How long is long-term—Management behavior and incentives?

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1st October 2012

Abstract

This paper examines whether firms benefit from paying incentives to managers in form of annual bonus tied to accounting performance. Previous research suggests that incentives may induce managers to underinvest in long-term projects. Our results do not support this view. We analyze a sample of firms that provide us with measures of ownership concentration and incentive system. We obtain ownership data from Euroclear Sweden and book series Owners and Power in Sweden’s Listed Companies, data on incentive systems from Nordic Investor Services, and financial variables from Thomson Reuters Datastream. We use a Gini coefficient to measure the inequality in the distribution of firm’s total ownership. We employ a variety of approaches to deal with the problem of omitted variables, errors in variables, and endogeneity that plague empirical studies on management behaviour and incentives. We show that managers engage in long-term projects when ownership concentration is high. Competition and market for control appear to discipline managers insuring less information asymmetry and goal incongruence and hence, encouraging for long-term management behavior.

Keywords: Incentives, ownership concentration, long-term-management behavior.

[JEL classification]: G30, G39.
1 Introduction

A striking debate in the corporate governance literature in recent years has been whether incentives can induce managers (CEOs) for long-term management behavior. Managerial myopia, which refers to inflating current earnings at the expense of long-term investments has been widely studied (see e.g. Rajgopal and Venkatachalam, 1997a; Bushee, 1998; Bange and De Bondt, 2003). As studies focus mainly on investments in intangible assets, evidence on the influence of incentives on investment horizon in physical assets is limited. We study firms’ investment horizon in physical assets in the context of a question which has attracted considerable attention in not only finance literature but also among practitioners and politicians: Can monitoring, incentive contracts, and market for corporate control reduce managerial myopia?

Prior research proposes reasons for managerial myopia. Stein (1989) suggests that the manager’s desire to generate enough internal capital to fund the firm’s project may cause short-termism. Vishny and Shleifer (1989) suggest that the manager may entrench himself and make manager specific investments that have a higher value under his management than under the best alternative manager thereby extracting higher compensation from shareholders. One reason for this short-termism is the time at job. CEOs are expected to stay in their current jobs for only 4 years (Vishny and Shleifer 1989; Rajgopal, 2008). Another reason is that the failure to meet quarterly analyst estimates can result in loss of bonus, equity grants and higher probability of forced dismissal for the CEO (Rajgopal and Venkatachalam, 1997).

The studies that focus on the mechanisms for countering managerial myopia provide several suggestions. Laffont and Tirole (1987) propose that the design of efficient incentive contracts may help managers to become long-term stockholders. Studying firms’ discretionary accruals, Rajgopal and Venkatachalam (1997) find that greater institutional ownership reduces the discretionary accruals and the earnings management. Bushee (1998) provides evidence on that greater institutional ownership prevents managers to cut investments in R&D to reverse an earnings decline. Studying the discretionary budget adjustments in R&D spending, Bange and De Bondt (2003) show that greater institutional ownership is negatively related to the unexpected changes in R&D spending.

Our study departs from the earlier research by directly testing the effect of bonus payments to managers and ownership concentration on firms’ investment horizon. Bange and De Bondt (2003) mention that earnings management may have an influence on the timing of R&D expenses rather than on investment horizon. Studying firms’ investment horizon can be important as the invisibility of some managerial action may lead to a deviation from the investment decisions about maximizing total firm value.

On the one hand, we know the literature suggests that the risk-neutral shareholders prefer long-term and risky projects since long-term projects are more productive than short-term projects and high-risk projects have higher expected returns than low-risk projects. Gopalan
et al (2012) mention that long-term compensation induces managers to invest in a long-term project but managers risk aversion may lead them to choose a low-risk project.

On the other hand, we know efficient market hypothesis suggests that a meaningful distinction between maximizing short-term or long-term performance does not exist, both may lead to efficient investment decisions. As the market adjusts for potential earnings inflation in a firm, managers will only lower the stock price of a firm by undertaking the projects that are not in the best long-run interest of the firm. In contrast, Stein (1989) shows that even a fully efficient market can lead managers to behave myopically. Accordingly, we need much more work to address managerial myopia hypothesis in different markets, industries, and over time.

In this paper, we use a depreciation rate in plant, property and equipment (PP&E) as our main proxy for the managers’ investment horizon. Expenditures in PP&E depresses current earnings. Depreciation rate indicates also how quickly a firm depreciates its PP&E. Thus, we expect managers with a short-term investment horizon to increase the depreciation rate. The reason for using this measure is that expenditures on PP&E are easily identified and they represent the long-term investments. Many other investments are relatively invisible and money spend on them cannot be easily disentangled from increasing operating costs.

We study the determinants of managerial myopia by examining the effect of three incentive systems. First, firms’ ownership is used as a governance variable. Previous research relates the fraction of institutional investors to managerial myopia (see e.g. Rajgopal and Venkatachalam, 1997; Wahal and McConnell, 2000; Bushee, 1998; Bange and De Bondt, 2003), while we relate the inequality in the distribution of firms’ entire ownership to the investment horizon (myopia in absolute terms). The size and distribution of the ownership might be more relevant because concentrated ownership might be necessary to incentivize investors to gather information\textsuperscript{1}. A great number of firms are owned by a large family and/or individual owners, which can influence managers’ investment decisions. Another contribution concerns the use of a single ownership measure, which may be problematic in estimation as a single correct measure of ownership does not exist. Examining the distributional properties of ownership measures Edwards and Weichenrieder (2009) and Overland et al. (2012) show that different measures of ownership yield in very different results. With this in mind, we use an alternative measure of ownership, the herfindahl index to test the robustness of our results.

Secondly, we use annual bonus payments (tied to accounting performance) to managers as an alternative to the governance mechanism. One branch of studies finds that executive compensation is a part of optimal contracting, whereas others argue that executive compensation may not influence firms’ success. As there is no conclusive results, there is scope for studies on the effect of compensation incentives on managerial myopia.

Finally, we use a relative firm size measure as a proxy for market for corporate control.
We expect that large firms are more competitive and there is more information available about large firms, reducing earning management possibilities.

To examine the determinants of managerial myopia we run a number of multiple regressions including the year and panel effects. We consider the potential problem of endogeneity with annual bonus payments. Since annual bonus payments depend on firm performance, it is an outcome variable generating difficulties in determining the direction and causal relationship of interest. To overcome this problem, we use two stage least squares estimators (2SLS) and dynamic panel estimators of two step linear system generalized method of moments (GMM). Our ownership data are obtained from Euroclear Sweden and a sample from the book series *Owners and Power in Sweden’s Listed Companies* by Sundin and Sundqvist (1994-2002), Fristedt et al. (2003), and Fristedt and Sundqvist (2004-2009) that cover the years between 2000 and 2005. Data on manager compensation come from Nordic Investor Services and data on the financial variables are obtained from Thomson Reuters Datastream.

Our results do not support the view that annual bonus payments are associated with managerial myopia once we account for endogeneity bias. We show that managers engage in long-term projects when ownership concentration is high and market for corporate control appear to encourage managers for long-term management behavior. These aspects provide a strong incentive to monitor managers closely reducing myopic behavior.

The remainder of this paper is organized as follows. Section 2 presents the hypotheses. Section 3 presents the data sources, outlines the econometric specification, and describes the sample. Section 4 presents the empirical results and robustness checks and section 5 concludes the paper.

## 2 Hypothesis development

According to agency theory, one reason why managers might invest capital sub-optimally is separation of ownership and control (Berle and Means, 1932; Jensen and Meckling, 1976). Managers may be concerned with the current profits of the firm while shareholders are unable to distinguish whether low current profits reflect a firm that underperforms or long-term investments whose expected pay-off is to be realized far in the future (Stein, 1989; Bar-Gill and Bebchuk, 2003).

We examine managerial myopia by assuming that myopic behavior leads to a less total value of the firm due to underinvestment. Managerial myopia reflects managerial opportunism: managers take actions that are unfavorable to the interests of the shareholders. Dechow and Sloan (1991) find that firms that have managers close to retirement are likely to cut R&D expenditures. Bushee (1998) documents that managers are likely to reduce R&D spending in order to inflate current earnings. Managers believe that traders put em-
phasis on the reported accounting earnings and if the market sentiment is bearish some
managers inflate current earnings because their employment and bonus depend on them.
This debate suggests that managers often choose projects that may maximize short-term
earnings in response to capital market pressure (see e.g. Myers and Majluf, 1984; Ellsworth,
1985; Bar-Gill and Bebchuk, 2003; Bhojraj and Libby, 2005).

Our first hypothesis of this paper concerns the ownership concentration. The effect of
ownership concentration on firms’ investment horizon elicited a great deal of interest since
owners, by the size of their equity positions, effectively can influence managers and have
some control over the firm. In line with the overinvestment hypothesis, some studies argue
that institutional ownership create a short-term focus that induces managers to manipulate
earnings through an investment cut (see e.g. Bhojraj and Libby, 2005). For instance,
Holmén and Högfeldt (2009) find that firms controlled by highly leveraged family pyramids
tend to be overcapitalized and overinvest. The intuition is that high institutional ownership
is related to a high trading volume and stock return volatility when firms announce their
quarterly earnings. This is explained by several market frictions as institutions may sell
stocks around declining earnings announcements because fund sponsors use earnings to
judge the performance of investments.

Conversely, a large number of studies assume that the greater the overlap between own-
ership and control, the greater the reduction in conflicts of interest, and therefore the share-
holder value is maximized. In accordance with this view, Bushee (1998) finds that institu-
tional ownership allows for long-term investments by monitoring and disciplining managers.
Rajgopal and Venkatachalam (1997) show that stock prices of firms are less sensitive to
current earnings relative to the future earnings when ownership concentration is high.

These findings suggest that when the ownership is widely-dispersed shareholders cannot
effectively influence the decisions taken by the management. It is likely that the cost of the
managerial myopia causes an inefficient performance of the firm, which in turn is shared
by all the owners in relation to the extent of fraction they hold in the firm. The most of
the above mentioned studies ignore the effect of strong family and individual ownership on
managerial myopia and focus on institutional ownership. These studies neither control for
unobserved firm heterogeneity that can significantly influence inferences in cross-sectional
analysis nor account for endogeneity bias or attempt to separate cross-sectional correlations
from a causal relationship. With these issues in mind, we determine whether ownership
concentration reduces myopic behavior. Our first hypothesis is therefore the following (in
the alternative form):

**Hypothesis 1:** A higher ownership concentration in a firm decreases managerial myopia.

An alternative mechanism for motivating managers to maximize shareholders’ value is to
introduce a compensation incentive system. This system is supposed to reward performance
leading to increase productivity (Holmstrom, 1979; Lazear and Rosen, 1981; Holmstrom,
Holmstrom (1982) suggests that the use of compensation incentives is more beneficial than using monitoring devices for inducing managers to act on behalf of owners’ interest. Empirical studies (see e.g. Conyon and Murphy; 2000; Jensen and Murphy, 1990) find that manager compensation increases with the shareholder wealth. Crespi et al. (2002) show that industry-adjusted stock price performance increases with the manager compensation when the ownership concentration is high. In a more recent work, Gopalan et al. (2012) find a negative association between CEO pay duration and abnormal accruals, which are used as proxy for the manager’s investment horizon.

In a departure from this stream of work, a considerable amount of empirical studies lends support to the view that the incentive contracts may not reduce managerial myopia. For instance, Warner et al. (1988) observe a negative association between stock performance and top management changes. Leonard (1990) finds that the firms’ success is not significantly related to manager compensation. Buck et al. (2003) suggest that the long-term incentive plans introduced in the UK in 1995 is related to the decline in the performance-pay sensitivity.

The underlying reasons for these contradicting findings are the different analytical methods and data collection are used to study the incentive schemes. However, there is very little evidence testing whether myopic behavior can occur due to executive compensation. These existing contradictory and inconsistent findings that fail to cover all aspects of incentive pay hint only at the indirect relation between executive compensation the firm’s investment horizon and executive compensation. Wahal and McConnell (2000) focus on corporate expenditures for PP&E when studying the relation between institutional investors and myopic behavior but they do not analyze whether annual bonus payments cause this type of behavior. Hence, it remains a fruitful area for research worldwide. Accordingly, our second hypothesis is written in the null form:

**Hypothesis 2:** Executive compensation does not affect managerial myopia.

Our final hypothesis concerns market for corporate control. Bushee (1998) points out that more information is available about large firms, resulting in a less flexibility of managers and earnings management. Using relative firm size, we expect that managers in large firms have more frequent and larger investment decisions to make. They are likely to be more talented and more competitive. Accordingly, we present our final hypothesis in the alternative form:

**Hypothesis 3:** Relative size of firms is associated with long-term investments.
3 Data and method

3.1 Data

Our data are obtained from four sources: i) Semi-annual investor data are obtained from Euroclear Sweden, which includes all investors’ stock holdings in listed firms. The firms are listed mainly on the stock market (OMX) exchange. ii) Data on family ownership come from a sample from the book series *Owners and Power in Sweden’s Listed Companies* that lists 25 largest owners of every listed firm. iii) Data on manager compensation come from Nordic Investor Services and iv) data on the financial variables are obtained from Thomson Reuters Datastream. Our total sample includes 1801 firm year observations based on end year figures between the years 2000 and 2005. Managerial myopia will be more of a problem when current earnings are a precise indicator of the future. This is less likely in industries such as biotechnology where future earnings are completely dependent on the success of R&D than in more mature firms, industrial firms where current earnings provide crucial information about future earnings. Also, our proxy for investment horizon, investments in PP&E are primarily observed in industrial firms.

With this in mind, we impose two restrictions on the sample. First, only the industrial firms are kept. Second, if a firm is missing PP&E data for a year, that firm-year observation is deleted. These restrictions reduce the sample size to 418 firm year observations over the years, allowing us to study a total of 75 firms of which 55 (73.3%) enter in the panel in each year.

3.2 Method

3.2.1 Measure of investment horizon

Our baseline measure depreciation rate, $D_{rate_{jt}}$, is constructed using average age of the capital stock:

$$D_{rate_{jt}} = \frac{D_{jt}}{K_{jt}},$$

where $D_{rate_{jt}}$ is the depreciation rate at time $t$, $D_{jt}$ is the annual depreciation of PP&E at time $t$, and $K_{jt}$ is the capital stock, PP&E at time $t$. The intuition is that the lower the depreciation rate, the higher the share of long-term investment taken by corporate managers. Prior studies use industry adjusted measure of net fixed assets as a proxy for investment horizon (see e.g. Wahal and McConnell, 2000). Our measure of investment horizon shows how quickly a firm depreciates its PP&E. A higher depreciation rate indicates that the firm has more shorter-term assets than long-term assets and vice versa.

3.2.2 Alternative measures of investment horizon
We construct alternative measures of investment horizon by expanding our measure in Eq. (1).

a) The accumulated depreciation divided by the net fixed asset, $\frac{Acc\_Dep}{PP&E}$.

b) The accumulated depreciation divided by the annual depreciation, $\frac{Acc\_Dep}{Dep}$.

c) The difference between the change in the net fixed asset divided by the change in the accumulated depreciation, $\frac{\Delta PP&E}{\Delta Acc\_Dep}$.

d) The difference between the change in the net fixed asset divided by the change in the accumulated depreciation at time $t$ and $t-1$, $\frac{\Delta PP&E}{\Delta Acc\_Dep} - \frac{\Delta PP&E_{t-1}}{\Delta Acc\_Dep_{t-1}}$.

e) The difference between a fraction: the net investment divided by the net fixed asset and the annual depreciation divided by the accumulated depreciation at time $t$ and $t-1$, $\frac{Investment}{PP&E} - \frac{Investment_{t-1}}{PP&E_{t-1}}$.

We have observed how these measures change when the firm maintains its statues, buys or and sells its PP&E, sells its short-term assets and buys long-term assets or vice versa. In our experiments, these measures did not reflect the expected changes. Our simple measure of depreciation rate does a better job in predicting the managers’ investment horizon than above mentioned measures.

In our untabulated robustness tests, we use other alternative measures, which are guided by the prior myopia literature; $\frac{Net\_sales}{PP&E}$, $\frac{Capex}{sales}$, $\frac{R&D}{sales}$ (see e.g. Rajgopal and Venkataram, 1997; Wahal and McConnell, 2000). Finally, we follow Gopalan et al. (2012) and use abnormal accruals as proxy for the managers’ investment horizon. These alternative proxies provide similar results in our analyses.

3.2.3 Specification of independent variables

a) Gini \_coefficient. In previous literature the number of institutional investors or fraction of all shares held by institutional investors is used as a measure for ownership concentration (see e.g. Rajgopal and Venkataram, 1997; Bushee, 1998; Wahal and McConnell, 2000; Bange and De Bondt, 2003). We use the gini coefficient defined by Deaton (1997) to measure ownership concentration. This measure accounts for the effect of strong family and individual ownership and it is calculated as follows:

$$Gini_{jt} = \frac{N + 1}{N - 1} - \frac{2}{N(N - 1)u} \left( \sum_{i=1}^{N} P_{i}X_{i} \right),$$

where $N$ is the total number of owners in each firm, $u$ is the mean voting right of the owners. $P_{i}$ is the voting rank $P$ of owner $i$ with voting right $X$, such that the owner with the highest voting right rank receives a rank of 1 and the owner with the lowest voting right receives a rank of $N$. Data show that owners that are ranked from 26 to $N$ have a very little stake in firms. Therefore, the 25 largest owners have been ranked and the owners from 26
to $N$ are assumed to have an equal voting right. Hence owners from 26 to $N$ have received their ranking and voting right in the following way:

$$\sum_{i=26}^{N} P_i X_i = \left(\frac{1 - \sum_{i=1}^{25} X_i}{N-25}\right) \left(\frac{N(N+1)}{2} - \frac{25(25+1)}{2}\right).$$  \hspace{1cm} (3)

The first term \(\frac{1 - \sum_{i=1}^{25} X_i}{N-25}\) is the percentage of voting right that will be equally distributed over the remaining owners \(i = 26, \ldots, N\), and the second term \(\frac{N(N+1)}{2} - \frac{25(25+1)}{2}\) accomplishes that the voting power right is equally distributed for the owners from 26 to $N$. The calculations are made for each year.

A gini coefficient of zero indicates that all the owners of a firm have an equal voting right, whereas a gini coefficient equals one indicates that one owner has 100% of the voting right. Hence the higher the gini coefficient is the higher the ownership concentration of the firm. We expect that high ownership concentration causes a better control over managers and reduces managerial myopia. To test the robustness of our results the herfindahl index, which is measured as a sum of squared values of ownership stakes$^2$ held by 25 largest owners, is used.

b) $Sflex_{Stotal}$. This is the ratio between the flexible salary and the total compensation. The flexible salary is based on the annual accounting performance. The total compensation consists of the flexible salary, the fixed salary, and the value of the perks.

c) $Mcap_{omxv}$. Sapp (2008) mentions that the reason why large firms pay their managers more is mainly because of the increasing complexity of the tasks conducted in large firms. We use market capitalization of firms deflated by the OMX value as proxy for market for corporate control and in turn an indicator for earnings management.

d) $Family_{owned}$. Our governance proxy is a dummy variable, which equals one if the firm is owned by a family group, else it is zero. Holmén and Högfeldt (2009) mention that not only the concentration but also the structure of ownership in a firm influences managers’ investment decision.

e) $CEO_{age}$. Prior studies$^3$ mention that managers’ age can be used as a proxy for the ability or the experience of managers. Managers have reputation concerns and therefore may manipulate investment policy in order to develop a personal reputation for high ability.

### 3.2.4 Econometric specification

In our analysis, we estimate how i) ownership concentration, ii) bonus payments, and iii) relative firm size affect managers’ choice of investment horizon. We achieve this by estimating variants of the following OLS model:

\[^2\text{Ownership stakes are calculated as the percentage of shares held by the 25 largest owners.}\]
\[^3\text{Prior studies refer to the work of Sapp (2008) and others.}\]
\[ D_{\text{rate}jt} = b_0 + b_1 Gini_{jt} + b_2 Sflex_{Stotal} + b_3 Mcap_{omxv} + b_4 D_{\text{Family owned}jt} + b_5 CEO_{age} \\
+ \sum_{g=2}^{6} F_{\text{group}g} + \varphi \sum_{t=2001}^{2005} D_{\text{year}} + u_{jt}, \]

where the dependent variable is the depreciation rate, \( D_{\text{rate}} \) and independent variables are ownership concentration, \( Gini \_coefficient \), the ratio between the flexible salary and the total compensation, \( Sflex \_Stotal \), the relative firm size, market capitalization of firms deflated by the OMX value, \( Mcap \_omxv \), a dummy variable, \( Family \_owned \) and managers’ age, \( CEO \_age \).

Our analysis is based on firm-year panel regressions where on the first hand fixed effects model is used \(^4\). Then, in a later regression, to control for firm specific effects, we use five firm group dummies. The reason for this is the large variation in the firm level fixed effects coefficients, \( rho \) is high, 0.795. In order to average out this high variation, we group the firms in the data based on their foundation date, which secures that the firms do not change group over time. The oldest firm was founded in the year of 1737 and the youngest firm was founded a decade ago. Firms that were founded earlier than the 20th century are classified as group 1, the rest of the groups are based on each 20 year periods in the 20th century. Thus, a total of 6 firm groups are generated.

To control for year effects we include five year dummies from 2001 to 2005 (dropping the first year dummy). The disturbance term, \( u_{jt} \), is an i.i.d. vector of heteroskedasticity and autocorrelation consistent (HAC) clustered standard errors for OLS (see Greene (2008)). It allows correlation within firm groups but not across them.

3.2.5 Summary statistics and pairwise correlations

Panel A of Table 1 displays summary statistics and Panel B displays pairwise correlations for the variables used in our analysis.

[Insert Table 1 here]

According to Panel A, the distribution of the annual depreciation rate, the fraction of the flexible salary, and our dummy variable family owned are rightward skewed. For these variables the mean values are higher than the median values. For the remaining variables, except gini coefficient and bonus dummy, mean values are approximately equal to median values, indicating that their distributions are close to normal. Gini coefficient and bonus dummy evidence some leftward skewness. In untablutaed analysis, we observe that
data exhibit some time series variation, but no a clear time-series trend. On average, the annual depreciation rate of the firms is 23% (median is 18%) and the gini coefficient is 75% (median is 79%). There are a few firms with a dispersed ownership structure that have a gini coefficient lower than 30%. The average fraction of the flexible salary is 13% (median is 6%) on average and we know that 76% (median is 100%) of the firms have paid bonus during at least one of the years. On average, relative firm size is 0.003 MSEK (median is 0). We also know that on average 35% (median is 0%) of the firms are owned by a family group and the average CEO age is 51 years (median is 52). The variable, Sflex_Stotal has the largest missing values among the variables; 18 out of 418 (4.3%).

Panel B of Table 1 displays pairwise correlation analysis. The depreciation rate is significantly negatively correlated with the gini_coefficient, Mcap_omxv, Family_owned, and CEO_age. The negative correlation between the depreciation rate and Sflex_Stotal is not statistically significant at the 5% level. As correlation coefficients vary between -0.24 and 0.41 none of them are strong enough to generate a multicollinearity problem in our model.

4 Estimation Results

4.1 Results from baseline models

Table 2 presents the results from pooled OLS (columns 2 and 3), pooled OLS with year effects (columns 4 and 5), firm level fixed effects (columns 6 and 7) and firm group level fixed effects models (columns 8 and 9). The dependent variable in the models is the depreciation rate. The results for the main variables of interest, gini_coefficient, Sflex_Stotal, Mcap_omxv, and for the control variables; Family_owned, CEO_age, and year dummies are shown in the table. In pooled OLS, and firm level fixed effects regressions, standard errors are clustered on firms, whereas standard errors are clustered on firm groups in firm group level fixed effects regression. As an alternative measure for ownership concentration the herfindahl index is used and results are presented in the table.

[Insert Table 2 here]

Results from pooled OLS model show that the variables gini_coefficient, Mcap_omxv, Family_owned, and CEO_age have significant negative coefficients (at the 5% level). These results suggest that firms with a high ownership concentration, relatively large firms, family owned firms, and firms that have older managers invest in relatively long-term assets. These results are consistent when the herfindahl index is used (column 3 of Table 2). When year effects are included in pooled OLS model, the results are consistent except for Family_owned. All coefficients for year dummies are positive but significant for three out
of five periods. The coefficient of the herfindahl index is negative insignificant when it is included together with the year dummies.

F-test result rejects the null hypothesis that all fixed effect coefficients are equal to zero, favoring fixed effects model over pooled OLS model (F-stat: 12.98). Similarly, Hausman test results favor fixed effects model over random effects model (Hausman-chi2: 64.08), leading us to use a fixed effects model including year dummies. The results (columns 6 and 7) show that the gini coefficient and the herfindahl index are positively related to the depreciation rate. The change of the sign of the gini coefficient is due to a high correlation between the unobserved panel effects and the independent variables. As mentioned, the fraction of variance due to the fixed effects rho (0.795) is very high in the regressions.

Including firm group level fixed effects gives similar results to the ones obtained from pooled OLS model except that it produces a significant coefficient of the variable $S_{flex \_Stotal}$, suggesting that firms that offer annual bonus to their managers are associated with short-term investments. Including the herfindahl index produces an insignificant ownership coefficient. Coefficient of $S_{flex \_Stotal}$ is still significant, while $M_{cap \_omxv}$ has lost its effect on managerial myopia.

### 4.2 Endogeneity bias

As annual bonus payments can be determined by many firm characteristics, it creates problems with the direction of causality. Indeed, Durbin-Wu-Hasman test of endogeneity of variable $S_{flex \_Stotal}$ rejects the null hypothesis that this variable is exogenous (t-stat: 3.824). To deal with this problem, we perform three additional analyses. These are i) 2SLS regression, where annual bonus payments are instrumented with one period lagged net profit. As bonus payments depend on the accounting net profit, it makes sense to use the lagged net profit as an instrument in order to create a variation in the annual bonus payments when it is predicted in the first stage, ii) we include firm group level fixed effects in our 2SLS, and iii) dynamic panel estimators of two step system GMM (Arellano and Bover, 1995; Blundell and Bond, 1998). In Table 3, we show that our results are robust in all the specifications after we account for endogeneity bias.

[Insert Table 3 here]

Column 2 of Table 3 presents 2SLS regression results from the pooled model, whereas column 3 of Table 3 presents 2SLS regression results from firm group level fixed effects model. The results that $gini\_coefficient$ and $M_{cap\_omxv}$ are negatively related to the depreciation rate are consistent in both regressions. Column 4 of Table 3 shows results from two step system GMM. The results confirm the negative significant parameters on $gini\_coefficient$ and $M_{cap\_omxv}$. Similar results are obtained when the herfindahl index is used (untabulated).
Examining the specification of the models, the table shows that 2SLS model including firm group level fixed effects and year effects provides an $R^2$ as high as 28%. F-values of the models do not indicate specification errors. For the two-step system GMM model, Blundell and Bond (1998)’s direct test of third order serial correlation AR(3) cannot reject zero serial correlation at lag three ($Pr > z : 55\%$). This is the reason for implementing instruments at lag three and further in our model. Finally, Hansen test of overidentifying restrictions supports that the restrictions imposed are valid ($H_0: E[\hat{Z}(y - X\beta) = 0, Prob > chi^2 : 36\%]$)

We test our hypotheses based on the estimation results from two step system GMM in Column 4 of Table 3.

Summarizing, \textit{ginicoefficient} and \textit{Mcap\_omxv} are the only variables that seem to have robust significantly negative effect on the depreciation rate (at the 5% significance level) after accounting for endogeneity bias. These results show that firms that have high ownership concentration and relatively large firms are associated with long-term investments. Our results do not support the argument that annual bonus payments cause corporate managers to invest less in projects with long-term payoffs.

Our coefficient estimates of these variables are also economically significant. Based on results from two step system GMM, column 4 of Table 3, holding other independent variables constant, the mean depreciation rate decreases by 0.74 percentage points (from 22.7\% to 15.3\%) for an additional increase by one percentage point in the average gini coefficient. Since the unconditional average length of the assets is 4.4 years (1/22.7\%), one percentage point increase in the average gini coefficient will lead to an additional increase in the average investment length by 0.2 years ($\frac{1}{(22.7\%-15.3\%)/100} = 4.6$ years $\rightarrow$ \textit{dif} : 0.2 years.). This result lends support to the findings of prior studies and also in accordance with our hypothesis that a higher ownership concentration in a firm reduces managerial myopia. One reason for this finding is that firms with a strong ownership concentration have a better governance mechanism.

Our analysis cannot confirm the positive relation between annual bonus payments and the depreciation rate after we account for endogeneity bias. Results presented in column 4 of Table 3 are in accordance with the findings of Lindblom et al. (2008) who stress that incentives are not a good substitute for direct control.

We also find that relative size of the firm is negatively (at the 5% significance level) related to the depreciation rate. Based on results from column 4 of Table 3, holding other independent variables constant, the mean depreciation rate decreases by 5 percentage points for an additional increase by one percentage point in the size measure. This means that the average investment length increases by 1.2 years for an additional increase of one percentage point in our relative size measure ($\frac{1}{(22.7\%-5\%)/100} = 5.6$ years $\rightarrow$ \textit{dif} : 1.2 years.). This result provides consistent evidence with the findings of Bushee (1998) and suggests that managers of large firms invest in longer-term assets. There is more information available about large
firms and they are relatively more competitive, implying that there is a market for control, which reduces earnings management possibilities and managerial myopia. In our unreported analysis we use industry adjusted size variable measured as deviations from the industry median and obtain very similar results.

To determine whether the effect of ownership concentration or relative size on investment length is more economically significant, we compare the coefficient of ownership concentration (-0.738) to the coefficient of relative firm size (-5) in Column 4 of Table 3. The coefficient of relative firm size is over seven times that of the ownership concentration (absolute $t-value = 9.38$), indicating that market for corporate control is a better mechanism to discipline the managers than ownership concentration.

Overall, our evidence from Table 3 indicates high ownership concentration and relatively large firms cause corporate managers to invest in projects with long-term payoff.

4.3 Further robustness checks

To assess the robustness of our results, we perform a battery of checks. First, we estimate separate regressions for each year. The results of these regressions are summarized in Table 4.

Table 4 shows that in three out of the six yearly regressions gini\textunderscore coefficient has a significant negative effect on the depreciation rate, whereas Mcap\textunderscore omxv has a significant negative effect in four out of the six regressions. Most importantly, in each year, the coefficients of the gini are negative. The results are similar when the herfindahl index is included instead of the gini index.

Results from the remaining sensitivity analyses are discussed below but not reported in separate tables. ii) Managerial compensation is determined as a dummy variable that is equal to one if the firm pays a bonus in at least one of the years during the period studied and is included in the model in Table 3. The results show that the gini coefficient has a significant negative effect on the depreciation rate. iii) Determining a bonus dummy variable for whether the firm pays a bonus in year $t$ or not results in a significant negative parameter on the gini coefficient but only a partially significant negative coefficient on Mcap\textunderscore omxv. iv) Using the number of stock options that the firm offers to its managers does not result in a significant coefficient in our models in Table 3. v) The flexible salary of the individual managers are divided by the median flexible salary of all the managers (industry adjusted measure) in the data in each year and included in the models in Table 3. The results from gini\textunderscore coefficient and Mcap\textunderscore omxv remain unchanged.

vi) The regressions are run with the standardized variables, which satisfy the normality assumption in the OLS regressions. Our main results remain unchanged.
vii) Including the logarithm of the total asset instead of $Mcap_{omxv}$ as a proxy for firm size leads to insignificant negative parameters on the gini and Family_owned, and a significant negative size coefficient. viii) Using the number of working years left for managers (a proxy for managerial reputation) does not produce a significant coefficient.

ix) The analyses are based on an unbalanced panel data set that includes gaps within time series. Using a balanced data set (obtained by removing 20 firms (88 observations) that have embedded gaps), the results indicate that the gini_coefficient, $Mcap_{omxv}$ and CEO_age have a significant negative effect on the depreciation rate.

Overall, we show that our results obtained in Table 3 survive all of these robustness checks.

4.4 Discussion

Our results are subject to more than one interpretation. The main reason for this is that managerial myopia is relatively invisible; it is very difficult to observe and even tougher to document. As prior myopia research, we use a proxy to measure the myopia by assuming that it exists because managers are better informed about the prospects of their firms than shareholders and that they are given some discretion in decision making. Our results show that if managerial myopia is indeed a problem of serious magnitude, then some control mechanism can be a solution to reduce it.

Using the gini coefficient as a measure of ownership concentration we show that strong ownership reduces managerial myopia. By using institutional ownership, Wahal and McConnell (2000) arrive at a similar conclusion. In the previous literature, the role of institutional ownership is not widely recognized. On the one hand, research suggest that institutions act as a buffer between individual investors and corporate managers and, thereby induce corporate managers to invest in long-term projects. The reason for such a view is that more patient institutional investors have an information advantage relative to individual investors and therefore they do not judge corporate managers on the basis of short-term reported earnings. On the other hand, evidence from earlier research (see Rajagopal and Venkatachalam, 1997) suggest that institutional investors are central for setting the stock prices and that they focus on short-term reported earnings. This puts pressure on corporate managers to meet or beat the analysts’ quarterly earnings forecasts. We follow Edmands (2009) and use a measure of ownership concentration for investor informedness instead of institutional ownership. Edman (2009) suggests that institutional ownership may be a good measure for obtaining information because institutions have the expertise to conduct fundamental analysis. However, concentrated ownership might be necessary to incentivize institutions to undertake such analysis. If institutional ownership is high but dispersed, shareholders may not bear the cost of monitoring. Our results are inline with the argument that strong ownership concentration reduces managerial myopia.
Another debate is that managers suffer significant cuts in bonus and stock options if they fail to meet the analysts’ quarterly earnings forecasts. There may even be carrier concerns, missing the forecast can be seen as a sign of managerial incompetence. This pressure encourages managers for earnings management and to shift earnings from the future to the present. Gopalan et al. (2012) find that firms that offer shorter-duration pay contract to their managers have higher abnormal accruals in the current period. It is possible that the pressure to meet the analysts’ forecasts induces managers to manage earnings to deliver the numbers by whatever means necessary, even "talk down" or revise the optimistic forecast. However, our results show that managers do not rely on real actions such as cutting down investments in PP&E to meet the analysts’ consensus forecasts. We do not find enough evidence on that annual bonus payments increases managerial myopia.

The above discussion implies that capital market pressure can have pros and cons. Stein (1989) mentions that capital market pressure can have adverse effects on managers’ performance. The likelihood of a takeover attempt may interfere with managers ability to pursue long-term objectives. One can expect that the likelihood of a takeover in relatively large firms is less than small firms and interpret our results as relatively large firms are associated with less managerial myopia because they are less vulnerable for takeovers. In this vein, one can argue that capital market pressure exacerbate managerial myopia. However, we believe that the conclusions reached in our analysis are in accordance with those derived from an agency-theoretic view of the firm; capital market pressure act as a disciplinary device. There is more information available to the market about large firms, reducing flexibility of managers and earning management possibilities. Thus we interpret our result as capital market pressure are associated with less myopic investments.

On the discussion whether managerial myopia is a serious problem or not, evidence from prior research is inconclusive. If it is true that managers shift earnings from the future to the present to avoid takeovers at undervalued stock prices, other factors that may cause stocks to be undervalued becomes important. Here, behavior and choice of investors come into play. Stein (1988) suggests that If shareholders are relatively patient, low earnings will not lead to a large undervaluation in the stock, and managers will not need to attempt to increase current earnings.

Finally, there is not much discussion on the corporate income tax effects in the prior managerial myopia research. A reduction in corporate tax reduces the user cost of capital for firms. This should increase investment, and vice versa for tax increases. In the myopia literature, the studied public firms are assumed to be equally sensitive to investment opportunities. Indeed, studying the sensitivity to investment opportunities in private and public firms, Asker et al. (2010) show that private firms significantly increase investment in tangible assets in response to tax cuts and lower the investment in response to tax increases. However, for public firms the effect of tax change is not significant.
5 Conclusions

There has been long-standing argument in the myopia literature that the desire to achieve a high stock price induce corporate managers to behave myopically. The agency-theoretic view of the firm suggests that in the absence of agency costs, the effect of capital market pressure is that only the undesirable investments will be eliminated, while the positive NPV projects will be preserved. To the extent that the capital market cannot observe all aspects of managerial decision making, this optimism is not wholly justified. In our analysis, we empirically examine the determinants of managerial myopia using ownership data from Euroclear Sweden, and SIS Ownership Service, and data on managerial compensation from Nordic Investor Services.

Our results provide a number of contributions to the myopia literature. First, unlike a majority of previous research, which use R&D expenditure as a proxy for investment length, we study investment horizon in physical assets. Secondly, previous research studies only the effect of institutional investors on managerial myopia excluding the effect of family and individual ownership, while this paper relates an ownership concentration measure to firms’ investment horizon. Thirdly, as one single correct measure of ownership concentration is absent, the sensitivity of our results from ownership concentration is analyzed by using the herfindahl index. Fourthly, a majority of previous research do not incorporate the effect of executive compensation on myopic behavior. This issue is addressed in the paper. Finally, this paper accounts for endogeneity bias arising from introducing annual bonus payments in the model.

Our results suggest that the high ownership concentration reduces managers’ investment decisions that are distorted by managerial myopia arising from agency costs associated with a separation of ownership and control. The managers of firms with high ownership concentration tend to exhibit less myopic behavior and invest in longer-term assets. This finding is consistent with the interpretation that a high ownership concentration allows owners to monitor and discipline managers, ensures less information asymmetry and goal incongruence between managers and owners. Our results also show that annual bonus payments do not have a significant effect on managerial myopia. The final remark of this paper is that there is a market for control, which limits earnings management possibilities and reduces managerial myopia. These findings are robust to a large number of sensitivity analyses.

The myopia hypothesis assumes that deviations in prices from their complete information values play a role in capital markets. Further research may provide evidence on whether capital market pressure makes managers work harder or makes them behave more myopically.

Notes
1 See e.g. Edman (2009), Bushee and Goodman (2007) and Parrino et al. (2003).

2 Similar results are obtained when the voting rights are used.


4 The fixed effects model is chosen over the random effects model based on Hausman test results.

5 We note that in the overidentified models, the validity condition cannot be tested because the condition involves the unobservable residual. Therefore this condition has to be taken on faith. Instead, it is investigated whether or not it is reliable to use a more restrictive model that is nested in the current model.

References


Table 1: Summary statistics for the variables

Panel A. Descriptive statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Nmiss</th>
<th>Mean</th>
<th>Median</th>
<th>Std Dev</th>
<th>Min</th>
<th>Max</th>
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<td>Dep_rate</td>
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<td>2</td>
<td>0.227</td>
<td>0.177</td>
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<td>Gini</td>
<td>408</td>
<td>10</td>
<td>0.748</td>
<td>0.789</td>
<td>0.175</td>
<td>0.071</td>
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<tr>
<td>S‡ ex_Stotal</td>
<td>400</td>
<td>18</td>
<td>0.130</td>
<td>0.060</td>
<td>0.165</td>
<td>0.00</td>
<td>0.819</td>
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<td>0</td>
<td>0.758</td>
<td>1</td>
<td>-</td>
<td>0</td>
<td>1</td>
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<tr>
<td>Mcap_Omxv</td>
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<td>0</td>
<td>0.007</td>
<td>0</td>
<td>0.051</td>
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<tr>
<td>Family_owned</td>
<td>408</td>
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<td>0.478</td>
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<td>1</td>
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<td>51</td>
<td>52</td>
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<td>66</td>
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Panel B. Pairwise correlations

<table>
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<th>Gini</th>
<th>S‡ ex_Stotal</th>
<th>Mcap_Omxv</th>
<th>Family_owned</th>
</tr>
</thead>
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<td>Gini</td>
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<td>0.00</td>
<td>-0.03</td>
<td>-0.12</td>
</tr>
<tr>
<td>S‡ ex_Stotal</td>
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<td>0.56</td>
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<tr>
<td>Mcap_Omxv</td>
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<td>0.41</td>
<td>0.02</td>
</tr>
<tr>
<td>Family_owned</td>
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<td>-0.04</td>
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<td>CEO_age</td>
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</tr>
<tr>
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<td>0.00</td>
<td>1.00</td>
<td>0.03</td>
<td>0.00</td>
</tr>
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</table>

The ownership data come from Euroclear Sweden and the book series Owners and Power in Sweden’s Listed Companies and stretch from 2000 to 2005. Data on manager compensation come from Nordic Investor Services and the financial variables are obtained from Thomson Reuters Datastream. Panel A of the table displays summary statistics for the variables while Panel B displays pairwise correlations. The depreciation rate Dep_rate represents the inverse of the average age of the capital stock, the gini coefficient is a measure of inequality of ownership concentration, S‡ ex_Stotal is the ratio of flexible salary to total compensation, D_bonus is one if the firms deliver bonus in at least one of the years, Mcap_Omxv is the market capitalization of firms in relation to the market value (in MSEK) of the local index (OMX), Family_owned is a dummy variable equals one if the largest owner of the firm based on voting power right is a family group, else it is zero, CEO_age is the managers’ age.
Table 2: Estimation results from pooled OLS, firm level fixed effects, firm group level fixed effects

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Pooled-OLS</th>
<th>Pooled-OLS</th>
<th>Pooled-OLS</th>
<th>fixed effects</th>
<th>fixed effects</th>
<th>fixed effects</th>
<th>fixed effects</th>
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</thead>
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<td>Gini</td>
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<td>-0.214***</td>
<td>0.243***</td>
<td>0.243***</td>
<td>0.210**</td>
<td>-0.210**</td>
<td>-0.210**</td>
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<td>-0.108</td>
<td>0.119**</td>
<td>0.075</td>
<td>-0.075**</td>
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<td></td>
<td>(2.412)</td>
<td>(1.619)</td>
<td>(1.619)</td>
<td>(2.109)</td>
<td>(2.109)</td>
<td>(2.109)</td>
<td>(2.109)</td>
</tr>
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<td>Sflex_Stotal</td>
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<td>0.022</td>
<td>0.022</td>
<td>0.002</td>
<td>0.015</td>
<td>0.045**</td>
<td>0.015</td>
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<td></td>
<td>(0.379)</td>
<td>(0.659)</td>
<td>(0.659)</td>
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<td>(0.314)</td>
<td>(2.600)</td>
<td>(2.600)</td>
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<td>(5.117)</td>
<td>(3.685)</td>
<td>(3.685)</td>
<td>(3.281)</td>
<td>(1.372)</td>
<td>(1.638)</td>
<td>(1.638)</td>
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<td>Family_owned</td>
<td>-0.026**</td>
<td>-0.040***</td>
<td>-0.023</td>
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<td>-0.016</td>
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<td>(2.004)</td>
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<td>(1.637)</td>
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<td>(0.505)</td>
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<td>-0.003</td>
<td>-0.003</td>
<td>-0.000</td>
<td>-0.002</td>
<td>-0.002</td>
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<td>(0.035)</td>
<td>(0.417)</td>
<td>(0.417)</td>
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<td>(0.314)</td>
<td>(4.138)</td>
<td>(4.138)</td>
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<td>Firm_group2</td>
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<td>0.034</td>
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<tr>
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<td>(5.953)</td>
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<td>(3.939)</td>
<td>(2.103)</td>
<td>(2.103)</td>
<td>(2.103)</td>
<td>(2.103)</td>
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<tr>
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<td>-0.004</td>
<td>-0.013*</td>
<td>-0.013*</td>
<td>-0.013*</td>
<td>-0.013*</td>
<td>-0.013*</td>
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</tr>
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<td>(2.103)</td>
<td>(2.103)</td>
<td>(2.103)</td>
<td>(2.103)</td>
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<tr>
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<td>0.081***</td>
<td>0.081***</td>
<td>0.081***</td>
<td>0.081***</td>
<td>0.081***</td>
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<td>0.084**</td>
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<tr>
<td></td>
<td>(0.042)</td>
<td>(7.655)</td>
<td>(7.655)</td>
<td>(7.655)</td>
<td>(7.655)</td>
<td>(7.655)</td>
<td>(7.655)</td>
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<tr>
<td>Firm_group6</td>
<td>0.081***</td>
<td>0.093***</td>
<td>0.093***</td>
<td>0.093***</td>
<td>0.093***</td>
<td>0.093***</td>
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</tr>
<tr>
<td>D_year_2001</td>
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<td>0.004</td>
<td>0.004</td>
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<td>(1.799)</td>
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<td>(0.325)</td>
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<td>(1.932)</td>
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<td>0.042**</td>
<td>0.042**</td>
<td>0.042**</td>
<td>0.055</td>
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<td>(2.350)</td>
<td>(1.372)</td>
<td>(1.761)</td>
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<td>D_year_2003</td>
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<td>0.055***</td>
<td>0.055***</td>
<td>0.055***</td>
<td>0.055***</td>
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<tr>
<td>D_year_2004</td>
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<td>(3.444)</td>
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<td>(3.272)</td>
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<tr>
<td>D_year_2005</td>
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<td>0.018</td>
<td>0.018</td>
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<td>0.038*</td>
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<td>(1.626)</td>
<td>(0.755)</td>
<td>(0.755)</td>
<td>(0.755)</td>
<td>(1.298)</td>
<td>(1.298)</td>
<td>(1.298)</td>
</tr>
<tr>
<td>Constant</td>
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<td>0.425***</td>
<td>0.563***</td>
<td>0.414***</td>
<td>0.156</td>
<td>0.156</td>
<td>0.156</td>
</tr>
</tbody>
</table>

The table shows the results from the estimation of the pooled OLS (columns 2 and 3), the pooled OLS with year effects (columns 4 and 5), the firm level fixed effects (columns 6 and 7), and the firm group level fixed effects models (columns 8 and 9). The dependent variable is the depreciation rate \( D_{\text{rate}} \). The independent variables are the gini coefficient (as an alternative the herfindahl index is also used), managers' flexible salary in relation to their total compensation \( Sflex_{\text{Stotal}} \), market capitalization of firms in relation to the stock market value \( Mcap_{\text{omxv}} \) (in MSEK), a dummy variable indicating whether the firm is owned by a family group or not \( Family_{\text{owned}} \), age of the firms’ CEO. Firm groups that are determined based on the date firm founded are included in the model to control for the fixed effects. First group represents the firms that were founded earlier than year 1900, the rest of the groups are based on each 20 year periods from 1900 to 2000. Year dummies from 2000 and 2005 are included in the model, dummy for the year 2000 and first firm group dummy are dropped due to multicollinearity problem. Each regression includes a firm specific intercept. The panel data is set up in calendar time presenting fiscal years ending values. The number of observations, R-squared, the number of firms used in panel data models, chi2 and Prob > chi2 values for the Hausman test, and finally F-test and Prob>F values for the test of fixed effects against the pooled OLS model are presented. Heteroskedasticity and autocorrelation-consistent standard errors clustered at the firm level and thus robust t-statistics are shown in absolute values within parenthesis. In the pooled OLS, and the firm level fixed effects regressions, standard errors are clustered on firms, whereas standard errors are clustered on firm groups in the firm group level fixed effects regression. The p-values are used to help assessing the statistical significance of the results at the 1%, 5%, and 10% significance levels and significance levels are denoted by ***, **, and * (two-sided), respectively.
Table 3: Estimation results from 2SLS and two step system GMM

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>2SLS Cohort fixed effects</th>
<th>2SLS Two-step system GMM</th>
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<td>Gini</td>
<td>-0.356***</td>
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<td>(4.427)</td>
<td>(4.239)</td>
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<td>0.041</td>
</tr>
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<td></td>
<td>(0.689)</td>
<td>(0.900)</td>
</tr>
<tr>
<td>Mcapm_omxv</td>
<td>-3.823***</td>
<td>-3.545**</td>
</tr>
<tr>
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<td>(3.418)</td>
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<td>Family_owned</td>
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<td></td>
<td>(0.391)</td>
<td>(0.237)</td>
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<tr>
<td>Cco_age</td>
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<td>-0.005*</td>
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<td>(1.842)</td>
<td>(1.753)</td>
</tr>
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<td>Firm_group2</td>
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<td>-0.008</td>
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<td>D_year_2001</td>
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<td>D_year_2002</td>
<td>0.055**</td>
<td>0.057**</td>
</tr>
<tr>
<td></td>
<td>(2.271)</td>
<td>(2.301)</td>
</tr>
<tr>
<td>D_year_2003</td>
<td>0.051**</td>
<td>0.052**</td>
</tr>
<tr>
<td></td>
<td>(2.379)</td>
<td>(2.341)</td>
</tr>
<tr>
<td>D_year_2004</td>
<td>0.042**</td>
<td>0.042**</td>
</tr>
<tr>
<td></td>
<td>(2.170)</td>
<td>(2.146)</td>
</tr>
<tr>
<td>D_year_2005</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.669***</td>
<td>0.682***</td>
</tr>
<tr>
<td></td>
<td>(5.298)</td>
<td>(4.629)</td>
</tr>
</tbody>
</table>

Observations: 392
Number of firms: 75

Durbin-Wu-Hausman test: 0.294**
t-stat: (3.924)

R-squared: 0.528
F-value: 4.342
Prob > F: 0.0004
Prob > F: 0.012
AR(3), Pr > z: 0.553
Hansen test chi2: 0.429
Prob > chi2: 0.512

The table shows the results from the estimation of the pooled 2SLS (columns 2), 2SLS where firm group level fixed effects are included (column 3) and two step system GMM (column 4). The dependent variable is the depreciation rate $D_{rate}$. The independent variables are the gini coefficient (as an alternative the herfindahl index is also used), managers’ flexible salary in relation to their total compensation $Sflex_{stotal}$, market capitalization of firms in relation to the stock market value $Mcap_{omxv}$ (in MSEK), a dummy variable indicating whether the firm is owned by a family group or not $Family_{owned}$, age of the firms’ CEO. Firm groups that are determined based on the date firm founded are included in the model to control for the fixed effects. First group represents the firms that were founded earlier than year 1900, the rest of the groups are based on each 20 year periods from 1900 to 2000. Year dummies from 2000 and 2005 are included in the model, dummy for the year 2000 and first firm group dummy are dropped due to multicollinearity problem. Each regression includes a firm specific intercept. The panel data is set up in calendar time presenting fiscal years ending values. The number of observations, the number of firms studied over time, a test results for endogeneity of $Sflex_{stotal}$ R-squared, F-value for the joint test of null, all the coefficients in the model are jointly insignificant against the alternative that at least one of the coefficients is significant, Blundell and Bond (1998b)’s direct test of third order serial correlation AR(3) at lag three. (The instruments are implemented at lag three and further), and finally the Hansen test of overidentifying restrictions, which tests the validity of the restrictions, $(H_0: E[Z(y - X\beta)] = 0)$. Heteroskedasticity and autocorrelation-consistent standard errors clustered at the firm level and thus robust t-statistics are shown in absolute values within parenthesis. In the pooled OLS, and regressions, standard errors are clustered on firms, whereas standard errors are clustered on firm groups in the firm group level fixed effects regression. The p-values are used to help assessing the statistical significance of the results at the 1%, 5%, and 10% significance levels and significance levels are denoted by ***, **, and * (two-sided), respectively.
The table shows the results from the estimation of the OLS regressions in each year. Regressions are run both for the gini coefficient and the herfindahl index. The dependent variable is the depreciation rate $D_{\text{rate}}$. The independent variables are the gini coefficient (as an alternative the herfindahl index is also used), managers' flexible salary in relation to their total compensation $S_{\text{flex}}/S_{\text{total}}$, market capitalization of firms in relation to the stock market value $\text{Mcap}_{\text{omxv}}$ (in MSEK), a dummy variable indicating whether the firm is owned by a family group or not $\text{Family\_owned}$, age of the firms' CEO. The number of observations, $R$-squared are presented. Heteroskedasticity-consistent standard errors clustered at the firm level and thus robust t-statistics are shown in absolute values within parenthesis. The p-values are used to help assessing the statistical significance of the results at the 1%, 5%, and 10% significance levels and significance levels are denoted by ***, **, and * (two-sided), respectively.

### Table 4: Estimation results from yearly OLS regressions

<table>
<thead>
<tr>
<th>Year</th>
<th>Gini</th>
<th>$S_{\text{flex}}/S_{\text{total}}$</th>
<th>$\text{Mcap}_{\text{omxv}}$</th>
<th>Family-owned</th>
<th>$\text{Ceo_age}$</th>
<th>Herfindahl_index</th>
<th>Constant</th>
<th>Observations</th>
<th>$R$-squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>-0.121</td>
<td>0.016**</td>
<td>-0.238**</td>
<td>-0.309**</td>
<td>-0.226</td>
<td>(1.447)</td>
<td>(2.098)</td>
<td>(2.212)</td>
<td>(2.443)</td>
</tr>
<tr>
<td>2001</td>
<td>-0.015</td>
<td>0.083</td>
<td>0.152</td>
<td>-0.059</td>
<td>-0.090</td>
<td>0.123</td>
<td>-0.002</td>
<td>0.091</td>
<td>0.195*</td>
</tr>
<tr>
<td>2002</td>
<td>-0.015</td>
<td>0.083</td>
<td>0.152</td>
<td>-0.059</td>
<td>-0.090</td>
<td>0.123</td>
<td>-0.002</td>
<td>0.091</td>
<td>0.195*</td>
</tr>
<tr>
<td>2003</td>
<td>-0.015</td>
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<td>0.152</td>
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<td>-0.002</td>
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</table>