

# The Performance Effect of Managerial Ownership: Evidence from China<sup>\*</sup>

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# The Performance Effect of Managerial Ownership: Evidence from China

## **Abstract**

By examining a sample of non-listed Chinese firms, we provide the first evidence from China for the effect of managerial ownership on firm performance. In matching-sample comparisons, we find that firms of significant managerial ownership outperform firms whose managers do not own equity shares. Our further results indicate the relation between firm performance and managerial ownership is nonlinear, and the inflection point at which the relation turns negative occurs at ownership above 50 percent. Compared with previous studies, our results are less likely to suffer from an endogeneity problem due to the non-list nature of our sample and the unique institutional environment in China.

*JEL classification:* G32; L14; L22

*Keywords:* Managerial ownership; Firm performance; Agency costs

## 1. Introduction

The separation of ownership and control in the modern corporation results in a conflict-of-interest problem between shareholders and the management (Berle and Means, 1932). Agency theory contends that incentive schemes should be used to mitigate this problem (Mirrlees, 1976, Jensen and Meckling, 1976). In the past few decades, a number of studies have examined various managerial incentive schemes. Recent studies tend to conclude that cash compensation – the conventional incentive device – plays a negligible role in providing incentives to managers.<sup>1</sup> On the other hand, equity holdings including stock options are believed to be the dominating component of managerial incentives (Hall and Liebman, 1998, Murphy, 1999).

It remains unclear whether managerial ownership matters for company performance in practice. If it does, as agency theory predicts, one should observe superior performance of firms with high managerial ownership. Previous studies have examined the relation between the firm's ownership structure and its performance, and to date, the evidence is mixed. Morck et al. (1988), McConnell and Servaes (1990), Hermalin and Weisbach (1991), and Core and Larcker (2002) document a significant effect of insider ownership on corporate performance. On the other hand, others, including Demsetz and Lehn (1985), Loderer and Martin (1997), and Himmelberg et al. (1999), do not identify a meaningful association between ownership and performance.

This literature extensively examines U.S. firms and other developed markets. To our best knowledge, no study has examined Chinese firms for the managerial ownership-performance relationship. One apparent reason is that under the unique regulatory environment in China (which we discuss in Section 2), managerial ownership in listed companies is usually very low.

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<sup>1</sup> Kole (1997) and Zhou and Swan (2003) show the complicated issues regarding compensation contracts that remain to be understood.

For a sample of 5,284 publicly traded Chinese firms, Wei et al. (2005) report an average stock holding of merely 0.015 percent by senior managers and directors. Given such negligibly low equity holdings, the data on listed Chinese firms are not useful for identifying any meaningful ownership effects. Hence, prior Chinese studies on ownership structures have unanimously ignored managerial shares.

In this study, we examine the managerial ownership-performance relation by using a unique sample of non-listed Chinese firms. The dataset is obtained from a World Bank survey on enterprise production and innovation in China. The survey contains 1,500 firms selected from ten industries and five cities, covering the three-year period 1998-2000. From the total sample, we are able to identify a subsample of 74 firms that have significant managerial shares. By constructing control firms that have similar firm characteristics but whose managers do not own equity shares, we conduct control-sample comparisons for firm performance.

We document large differences in performance between the 74 manager-controlled firms and a control group of 148 size- and industry-matched firms obtained from a one-to-two matching process. After controlling for various firm characteristics, we estimate an average return on assets of 1.49 percent for manager-controlled firms, but only 0.66 percent for the matching group. From the total factor productivity model, we estimate the average value-added at 3.61 million RMB (or approximately US\$437,000) per year for manager-controlled firms and 1.87 million RMB per year for their matching counterparts. These numbers indicate large differences in performance between the two groups of firms: the performance measures of manager-controlled firms double those of the matching firms. Our results are statistically and economically significant and robust.

In quadratic-model regressions, we further find the performance-ownership relation to be nonlinear, which is consistent with many previous studies. The inflection point where the

performance gains from managerial ownership begin to taper off occurs at ownership above 50 percent. This turning-point level of ownership is much higher than prior estimates for U.S. firms that are often a few percentage points.

Our study contributes to the existing literature in two ways. First, our findings provide the first evidence from China for the performance-ownership relation. Due to insufficient data on Chinese firms, such evidence is difficult to obtain from China's currently listed companies. Second, given the uniqueness of our sample, our results are less likely to suffer from an endogeneity problem as compared to studies of publicly traded companies.

An important issue under debate in the literature is whether or not the empirically observed association between performance and ownership is a spurious correlation due to an endogeneity problem. Existing studies focus on listed firms, within which insider ownership itself is a complex function of stock-price performance and incentive contracts so it is difficult to ideally control for endogeneity. Our sample is composed of non-listed firms, covering an early period of China's economic reform. It has three distinct features. First, without a secondary market for non-listed firms, managerial ownership in our sample is not subject to open market transactions and hence should not meaningfully change with company performance. Second, given the central-planning nature of the Chinese economy and the premature market conditions, the firms' ownership structures were largely determined by government policies constrained by political considerations. Third, important incentive schemes that are common in a developed market, such as high-powered bonus plans and stock options, were either negligible or simply do not exist. Thus, the ownership structures do not interact with complex alternative incentive schemes. With such features, the ownership structures are largely determined by exogenous factors irrelevant to incentive contracting, and hence the endogeneity concern is minimized.

The rest of the paper is organized as follows. Section 2 briefly discusses the institutional background of the ownership reform in China. Section 3 describes the data we use in the test. Section 4 presents our main results for the performance effect of managerial ownership. The final section concludes.

## **2. The Ownership Structure of Chinese Firms**

China began its decades-long economic reform in the late 1970s. The main objective of the reform was to introduce market-economy mechanisms into the old system of central planning to enhance the efficiency of resource allocation and to increase productivity. Ever since the start of the reform, it has remained a challenging task for the Chinese government to reform its state-owned enterprises (SOEs) – those that are legally owned by the state and are administered by central, provincial, or local governments. Early reform measures included increasing managerial decision autonomy, implementing incentive-based corporate tax schemes, and introducing performance contracts for management and employees. In the early 1990s, the government introduced more drastic measures intended to reform the ownership of SOEs. The implementation of what was called a “share ownership scheme” started the process of corporatization, in which SOEs were allowed to be privatized or partially privatized. Small SOEs could be privatized through restructuring, selling, or mergers. Middle- and large-sized enterprises could be partially privatized through “share issue privatization,” that is, by listing on the two national stock exchanges, the Shanghai Stock Exchange and the Shenzhen Stock Exchange.

The wave of corporatization has substantially changed the ownership structure of Chinese firms. After ownership restructuring and depending on its owners, a previously state-owned firm would typically have five types of shares: state shares, legal person shares, employee shares, domestic individual shares, and foreign shares. State shares are held by central, provincial, or

local governments, or by solely government-owned enterprises. Legal person shares are equity held by domestic institutions, including insurance companies, mutual funds, and other enterprises.

Managerial ownership falls into the category of employee shares or domestic individual shares. In publicly traded companies, managerial shares mostly result from the so-called “company employee ownership.” Since 1993, an incorporated company going public can allocate up to 2.5 percent of its total equity to its employees. Employee shares become publicly tradable six months after the offering. Because managers in China are not granted equity shares in any other way (although they can purchase shares from the market using their limited personal money), the average stake arising from employee ownership is very low.

For a large sample of 5,284 partially privatized former SOEs, Wei et al. (2005) report an average stock holding of merely 0.015 percent by senior managers and directors. Previous studies of Chinese firms on ownership structures and the SOE reform exclusively investigated listed companies. Because managerial ownership in such companies is negligibly low, these studies have unanimously ignored managerial shares (e.g., Qi et al., 2000; Sun and Tong, 2003; Wang et al., 2004; Wei et al., 2005).

On the other hand, managerial equity holdings can be substantive in small and typically non-listed companies. There are two main cases in which a Chinese firm’s manager can own a large portion of the firm’s equity. In the first case, the firm started as a small enterprise, originally controlled or solely owned by the manager. Since the late 1970s when China began its economic reform, there has been a sustained growth of such entrepreneur-controlled companies. In the second case, the manager of a previously state-owned enterprise became a major shareholder after the company was privatized, in which the shares were sold, wholly or partially, to legal

persons or individual investors including the manager. After such a significant restructuring event, managerial shares would typically not change from year to year. In either case, the manager's personal wealth is likely to impose a binding constraint on her or his capacity for holding equity shares.

### **3. Data**

Our data set is constructed from a World Bank survey on enterprise production and innovation in China. The survey was designed by the Development and Economic Research Department of the World Bank and was conducted by China's National Bureau of Statistics. In the survey, a sample of 1,500 Chinese firms was drawn from five cities and ten industries for the period of 1998-2000. The five cities were chosen so that they are representative in terms of economic development and reform progress, and so that the fast-growing and most economically developed regions (Beijing, Guangzhou, and Shanghai) contrast with less-developed and economically more conservative regions (Tianjin and Chengu). The 10 industries, based on China's industrial classification<sup>2</sup>, include five manufacturing sectors (apparel and leather goods, consumer goods, electronic components, electronic equipment, and vehicles and vehicle parts) and five service sectors (accounting and related services, advertising and marketing, business logistics, communication services, and information technology services). These sectors represent relatively fast-growing and technologically advanced industries in China.

The survey consists of two parts. The first part was completed by a firm's accountant, which provides information on the firm's production and performance. In addition to key performance

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<sup>2</sup> China's industrial classification, GB/T 4754, was initially published in 1984 and revised in 1994 and 2002, and is similar to the 1989 industrial classification announced by the United Nations (ISIC/Rev.3). Detailed information on China's industrial classification can be found in the following Web site: <http://www.stats.gov.cn/tjbz/hyflbz/>.



measures, this part also details the firm's ownership structure, specifying state shares, legal person shares, and managerial shares. Managerial shares refer to equity held by the top manager and her or his family members. The second part of the survey was completed by a firm's senior manager. It provides information on the firm's innovation and external relations with clients, suppliers, government, and research institutions. The variables used in our study are mostly from the first part of the survey data.

Of the total sample, 83 firms have managerial ownership, which account for 5.5 percent of all firms in the sample.<sup>3</sup> Such a percentage of firms with managerial ownership is very small as compared to typical situations in a developed market. On the other hand, this difference precisely reflects the unique market and institutional environment in China. Unlike a result of incentive contracting or governance design, managerial ownership in China depends on government reform policies that, being largely exogenous under the reform strategy of "crossing the river by touching stones," have determined the development of entrepreneur-owned companies and the privatization of SOEs. Apparently, constrained by government policies and managers' personal wealth, managerial ownership was not a widely adopted mechanism in China in the late 1990s.

Table 1 shows the distribution of managerial ownership across industry and over ownership level for the 83 firms with managerial ownership. The left panel shows the distribution by industry, which indicates notable differences between these firms and the total sample. For instance, for the total sample, 7.3 percent are in business logistics services and 14.4 percent in vehicles and vehicle parts. However, for the subsample of the firms with managerial ownership, the corresponding percentages are zero percent and 7.2 percent, respectively.

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<sup>3</sup> We note that the firms with managerial ownership are notably smaller than those without managerial ownership. If we exclude the firms without managerial ownership that have sales higher than the maximum sales of the firms with managerial ownership, this percentage rises to 8.4.

The right panel shows the ownership distribution is highly concentrated: 34 managers were sole proprietors, and the average managerial ownership of all 83 firms was as high as 70 percent (among which, only four firms' managerial ownership was less than 10 percent). This observation, together with the fact that a small number of firms had managerial ownership, further suggests that managerial ownership in China was not an equilibrium outcome of incentive contracting but was constrained by government policies and managers' personal wealth. For convenience of discussion, we loosely call these 83 firms as "manager-controlled firms."

Manager-controlled firms have average assets of 41 million RMB, which are much smaller than the average assets of 183 million RMB for the rest of the total sample. This difference is consistent with the notion that manager-controlled firms are either small and previously state-owned enterprises that were privatized and subsequently owned by individual investors including the managers, or are relatively new companies that have grown rapidly during the reform period. It is hence not surprising that the 34 firms solely owned by managers have average assets of merely 13.5 million RMB. These firms were mostly set up in the mid-1990s.

Our main objective is to compare managerial performance between manager-controlled firms and those with no managerial ownership. However, given the large difference in size between these two groups of firms, it is difficult to make the comparison by simply pooling all firms in one regression and using a variable to control for size. It has been well observed that firm size is associated with both managerial incentive measures and firm performance measures, and that these associations are typically nonlinear. For similar reasons, industry heterogeneity may also complicate our comparison. To mitigate the problem of firm size and industry heterogeneity, we construct matching samples: For each of the manager-controlled firms (which is our treatment group), we identify a matching firm of which the manager does not own equity shares and which

is of similar size and the same industry. We then compare the performance between the manager-controlled firms and their size- and industry-matched counterparts, controlling for various other firm characteristics.

Before matching, we exclude two publicly traded companies from the treatment group. As discussed earlier, the ownership structure of listed companies is likely to suffer from reverse causality due to open-market transactions. Furthermore, because listed companies are subject to market discipline and more stringent government regulations, the incentive schemes are expected to be different from those in non-listed companies. We further exclude five firms with foreign investment because the presence of foreign investors might help improve the firms' performance by bringing in advanced technology and stronger monitoring. We also exclude one firm that appears to be an obvious outlier, of which the average return on assets is as high as 3,800 percent, although the sample average is just one percent.

For each of the 75 remaining manager-controlled firms, we identify two matching firms from the rest of the total sample. A matching firm must be in the same industry and must have a size similar to that of the manager-controlled firm. Size is measured by the firm's total assets. A matching firm is considered to be of a similar size if its total assets are between 70 percent and 130 percent of that of the manager-controlled firm. Because we were unable to find a match for one manager-controlled firm, the final sample consists of 74 manager-controlled firms and 148 matching firms.

The first two panels of Table 2 present the summary statistics of selected firm variables for the sample in which the matching firms are denoted as "matching group A." As expected, the treatment group and the matching group have quite similar size distributions, in which the mean and median assets are both very close between the two groups. Sales and labor are alternative

proxies for firm size, which are also similar between the two groups. We also observe two notable differences between the firms. First, legal person shares appear to be more important relative to state shares with the treatment group (17.6 percent legal person shares vs. 3.0 percent state shares on the average) than with the matching group (44.9 percent legal person shares vs. 34.4 percent state shares on the average). Second, the manager-controlled firms are younger than the matching firms. The mean and median firm ages are 7.5 years and 6.0 years, respectively, for the treatment group, and 15.4 years and 10.0 years, respectively, for the matching group.

Some recent studies on Chinese firms suggest a negative effect of state shares and a positive effect of legal person shares on company performance (e.g., Qi et al., 2000; Sun and Tong, 2003; Wei et al., 2005). Such effects are often controlled by a variable for state shares or legal person shares. However, this approach may not work with our data because the percentage of state shares in the treatment group is negligibly small. For this reason, we also construct another two matching groups, one consisting of SOEs that have 100 percent state shares, which we call “matching group B,” and the other consisting of non-SOEs that have no shares directly held by the state, which we call “matching group C.” Using a similar matching strategy, we require the matching firms to be in the same industries as, and to have assets close to, that of the manager-controlled firms. With fewer firms available for this separated matching, we perform one-to-one matching and identify 74 firms for each matching group.

The third and fourth panels of Table 2 present the summary statistics for matching groups B and C, respectively. Clearly, both groups have similar size distributions as that of the treatment group. Legal person shares are dominating in matching group C (averaged 65.0 percent), while by design, they are nonexistent in matching group B. Because non-SOEs include entrepreneur-owned firms that are relatively young, firms in matching group C are a few years younger than

those in matching group B.

## 4. Empirical Results

We use two performance measures in our examination. The first measure is the firm's ROA, computed as the firm's profits divided by its assets. Profits are sales revenue minus operating costs, which are close to earnings before interest payments and taxes. The second measure is value-added, calculated as sales revenue less intermediate goods. Both ROA and value-added are proxies for managerial efficiency, which, as an accounting performance measure, have the advantage of being unaffected by equity-market volatilities. Another advantage of these performance measures is that because the firms are not publicly held and hence are not subject to regulatory disclosure requirements, the managers are not as strongly motivated as managers of listed companies to manipulate the measures to influence public opinion.

The firm's return on equity is another popular accounting performance measure used in the literature. However, there is a limitation in our data: the World Bank survey provides the information on equity and debt only for the year 2000. We do not use this performance measure in this study.

### 4.1. Base Regressions

We now further examine the managerial-ownership effect on performance using two regression models. The first model estimates the firm's ROA, taking the following linear form:

$$ROA_{it} = \alpha + \beta \times (\text{Managerial ownership}_i) + \sum_j \gamma_j X_{it}^j + \varepsilon_{it} \quad (1)$$

where subscripts  $i$  and  $t$  denote firm and year, respectively. The first term is a constant, which allows for industry effects. The second term is a dummy variable for managerial ownership, which equals one for manager-controlled firms and zero for matching firms. The coefficient  $\beta$

captures the performance effect of managerial ownership, which is our main concern.  $X_{it}^j$  is the  $j$ th control variable, and  $\varepsilon_{it}$  is the error term.

The set of control variables,  $\sum_j \gamma_j X_{it}^j$ , captures various firm characteristics that potentially affect the performance measures. In addition to firm size, we also control for firm age, leverage, external auditors appointment, state shares, and legal person shares. Firm age is a proxy for the firm's development stage and may be associated with certain levels or patterns of the firm's performance. The summary statistics in Table 2 show notable differences in firm age between manager-controlled firms and matching firms. We thus control for firm age heterogeneity. Leverage, external auditors, and legal person shares are all potential factors influencing a firm's governance and performance, so they are also included in the model. We also use an alternative control variable, the ratio of legal person shares over state shares, to simultaneously control for state shares and legal-person shares. Since our data provide information on equity and debt only for the year 2000, the variable of leverage is constant for each firm. The effect of external auditors is captured by a dummy variable, which equals one for firms that appoint external auditors and equals zero for other firms. Year and city dummies are also included in the model.

The second regression model estimates the firm's total factor productivity (TFP), using the logistic Cobb-Douglas function:

$$\begin{aligned} \ln(\text{Value added}_{it}) = & \alpha + \beta_1 \times (\text{Managerial Ownership}_i) \\ & + \beta_2 \times \ln(\text{Capital}_{it}) + \beta_3 \times \ln(\text{Labor}_{it}) + \sum_j \gamma_j X_{it}^j + \varepsilon_{it} \end{aligned} \quad (2)$$

where capital is the firm's total assets, and labor is the number of employees. Other variables in model (2) are similarly defined as in model (1). The coefficient  $\beta_1$  estimates the effect of managerial ownership on the firm's productivity.

Table 3 presents our base-model regressions, which compare the performance between the 74 manager-controlled firms and the 148 size- and industry-matched control firms (matching group A). Columns 1-3 report the regressions of ROA, and columns 4-6 report the regressions of value-added. As discussed above, to avoid the interaction of managerial shares and state shares, we do not directly include state shares in the base-model regressions. Instead, we use an alternative variable – the ratio of legal person shares over state shares – to simultaneously control for both factors. Columns (3) and (6) present the regressions using this approach. The effect of state shares is further examined below by using matching groups B and C. The two models fit the data well, where the adjusted  $R^2$  is close to 20 percent for the estimation of ROA and about 60 percent for the estimation of value-added.

In all six regressions, the coefficient on the dummy variable of managerial ownership is positive and statistically significant, mostly, at the one percent level. This observation, together with the large magnitude of the coefficient, suggests a strong positive effect of managerial ownership on company performance. To gauge the economic significance of this effect, we obtain the point estimates of ROA and value-added using the regressions in columns (2) and (5), respectively. Based on the mean values of the firm variables for the matching-firm group,<sup>4</sup> we estimate ROA at 0.66 percent and value-added at 1.86 million RMB. When these firms were owned or controlled by the managers (by setting the managerial ownership dummy to one), the estimate of ROA increases to 1.49 percent, and the estimate of value-added increases to 3.61 million RMB. These numbers show an economically strong effect of managerial ownership; both performance measures are about doubled with the inclusion of managerial ownership.

The coefficients on the control variables are mostly consistent with previous studies. The

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<sup>4</sup> Very similar results are obtained when the median values of firm variables are used in the estimation.

logarithm of assets is clearly an important determinant of the firm's performance, of which the coefficient is statistically highly significant in all regressions. The logarithm of labor is also a significant factor in the determination of the firm's productivity.

The coefficient on the debt-equity ratio is negative and becomes marginally significant in the regressions of TFP. This finding is inconsistent with the standard capital structure theory, which predicts a higher default risk and thus higher returns for firms of higher leverage. On the other hand, a negative effect of debt is in line with the soft-budget constraint theory that predicts higher agency costs of debt with soft-budget constraints (Kornai, 1980).

Other control variables are either insignificant or have mixed coefficient estimates. Since the coefficients on the control variables (except firm age, which is further examined in Section 4.3) do not change qualitatively in the various regressions, we will ignore the effects of these variables in later discussions.

Table 4 reports the regressions for the comparison between manager-controlled firms and matching groups A and B separately. All the control variables, including year, industry, and city dummies, are included in the regressions. The coefficients on the control variables are not reported in this table.

We have two main observations from Table 4. First, consistent with the results reported in Table 3, the regressions in Table 4 show a significantly positive effect of managerial shareholdings on performance, both in the comparison with matching group B and in the comparison with matching group C. Because group C consists only of non-SOEs that have no state shares, the comparison with this group is particularly interesting, further highlighting the role of managerial ownership incentives. These results reinforce our findings from Table 3 and further confirm that the positive effect of managerial ownership is not driven by a lack of state



shares at the manager-controlled firms.

On the other hand, the estimates do suggest a stronger performance effect in the comparison with matching group B than with matching group C. This is our second observation. The difference is explicit and more notable in the regressions of the TFP model. For instance, based on the mean values of the firm variables, managerial ownership would increase value-added from 2.32 million RMB to 3.28 million RMB for non-SOEs and more significantly, from 1.74 million RMB to 4.18 million RMB for SOEs. This observation lends further support to the proposition that managerial ownership mitigates agency costs and improves company performance. When state shares provide a weaker role than non-state shares in monitoring, state-owned enterprises should incur the highest agency costs, and hence the benefit of managerial ownership should be strongest for such firms.

We have so far ignored the equity shares held by individuals other than the top manager and her or his family members. The World Bank survey also provides information on equity shares held by such individuals, which we call *individual shares*. Individual shares present the ownership of individual investors or the firm's employees, or both. Employee shares in China are subject to government regulations and, on the average, account for less than two percent of a listed firm's total equity. For non-listed companies, however, both employee shares and the shares held by individual investors can be significant. Of the World Bank survey sample, 359 firms have individual shares of which 312 have total individual shares higher than 20 percent. At such high levels, individual shares can be concentrated and one cannot exclude the possibility that employees or individual investors play an active role in monitoring the management, hence influencing the firm's performance.

This possibility can complicate our results. In the presence of both managerial shares and

individual shares, our tests would not distinguish the performance effects between these two factors. A simple method for disentangling the effects is to add a variable in models (1) and (2) to control for individual shares. Alternatively, we can use a dummy variable for firms with significant individual shares (e.g., for individual shareholdings above 20 percent), which are more likely to be associated with concentrated individual ownership.

We use both methods to address this issue. To compare alternative specifications for the control of legal person shares, state shares, and individual shares, we run four different regressions for both ROA and TFP. Table 5 presents the regressions based on the models in Table 3, including a control for individual shares. In six out of eight regressions, the coefficient on individual shares, as a dummy variable or as a percentage of total equity, has mixed signs and is statistically not different from zero. In the other two regressions (columns 5 and 7), the coefficient is significantly positive.

Importantly, after we control for individual shares, the coefficient on the managerial ownership dummy remains significantly positive in all regressions, although the significance level slightly drops in some of the ROA regressions compared with their counterparts in Table 3. It is interesting to note the difference between the regressions in columns 5 and 7 and their counterparts in Table 3. In these two regressions, the coefficient on individual shares is significantly positive, but the coefficient on the managerial ownership dummy becomes greater and with a slightly higher significance level than its counterpart in Table 3 (columns 5 and 6). Therefore, these two regressions show a strengthened performance effect of managerial ownership after controlling for individual shares.

#### **4.2. Nonlinearities between Firm Performance and Managerial Ownership**

Many previous studies document a nonlinear relation between managerial ownership and firm

performance. The relation is positive at low levels of ownership and then turns negative for ownership above a certain level. In our sample, the majority of the firms with managerial shares are either solely owned or substantially controlled by managers so the ownership structure is highly concentrated. For this reason, we have so far used a dummy variable to capture the effect of managerial shares. On the other hand, although managerial shares in our sample are concentrated at high levels, the distribution also shows a notable variation (see Table 1). Following McConnell and Servaes (1990) and others, we examine in this section the nonlinear ownership-performance relation by using continuous variables for managerial shares.

Table 6 presents the regressions for this examination, in which managerial ownership is measured as the percentage of the firm's equity held by the manager. Three functions are used to characterize the ownership effect, which are linear, quadratic, and logarithm functions. To avoid causing missing values, in the logarithm function, an ownership level of 0.1 percent is assumed when the ownership is zero. All control variables discussed above, including the dummy variables, are included in the regressions.

We have two observations from these regressions. First, consistent with our findings discussed above, the linear and logarithm models in columns 1, 3, 4, and 6 show an overall positive relationship between performance and managerial ownership. The coefficient on the ownership variable is positive in all four regressions, and is significant or marginally significant in three of them. Our earlier results further suggest that the performance-ownership relation is stronger with the model of value added than with that of ROA. This is also the case with these regressions using continuous ownership variables.

Second, consistent with previous studies, the coefficients in the quadratic regressions, columns 2 and 5, indicate an inverted-U shape relation between performance and ownership. For

the ROA-ownership relation, the coefficients are insignificant. However, they are consistently with the right signs, which are robust in the various checks for the controls of legal person shares, state shares, and individual shares. The model of value added fits the data much better, and identifies a strong, highly significant inverted-U shape relationship between performance and managerial ownership. An inflection point occurs at ownership of 75 percent in the regression of ROA (column 2) and 53 percent in the regression of value added (column 5). Such a turning-point level of ownership is much higher than the typical estimate for U.S. firms; for instance, Morck, Shleifer, and Vishny (1988) identify an inflection point at around 5 percent.

The coefficients on the control variables are directly comparable with those reported in Tables 3 and 5. These coefficient estimates do not change notably and remain qualitatively the same as the corresponding coefficients in these two tables.

#### **4.3. Potential Effects of Founding-Family Firms**

Our sample consists of mostly small and young companies and many of the managers are expected to be the founders. A potential problem is that our results might be complicated by a founder effect. By examining the S&P 500 firms, Anderson and Reeb (2003) find founding-family firms perform better than nonfamily firms. Palia et al. (2007) report differences in managerial compensation between founders' led firms and non-founder firms and also find evidence that founder firms are associated with higher values.

Our data do not contain the information on company founders and their ownership, so we cannot directly control for the founder effect. We briefly address this issue by two indirect approaches. In the first approach, we reexamine the base-model regressions (Table 3) by using firm age as a proxy for the role of founders. The intuition for this proxy variable is simple: for relatively young firms, the younger the firm, the more likely it is still controlled by the founder.

Consistent with this intuition, the summary statistics in Table 1 indicate the firms with managerial ownership are several years younger than the control firms.

We examine different functional forms for firm age; in addition to the logarithm function as in above regressions, we also examine a linear model and a quadratic model. We obtain two observations from this exercise.<sup>5</sup> First, there is a mixed effect of firm age on performance, which varies with the model specification and the performance measure. Second, the coefficients on the ownership dummy do not change qualitatively; the positive relation between performance and ownership remains significant and robust.

In the second approach, we reexamine the base regressions by including a dummy variable for firms with 100 percent managerial ownership. Since managers of such fully owned firms are more likely to be the founder,<sup>6</sup> we expect the 100%-ownership dummy to capture the effect of founder ownership relative to non-founder ownership. This examination also shows a mixed effect of the sole ownership. The coefficient on the 100%-ownership dummy is insignificant in the regressions for ROA, and is significantly negative in the regressions for value added. On the other hand, the coefficient on the ownership dummy remains to be positive and highly significant in all regressions, where the economic significance even increases with the value-add model.

However, with these limited results, we are cautious not to make a conclusion about the founder effect. It is possible that our proxy variables do not adequately capture this effect. More important, it is inherently difficult to disentangle an ownership effect from a founder effect. In the literature regarding founder firms, one of the primary concerns is the identification of founder

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<sup>5</sup> The regressions for the discussions in this section are not reported, which are available upon request.

<sup>6</sup> Our data indicate that on average, the firms fully owned by managers are smaller and younger than those partially owned by managers. However, because the firm's owner might have changed, 100 percent ownership does not necessarily mean founder ownership.

companies. Founder families usually own substantial equity ownership. Anderson and Reeb (2003) find that founding family ownership “is both prevalent and substantial; families are present in one-third of the S&P 500 and account for 18 percent of outstanding equity” (p.1301). Significant founder ownership seems a general phenomenon and a founder effect unavoidably interacts with a substantial-ownership effect. Two further questions here are: (i) In what mechanism is a founder effect realized? Is it through founding family’s control due to substantial ownership, or through ownership-unrelated means such as founders’ expertise and reputation concerns? (ii) Does founding-family ownership work differently from non-founder ownership in influencing firm performance? To answer these questions, a careful, separate examination is needed, which requires detailed data on ownership structure and investor background.

## **5. Conclusion**

By examining a sample of non-listed Chinese firms, we provide the first Chinese evidence for managerial ownership-performance relations. This evidence is difficult to obtain from publicly traded companies because, given the institutional and policy constraints in China, managerial ownership in listed companies is mostly negligible.

From matching-sample comparisons, we document a strong, positive effect of managerial ownership on firm performance. We compare firms owned or substantially controlled by managers with groups of size- and industry-matched firms whose managers do not own equity. We find that manager-controlled firms outperform matching firms. For example, for the average sample firm without managerial shares, our model estimates the ROA at 0.41 percent and value-added at 1.74 million RMB. When this firm is controlled by the manager, the ROA increases to 1.41 percent, and value-added jumps to 4.18 million RMB. Our further examination finds the ownership-performance relation to be nonlinear, consistent with many previous studies.

However, the inflection point with our sample is above 50 percent, which is much higher than the typical US counterpart.

Given the unique features of the data, our test has distinct advantages in mitigating the potential endogeneity problem in such a test. First, without a secondary market, the managerial shares of non-listed companies are mostly invariant to company performance and hence our test is unlikely to suffer from a causality problem. Second, due to the institutional background of central planning and the premature development of the financial markets in China, managerial ownership in our sample is largely determined by exogenous government policies irrelevant to incentive contracting. Third, many incentive schemes that are common in a developed market, such as high-powered bonus plans, restricted stock awards, and stock options, either are rare or do not exist in China, so our data do not involve complex interactions between ownership incentives and alternative incentive mechanisms.

There are apparent limitations of our data. Our sample is relatively small and it consists of mostly small firms. In particular, the distribution of managerial ownership does not show a sufficient variation. While a small number of firms in our sample have concentrated equity holdings by managers, other firms have no managerial ownership. Because of this problem, we have focused on the role of substantial ownership. Clearly, our results are uninformative of the ownership-performance relation at low levels of ownership, say, around five percent, which attracts the attention of many previous studies.

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**Table 1. Distribution of Firms with Managerial Ownership**

Our sample is obtained from the World Bank survey on enterprise production and innovation in China for the period of 1998-2000. In the survey, 1,500 Chinese firms are drawn from five cities (Beijing, Chengdu, Guangzhou, Tianjin, and Shanghai) and ten industry sectors. Of the total sample, 83 firms' managers have equity shares. This table shows the distribution of these firms across industry and over managerial ownership.

| Industry                     | Number of firms | Ownership range (%) | Number of firms |
|------------------------------|-----------------|---------------------|-----------------|
| <u>Service sector:</u>       |                 |                     |                 |
| Accounting services          | 6               | 2-10                | 4               |
| Advertising & marketing      | 8               | 10-20               | 9               |
| Business logistics services  | 0               | 20-30               | 9               |
| Communication services       | 7               | 30-40               | 1               |
| IT services                  | 8               | 40-50               | 6               |
|                              |                 | 50-60               | 4               |
|                              |                 | 60-70               | 5               |
| <u>Manufacturing sector:</u> |                 |                     |                 |
| Apparel & leather goods      | 16              | 70-80               | 5               |
| Consumer products            | 9               | 80-90               | 4               |
| Electronic components        | 8               | 90-100              | 2               |
| Electronic equipment         | 13              | 100                 | 34              |
| Vehicles & vehicle parts     | 6               |                     |                 |
| Total                        | 83              | Total               | 83              |

## **Table 2. Summary Statistics**

This table presents the summary statistics of ownership structures and firm variables for our sample for regression models (1) and (2). As a subsample of the World Bank survey on enterprise production and innovation in China, our sample is obtained by matching 83 manager-controlled firms (as described in Table 1) with firms without managerial ownership. After excluding two listed firms, five firms with foreign shares, and one outlier from the manager-controlled firms, our one-to-two matching process results in 74 manager-controlled firms (the treatment group) and 148 matching firms (matching group A). For each manager-controlled firm, we have two matching firms, which are in the same industry and have a similar size, but of which the manager does not own equity shares. To isolate the role of state shares, we also separately match manager-controlled firms with firms of 100 percent state shares (matching group B) and with firms of zero state shares (matching group C). In one-to-one matches, we identify 74 control firms for groups B and C, respectively. Firm age is the number of years the firm has been in operation. External auditor is a dummy variable that equals one if the firm hires external auditing firms, and zero otherwise. The exchange rate between U.S. dollar and Chinese yuan (RMB) was within the range of 8.237 to 8.280 yuan per dollar during the years 1998-2000.

| Variable  | Unit        | Mean  | Median | Standard deviation | Observation |
|---|-------------|-------|--------|--------------------|-------------|
| <u>Treatment group: Firms with managerial ownership (74 firms)</u>        |             |       |        |                    |             |
| Manager-owned shares  | Percent     | 69.0  | 80.0   | 33.5               | 212         |
| State shares  | Percent     | 3.0   | 0.0    | 11.6               | 212         |
| Legal person shares   | Percent     | 17.6  | 0.0    | 27.2               | 212         |
| Labor   | Workers     | 300.3 | 105.0  | 514.2              | 203         |
| Assets  | Million RMB | 25.8  | 3.0    | 65.1               | 202         |
| Sales   | Million RMB | 56.9  | 9.1    | 129.5              | 201         |
| Firm age  | Years       | 7.5   | 6.0    | 5.8                | 212         |
| Debt-equity ratio   | –           | 0.89  | 0.43   | 1.26               | 195         |
| External auditor dummy  | –           | 0.5   | 1.0    | 0.5                | 212         |
| <u>Matching group A: Firms without managerial ownership (148 firms)</u>   |             |       |        |                    |             |
| State shares  | Percent     | 34.4  | 0.0    | 46.2               | 443         |
| Legal person shares   | Percent     | 44.9  | 20.0   | 46.7               | 443         |
| Labor   | Workers     | 365.1 | 102.0  | 624.4              | 412         |
| Assets  | Million RMB | 27.1  | 3.4    | 68.5               | 414         |
| Sales   | Million RMB | 31.6  | 6.5    | 74.8               | 413         |
| Firm age  | Years       | 15.4  | 10.0   | 14.6               | 443         |
| Debt-equity ratio   | –           | 1.22  | 0.11   | 3.00               | 403         |
| External auditor dummy  | –           | 0.5   | 1.0    | 0.5                | 443         |
| <u>Matching group B: SOEs without managerial ownership (74 firms)</u>     |             |       |        |                    |             |
| State shares  | Percent     | 100.0 | 100.0  | 0.0                | 219         |
| Legal person shares   | Percent     | 0.0   | 0.0    | 0.0                | 219         |
| Labor   | Workers     | 369.0 | 101.0  | 524.7              | 193         |
| Assets  | Million RMB | 25.9  | 3.9    | 56.0               | 193         |
| Sales   | Million RMB | 26.5  | 6.3    | 62.5               | 189         |
| Firm age  | Years       | 19.4  | 12.0   | 17.3               | 219         |
| Debt-equity ratio   | –           | 1.31  | 0.00   | 3.19               | 181         |
| External auditor dummy  | –           | 0.6   | 1.0    | 0.5                | 219         |
| <u>Matching group C: Non-SOEs without managerial ownership (74 firms)</u> |             |       |        |                    |             |
| State shares  | Percent     | 0.0   | 0.0    | 0.0                | 221         |
| Legal person shares   | Percent     | 65.0  | 100.0  | 45.1               | 221         |
| Labor   | Workers     | 364.2 | 100.0  | 701.5              | 197         |
| Assets  | Million RMB | 26.4  | 3.7    | 61.4               | 198         |
| Sales   | Million RMB | 43.0  | 7.0    | 90.3               | 197         |
| Firm age  | Years       | 11.3  | 7.0    | 11.6               | 221         |
| Debt-equity ratio   | –           | 1.62  | 0.11   | 6.25               | 191         |
| External auditor dummy  | –           | 0.5   | 1.0    | 0.5                | 221         |

**Table 3. The Effect of Ownership: Manager-Controlled Firms vs. Matching Group A**

This table presents our base-regression results for the effect of managerial ownership on firm performance using matching group A as the control. The sample is described in Table 2. Columns 1-3 are the regressions for model (1), and columns 4-6 are the regressions for model (2). Return on assets is calculated as the ratio of profits to assets, and value added is estimated as sales less intermediate goods. The managerial ownership dummy equals one for manager-controlled firms and zero for matching firms. The ratio of legal person shares over state shares equals zero when there are no state shares. *t*-statistics are reported in parentheses. The signs \*\*\*, \*\*, and \* represent significance levels at 1%, 5%, and 10%, respectively.

| Independent variables            | Dependent variables |                     |                     |                    |                    |                    |
|----------------------------------|---------------------|---------------------|---------------------|--------------------|--------------------|--------------------|
|                                  | Return on assets    |                     |                     | ln(Value added)    |                    |                    |
|                                  | (1)                 | (2)                 | (3)                 | (4)                | (5)                | (6)                |
| Constant                         | 3.936***<br>(3.73)  | 3.796***<br>(3.19)  | 4.027***<br>(3.22)  | 2.206***<br>(5.34) | 1.444***<br>(3.08) | 1.806***<br>(3.76) |
| Managerial ownership dummy       | 0.684***<br>(2.59)  | 0.830***<br>(2.66)  | 0.656**<br>(2.14)   | 0.648***<br>(5.21) | 0.664***<br>(5.09) | 0.578***<br>(4.49) |
| ln(Assets)                       | -0.363***<br>(4.09) | -0.417***<br>(4.32) | -0.414***<br>(4.19) | 0.319***<br>(5.97) | 0.376***<br>(6.78) | 0.356***<br>(6.37) |
| ln(Labor)                        |                     |                     |                     | 0.527***<br>(5.44) | 0.560***<br>(5.56) | 0.567***<br>(5.48) |
| ln(Firm age)                     |                     | 0.139<br>(0.87)     | 0.127<br>(0.78)     |                    | -0.039<br>(0.49)   | -0.042<br>(0.53)   |
| Debt-equity ratio                |                     | -0.007<br>(0.23)    | -0.126<br>(0.38)    |                    | -0.042*<br>(1.79)  | -0.042*<br>(1.82)  |
| External auditor dummy           |                     | 0.133<br>(0.52)     | 0.095<br>(0.38)     |                    | 0.127<br>(0.88)    | 0.150<br>(1.03)    |
| Legal person shares (%)          |                     | 0.003<br>(1.22)     |                     |                    | 0.004***<br>(2.65) |                    |
| Legal person shares/state shares |                     |                     | 0.054<br>(0.71)     |                    |                    | -0.005<br>(0.42)   |
| Year dummy                       | Yes                 | Yes                 | Yes                 | Yes                | Yes                | Yes                |
| Industry dummy                   | Yes                 | Yes                 | Yes                 | Yes                | Yes                | Yes                |
| City dummy                       | Yes                 | Yes                 | Yes                 | Yes                | Yes                | Yes                |
| Adjusted R <sup>2</sup>          | 0.176               | 0.187               | 0.195               | 0.558              | 0.594              | 0.588              |
| Observations                     | 586                 | 509                 | 509                 | 454                | 404                | 404                |

**Table 4. The Effect of Ownership: Manager-Controlled Firms vs. Matching Groups B and C**

This table presents the regressions for the effect of managerial ownership on firm performance using matching groups B (SOEs) and C (non-SOEs), separately, as the control. The sample is described in Table 2. Return on assets is calculated as the ratio of profits to assets, and value added is estimated as sales less intermediate goods. The managerial ownership dummy equals one for manager-controlled firms and zero for matching firms. The ratio of legal person shares over state shares equals zero when there are no state shares. All control variables, including the year, industry, and city dummies, are included, of which the coefficients, are not reported in this table. *t*-statistics are reported in parentheses. The signs \*\*\*, \*\*, and \* represent significance levels at 1%, 5%, and 10%, respectively.

| Independent variables             | Dependent variables |                     |                    |                    |                     |                     |                    |                    |
|-----------------------------------|---------------------|---------------------|--------------------|--------------------|---------------------|---------------------|--------------------|--------------------|
|                                   | (Control group B)   |                     |                    |                    | (Control group C)   |                     |                    |                    |
|                                   | Return on assets    | Return on assets    | ln(Value added)    | ln(Value added)    | Return on assets    | Return on assets    | ln(Value added)    | ln(Value added)    |
| Managerial ownership dummy        | 0.992**<br>(2.49)   | 1.001***<br>(2.66)  | 0.884***<br>(4.10) | 1.036***<br>(5.08) | 1.122***<br>(3.12)  | 1.009***<br>(2.77)  | 0.349***<br>(2.77) | 0.263**<br>(2.19)  |
| ln(Assets)                        | -0.395***<br>(4.18) | -0.384***<br>(3.98) | 0.429***<br>(6.51) | 0.421***<br>(6.34) | -0.364***<br>(3.72) | -0.376***<br>(3.76) | 0.350***<br>(6.61) | 0.340***<br>(6.43) |
| ln(Labor)                         |                     |                     | 0.406***<br>(3.37) | 0.403***<br>(3.32) |                     |                     | 0.781***<br>(8.30) | 0.794***<br>(8.49) |
| Legal person shares (%)           | 0.010<br>(1.03)     |                     | 0.005<br>(1.46)    |                    | 0.004<br>(1.33)     |                     | 0.002<br>(1.28)    |                    |
| Legal person shares /state shares |                     | 0.055<br>(0.71)     |                    | -0.013<br>(1.02)   |                     | 0.037<br>(1.06)     |                    | 0.004<br>(0.93)    |
| Intercept and control variables   | Yes                 | Yes                 | Yes                | Yes                | Yes                 | Yes                 | Yes                | Yes                |
| Adjusted R <sup>2</sup>           | 0.225               | 0.236               | 0.639              | 0.638              | 0.185               | 0.199               | 0.753              | 0.752              |
| Observations                      | 331                 | 331                 | 262                | 262                | 356                 | 356                 | 292                | 292                |

**Table 5. The Effect of Managerial Ownership after Controlling for Individual Shares**

The regressions in this table are based on the regressions in Table 3 with complete control variables. A control variable for non-managerial individual shares (defined as equity held by individuals other than the top manager and the manager’s family members) is included, either as a percentage of the firm’s total equity (columns (1), (3), (5), and (7)) or as a dummy variable for individual shares equal to or above 20 percent (columns (2), (4), (6), and (8)). Return on assets is calculated as the ratio of profits to total assets, and value added is estimated as sales less intermediate goods. The managerial ownership dummy equals one for manager-controlled firms and zero for matching firms. The ratio of legal person shares over state shares equals zero when there are no state shares. The coefficients on the control variables, including the year, industry, and city dummies, are not reported in this table. *t*-statistics are reported in parentheses. The signs \*\*\*, \*\*, and \* represent significance levels at 1%, 5%, and 10%, respectively.

| Independent variables                 | Dependent variables |                     |                     |                     |                    |                    |                    |                    |
|---------------------------------------|---------------------|---------------------|---------------------|---------------------|--------------------|--------------------|--------------------|--------------------|
|                                       | Return on assets    |                     |                     |                     | ln(Value added)    |                    |                    |                    |
|                                       | (1)                 | (2)                 | (3)                 | (4)                 | (5)                | (6)                | (7)                | (8)                |
| Managerial ownership dummy            | 0.734**<br>(2.39)   | 0.947**<br>(2.17)   | 0.552*<br>(1.82)    | 0.914**<br>(2.12)   | 0.900***<br>(5.78) | 0.620***<br>(2.88) | 0.678***<br>(4.77) | 0.699***<br>(3.27) |
| ln(Assets)                            | -0.419***<br>(4.28) | -0.418***<br>(4.35) | -0.412***<br>(4.22) | -0.414***<br>(4.20) | 0.371***<br>(6.93) | 0.376***<br>(6.76) | 0.346***<br>(6.22) | 0.358***<br>(6.37) |
| ln(Labor)                             |                     |                     |                     |                     | 0.592***<br>(6.09) | 0.562***<br>(5.52) | 0.588***<br>(5.72) | 0.562***<br>(5.35) |
| Legal person shares (%)               | 0.002<br>(0.70)     | 0.003<br>(1.10)     |                     |                     | 0.007***<br>(3.85) | 0.004**<br>(2.56)  |                    |                    |
| Legal person shares over state shares |                     |                     | 0.054<br>(0.71)     | 0.054<br>(0.71)     |                    |                    | -0.006<br>(0.47)   | -0.005<br>(0.42)   |
| Individual shares (%)                 | -0.003<br>(0.73)    |                     | -0.004<br>(1.27)    |                     | 0.008***<br>(3.80) |                    | 0.005**<br>(2.52)  |                    |
| Individual shares dummy               |                     | -0.140<br>(0.27)    |                     | -0.298<br>(0.61)    |                    | 0.054<br>(0.22)    |                    | -0.144<br>(0.64)   |
| Intercept and control variables       | Yes                 | Yes                 | Yes                 | Yes                 | Yes                | Yes                | Yes                | Yes                |
| Adjusted R <sup>2</sup>               | 0.188               | 0.187               | 0.198               | 0.196               | 0.610              | 0.595              | 0.594              | 0.588              |
| Observations                          | 509                 | 509                 | 509                 | 509                 | 404                | 404                | 404                | 404                |

**Table 6. Nonlinearities between Firm Performance and Managerial Ownership**

This table presents the regressions of firm performance on managerial ownership as a percentage of the firm's equity. Three functional forms are used for managerial ownership, which are linear, quadratic, and logarithm functions. The sample, described in Table 2, consists of 74 manager-controlled firms and 148 matching firms (matching group A). Return on assets is calculated as the ratio of profits to assets, and value added is estimated as sales less intermediate goods. Individual shares are the equity held by individuals other than the top manager and the manager's family members, as a percentage of the firm's total equity. The ratio of legal person shares over state shares equals zero when there are no state shares. All control variables, including the year, industry, and city dummies, are included, of which the coefficients are not reported in this table. t-statistics are reported in parentheses. \*\*\*, \*\*, and \* represent significance levels at 1%, 5%, and 10%, respectively.

| Independent Variables                 | Dependent variables |                     |                     |                    |                      |                    |
|---------------------------------------|---------------------|---------------------|---------------------|--------------------|----------------------|--------------------|
|                                       | Return on assets    |                     |                     | ln(Value added)    |                      |                    |
|                                       | (1)                 | (2)                 | (3)                 | (4)                | (5)                  | (6)                |
| Constant                              | 4.275***<br>(3.23)  | 4.301***<br>(3.25)  | 4.405***<br>(3.37)  | 1.738***<br>(3.53) | 1.890***<br>(3.91)   | 2.068***<br>(3.86) |
| Managerial ownership (%)              | 0.005<br>(1.18)     | 0.015<br>(1.28)     |                     | 0.005***<br>(2.96) | 0.042***<br>(5.34)   |                    |
| Managerial ownership Squared          |                     | -0.0001<br>(0.79)   |                     |                    | -0.0004***<br>(4.70) |                    |
| ln(Managerial ownership)              |                     |                     | 0.080*<br>(1.60)    |                    |                      | 0.104**<br>(1.97)  |
| ln (Assets)                           | -0.411***<br>(4.20) | -0.412***<br>(4.22) | -0.411***<br>(4.21) | 0.350***<br>(6.11) | 0.316***<br>(6.02)   | 0.356***<br>(6.34) |
| ln (Labor)                            |                     |                     |                     | 0.581***<br>(5.49) | 0.635***<br>(6.52)   | 0.566***<br>(5.40) |
| Legal person shares over state shares | 0.060<br>(0.79)     | 0.057<br>(0.74)     | 0.055<br>(0.73)     | 0.002<br>(0.17)    | -0.010<br>(0.87)     | -0.003<br>(0.26)   |
| Individual shares (%)                 | -0.004<br>(1.42)    | -0.005<br>(1.48)    | -0.004<br>(1.30)    | 0.004**<br>(2.20)  | 0.003*<br>(1.95)     | 0.137<br>(0.41)    |
| Intercept and control variables       | Yes                 | Yes                 | Yes                 | Yes                | Yes                  | Yes                |
| Adjusted R <sup>2</sup>               | 0.195               | 0.196               | 0.197               | 0.599              | 0.604                | 0.599              |
| Observations                          | 509                 | 509                 | 509                 | 404                | 404                  | 404                |