ownership of unrestricted shares similar to the *Shrownpc* measure. The results we obtain are very similar in economic as well as statistical terms. However, our measures of the fractions of unrestricted shares is plagued by a data problem, because the reporting dates for unrestricted shares and the reporting dates of outstanding shares do not always conincide. Thus, we decided not to report them. Furthermore, creating portfolios solely based on option ownership does not provide any significant abnormal returns.

[7]The market, the size, and the value portfolio returns were taken from Kenneth French's Web site: `http://mba.tuck.dartmouth.edu/pages/faculty/ken.french`, while the momentum factor was kindly provided by Mark Carhart.

[8]We do not report results for higher cutoffs, as the number of firms that enter our portfolio gets relatively small in these cases. For extremely high cutoffs, e.g., 25 percent or higher, we are not able to find any statistically significant coefficients anymore.

[9]We carry out the industry adjustment by subtracting the industry return from each individual firm return before constructing our portfolios. Technically, the managerial ownership portfolios then consist of the same stocks as before. Additionally, for each firm there is an industry hedge term. It essentially is a short position in a portfolio consisting of all stocks in the same industry as the firm and which is equal in size to the stock's weight in the portfolio. It is sometimes argued that adjusting returns based on the Fama and French [1993] industry classification of firms might lead to misleading results, especially during the U.S. tech bubble. Thus, we use an alternative industry adjustment based on two-digit SIC-codes. Results (not presented) are very similar to those obtained using the Fama and French [1993] industry classification.

[10]Results are very similar if we split our sample period in two subsamples of equal length.

[11]For reasons of direct comparability with our results from the broader S&P 1500 universe, we also compute abnormal returns for managerial ownership portfolios drawn from the S&P 500 universe for the years 1996 to 2004. They are presented in the last row in Panel C and are very consistent with results obtained using the slightly longer 1994 to 2006 time period.

[12]We thank Andrew Metrick for providing this data on his Web page http://finance.wharton.upenn.edu/ metrick/data.htm.

[13]There are some necessary adjustments. The data of DFGM are somewhat differently organized. Each firm of their 1996 sample issues ownership information during the year 1996. As a result, all ownership information of the 1996 firms was public information by the beginning of the year 1997. Consequently, our portfolios invest in firms of the DFGM year t at the beginning of year $t + 1$.

[14]To give a precise measure of the manager's incentives, this number alternatively could also be related to the manager's overall personal wealth. Unfortunately, we do not have information on the manager's personal wealth outside the firm. However, especially for the large shares of managerial ownership of 5 percent or more of the whole company, it is very likely that the investment in her own firm clearly dominates the personal portfolio.

[15]These variables are also used in Gompers et al. [2003]. A detailed description is given in their Appendix 2. Data on the governance index G are taken from Andrew Metrick's Web page http://finance.wharton.upenn.edu/ metrick/data.htm. Gompers et al. [2003] also use institutional ownership as a control variable. We do not have this data item available. However, in Gompers et al. [2003], the influence of institutional ownership is never significant. Thus, we do not expect that this omission influences our results.

[16]We also examine abnormal returns across size quintiles. Results (not supported) show no clear influence of firm size on the extent of abnormal returns generated by managerial ownership portfolios.

[17]Gorton and He [2006] analyze similar issues in private bilateral bargaining situations.

[18]Press release by the Conference Board, Jan 22, 2007.

[19]We use data on firm age from the Field-Ritter dataset (Field and Karpoff [2002] and Laughran and Ritter [2004]), supplemented by firm age as reported in the S&P Public Company Database.

Table 1: CEO Ownership

This table reports the number of firms in which the CEO owns more than a specific cutoff of the firms outstanding stocks. The respective cutoffs for managerial ownership are given in the first column. The number of all firms in our dataset in the respective year are reported in the 'total' rows. Panel A provides information for all S&P 500 sample firms for each year from 1992 to 2003. Panel B provides information for all S&P 1500 sample firms for each year from 1994 to 2003.

Panel A: S&P 500 Index

Year shown	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
total	478	488	488	485	490	490	487	494	489	495	498	499
>0%	96	129	137	109	107	116	121	140	157	159	159	168
>5%	33	39	37	38	37	41	42	47	45	43	37	35
>10%	19	22	23	24	25	28	30	32	30	30	24	19
>15%	11	13	14	15	15	16	18	16	13	14	11	9
>20%	9	8	7	10	9	8	9	8	6	5	5	4
>25%	3	3	2	2	1	2	3	2	3	3	4	3
>30%	1	2	2	1	1	1	2	2	2	3	4	1
>50%	0	0	0	0	0	0	0	0	0	0	1	0

Panel B: S&P 1500 Index

Year shown	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
total			1,468	1,462	1,472	1,452	1,451	1,452	1,463	1,480	1,479	1,455
>0%			798	760	755	748	744	801	856	825	868	864
>5%			295	279	261	254	256	270	261	232	217	195
>10%			187	177	164	159	163	174	165	143	131	117
>15%			114	109	100	101	105	113	102	87	78	69
>20%			77	81	67	64	64	71	68	57	50	43
>25%			49	47	39	41	41	51	46	36	33	27
>30%			26	26	26	27	29	32	25	22	20	18
>50%			3	3	2	2	0	1	2	0	3	3

31

Table 2: Results for All Firms

This table describes estimation results for value-weighted portfolio returns consisting of all S&P 500 and S&P 1500 sample firms, respectively, using the four factor Model (1) as described in the main text. Alphas are on a monthly basis. Standard errors are in parentheses. The number of months used to estimate the model is given in the last column. ***, **, and * indicate significance at the one, five, and ten percent level, respectively.

Portfolio	α	RMRF	SMB	HML	Mom.	Obs.
S&P 1500	0.08	0.928***	−0.071***	0.009	−0.039***	120
	(0.083)	(0.02)	(0.021)	(0.027)	(0.012)	
S&P 500	0.132	0.903***	0.12***	−0.029	−0.048***	144
	(0.085)	(0.022)	(0.023)	(0.029)	(0.013)	

32

Table 3: Managerial Ownership Portfolios

This table describes estimation results of the four factor model Model (1) as described in the main text for value-weighted managerial ownership portfolios. Portfolios are constructed based on the fraction of the firm's outstanding shares owned by the officer with the highest managerial ownership. The cutoff for managerial ownership of the respective portfolio is based on the Execucomp data-item *Shrownpc* and is given in the first column. Stocks are selected from the S&P 1500 and S&P 500 universe, respectively. Alphas are on a monthly basis. Standard errors are in parentheses. The number of months used to estimate the model is given in the last column. ***, **, and * indicate significance at the one, five, and ten percent level, respectively.

Panel A: S&P 1500

Shrown	α	RMRF	SMB	HML	Mom.	Obs.
>5	0.684**	1.112***	−0.136*	−0.396***	−0.043	120
	(0.283)	(0.068)	(0.072)	(0.092)	(0.039)	
>7.5	0.809***	1.118***	−0.188**	−0.47***	−0.05	120
	(0.308)	(0.074)	(0.079)	(0.1)	(0.043)	
>10	0.953***	1.115***	−0.239***	−0.547***	−0.034	120
	(0.339)	(0.081)	(0.087)	(0.11)	(0.047)	
>12.5	1.121***	1.201***	−0.211**	−0.546***	−0.039	120
	(0.385)	(0.093)	(0.099)	(0.125)	(0.054)	
>15	1.261***	1.163***	−0.185*	−0.566***	−0.04	120
	(0.42)	(0.101)	(0.107)	(0.136)	(0.059)	

Panel B: S&P 500

Shrown	α	RMRF	SMB	HML	Mom.	Obs.
>5	0.777**	1.031***	−0.277***	−0.59***	−0.085*	144
	(0.314)	(0.079)	(0.086)	(0.108)	(0.047)	
>7.5	0.893***	1.033***	−0.317***	−0.649***	−0.091*	144
	(0.335)	(0.085)	(0.092)	(0.115)	(0.051)	
>10	1.038***	1.023***	−0.356***	−0.725***	−0.073	144
	(0.362)	(0.091)	(0.1)	(0.124)	(0.055)	
>12.5	1.199***	1.11***	−0.31***	−0.728***	−0.084	144
	(0.41)	(0.104)	(0.113)	(0.141)	(0.062)	
>15	1.038***	1.023***	−0.356***	−0.725***	−0.073	144
	(0.362)	(0.091)	(0.1)	(0.124)	(0.055)	

Table 4: Robustness Checks

This table reports monthly α estimates in % from Model (1) as described in the main text for value-weighted (Panels A to D and Panels F to H) managerial ownership portfolios. We report results for managerial ownership portfolios consisting of S&P 1500 firms with more than 5% and 10% CEO ownership, respectively (except in the last line in Panel C and in Panel D). In Panel A, estimation results for difference portfolios consisting of a long position in the managerial owernship portfolio and a short position in the no managerial ownership portfolio are reported. In Panel B, results for industry adjusted managerial ownership portfolios are presented. Each firm return is adjusted by the return of the Fama-French industry return of the industry this firm belongs to before constructing portfolios. Panel C presents results for an estimation based on subsamples. The first line reports results for a sample period including all months from January 1996 till February 2002 (the peak of the tech bubble). The second line contains results for March 2002 till December 2004. The last line contains results for S&P 500 sample firms for the period January 1996 till December 2004. In Panel D, instead of using our Execucomp data, we use ownership data provided by Dlugosz et al. [2006] (DFGM). We examine managerial ownership portfolios with a cutoff of 5% and 10% managerial ownership, respectively. In addition to the time period 1997 to 2002, for which the alternative data is available, we also examine the period 1997 to 2005, assuming that managerial ownership remains constant from 2002 to 2005. In Panel E, we calculate portfolio returns by equal-weighting individual stock returns of the constituent firms. Panel F presents the results from buy-and-hold strategies, where the portfolio was set up in 1996 and not readjusted. We examine a buy-and-hold strategy with a 5% and with a 10% cutoff for managerial ownership. In Panel G, we present results for the full universe of S&P 1500 firms as well as for managerial ownership portfolios with cutoffs of 5% and 10% managerial ownership where all missing returns are replaced by -1.

In Panel H, portfolios are constructed based on the rank of the managerial ownership of that officer who owns the highest fraction of the firm's outstanding shares. We examine portfolios consisting of the 100 and 250 firms with the highest managerial ownership, respectively. Standard errors are in parentheses. The number of months used to estimate the model is given in the last column. ***, **, and * indicate significance at the one, five, and ten percent level, respectively.

	CEO Ownership		
Panel A: Difference Portfolios	> 5%	> 10%	Obs.
Long-Short Portfolios	0.629**	0.897***	120
	(0.338)	(0.390)	
Panel B: Industry-Adjusted Returns			
Fama-French Industries	0.639*	0.911**	120
	(0.382)	(0.439)	
Panel C: Temporal Stability			
Jan 1996 – Feb 2000 (S&P 1500)	0.660	0.934*	50
	(0.463)	(0.565)	
Mar 2000 – Dec 2004 (S&P 1500)	0.483	0.769*	70
	(0.477)	(0.421)	
Jan 1996 – Dec 2004 (S&P 500)	0.989***	1.238***	120
	(0.365)	(0.417)	
Panel D: Alternative Samples			
DFGM 1997–2005	0.885**	1.184**	108
	(0.389)	(0.478)	
DFGM 1997–2002	1.366**	1.788***	72
	(0.549)	(0.669)	
Panel E: Weighting Scheme			
Equal Weighted Portfolio	0.238	0.381**	120
	(0.159)	(0.166)	
Panel F: No Rebalancing			
Buy-and-Hold Returns	0.712**	0.907**	120
	(0.311)	(0.379)	

Table 4: (continued)

	CEO Ownership		
Panel G: Treatment of Missing Returns	> 5%	> 10%	Obs.
Setting Missing Returns to −100%	0.513* (0.276)	0.901*** (0.342)	120
Panel H: Constant Number of Firms	Rank 1–100	Rank 1–250	Obs.
Ranking Ownership	0.951** (0.414)	0.707** (0.284)	120

Table 5: Multivariate Evidence

This table contains the results of Fama and MacBeth [1973] regressions of Model (2) as described in the main text. The dependent variable is the individual firm's monthly raw return (Columns 1 and 2) and industry adjusted return (Columns 3 and 4), respectively. Independent variables are *Shrown*, the share of stocks owned by the CEO of the firm; $D(10\%)$, a dummy variable that takes on the value one if *Shrown* is larger than 10%, and zero otherwise; and the Gompers et al. [2003] G-Index. The remaining control variables are the same as used by Brennan et al. [1998] and Gompers et al. [2003] and are described in detail in Appendix 2 of the latter paper. Numbers are in percent. Standard errors are in parentheses. ***, **, and * indicate significance at the one, five, and ten percent level, respectively.

Table 5: (continued)

	Raw Returns		Industry-Adjusted Returns	
	(1)	(2)	(3)	(4)
Shrown	0.005	−0.020	0.012	−0.011
	(0.006)	(0.012)	(0.008)	(0.013)
D(10%)		0.647**		0.600**
		(0.267)		(0.294)
G	0.006	0.006	−0.007	−0.006
	(0.018)	(0.018)	(0.028)	(0.028)
NASDUM	1.399	1.456	1.822	0.127
	(1.049)	(1.052)	(1.213)	(0.187)
SP500	0.105	0.109	0.124	1.892
	(0.176)	(0.175)	(0.189)	(1.221)
LOGBM	0.179*	0.183*	0.220*	0.222*
	(0.100)	(0.100)	(0.130)	(0.130)
LOGSIZE	−0.268	−0.273	−0.309	−0.313
	(0.205)	(0.204)	(0.203)	(0.202)
Price	−0.001	−0.001	−0.004	−0.004
	(0.002)	(0.002)	(0.005)	(0.005)
NYDVOL	0.228	0.229	0.359*	0.360*
	(0.159)	(0.159)	(0.195)	(0.195)
NADVOL	0.145	0.142	0.246	0.242
	(0.188)	(0.188)	(0.223)	(0.223)
Yield	−48.653	−50.046	−45.150	−45.877
	(41.526)	(41.540)	(44.061)	(43.951)
Ret2-3	−0.481	−0.507	−0.559	−0.586
	(0.858)	(0.861)	(0.900)	(0.903)
Ret4-6	0.038	0.040	−0.207	−0.195
	(0.685)	(0.687)	(0.733)	(0.735)
Ret7-12	0.361	0.384	0.042	0.071
	(0.448)	(0.448)	(0.498)	(0.498)
SGROWTH	0.018	0.019	0.034	0.035
	(0.022)	(0.022)	(0.043)	(0.043)
Constant	2.833*	2.922*	1.076	1.146
	(1.621)	(1.612)	(1.639)	(1.629)

Table 6: Impact of CEO Discretion

This table describes estimation results of the four-factor model Model (1) as described in the main text for value-weighted managerial ownership portfolios. Portfolios are constructed based on characteristics that proxy for managerial discretion and on the fraction of the firm's outstanding shares owned by the officer with the highest managerial ownership. In the first row, results using all firms are repeated for easy comparison. In the second and third rows, selection is based on firms from the industries in which CEO impact on firm value (Tobin's Q) and performance (return on assets, ROA), respectively, as reported in Wasserman et al. [2001], is above the median. In the fourth row, firms with above median sales growth in the past five years are included. In the fifth row, only firms in which CEO tenure at the respective firm is above the median are included. In the last row, firms whose age in the respective month is below the median of all firms are included. The cutoff for managerial ownership of the respective portfolio is based on the Execucomp data-item *Shrownpc* and is given in the first row. Stocks are selected from the S&P 1500 universe. Alphas are on a monthly basis. Standard errors are in parentheses. The number of months used to estimate the model is always 120. ***, **, and * indicate significance at the one, five, and ten percent level, respectively.

| | Four-Factor α | | |
| | CEO Ownership | | |
	$> 5\%$	$> 10\%$	0%
All Firms	0.6758**	0.9561***	0.0552
	(0.2708)	(0.3249)	(0.0614)
High Impact Industries (Tobin's Q)	1.4247***	1.6172***	0.1234
	(0.4767)	(0.5097)	(0.1795)
High Impact Industries (ROA)	1.2772***	1.4601***	0.0091
	(0.4745)	(0.5171)	(0.2162)
Growth Firms (Median)	0.8168**	1.0989***	0.0669
	(0.3133)	(0.3686)	(0.0649)
High Firm Tenure (Median)	1.0424***	1.2623***	0.0032
	(0.3696)	(0.4122)	(0.2591)
Young Firms (Median)	1.0205***	1.3188***	0.1695
	(0.3528)	(0.4062)	(0.2516)