Productivity and Survival of Family Firms in Japan: An Analysis Using Firm-Level Microdata

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Abstract

This article, by using a unique dataset of a large number of Japanese firms, empirically investigates the relationship between the structure of shareholding and productivity, survival, and managerial objectives. The focus is on the distinct traits of family firms, which compose the majority of Japanese firms.

According to the results, the managerial objectives and performance of family firms are qualitatively and quantitatively different from those of non-family firms. Specifically, 1) productivity growth of family firms are significantly slower than non-family firms, after controlling for firm size, firm age, and industry; 2) family firms' probability of survival is higher than that of non-family firms; and 3) even after controlling for the high propensity to survive, family firms' productivity growth is slower.

As family firms' management objectives are different from non-family firms, these results cannot be interpreted normatively. However, it is desirable to expand ownership options by reducing barriers to going public or transferring ownership.

Keywords: Family Firm, Ownership, Productivity, Survival
JEL Classification: L21, L26, M21

1. Introduction

Productivity growth is an important policy issue in advanced countries. In order to fully understand firm-level productivity differences and draw policy implications, it is essential to clarify what types of management and organization produce higher productivity. This article, by using a unique dataset of a large number of Japanese firms, empirically investigates the effects of the shareholding structure on firm productivity, growth, and survival. Special attention is paid to the differences between family firms, including owner-managed firms, and non-family firms.

Survey data on detailed firm characteristics and firm-level microdata from official statistics are matched and used in the analysis. The data contain information on the structure of shareholdings and the objectives of management. The sample exceeds 5,000 manufacturing and non-manufacturing firms including listed large firms and non-listed SMEs.

Family firms comprise a majority of Japanese firms as in other advanced economies. According to Ellul et al. (2007), from 30% to 40% of Fortune 500 and S&P 500 big companies are family owned. [1] Because owner-managed firms and family firms have intriguing implications for corporate governance, the effects of board or family ownership on firm performance have been vigorously investigated from the viewpoint of an agency problem (see, among others, Radice (1971), Palmer (1973), Demsetz and Lehn (1985), Morck et al. (1988), McConnell and Servaes (1990), Anderson and Reeb (2003), Miller et al. (2007)). Family-controlled firms, where conflicts of interest between owners and managers are absent, may have positive effects on firm performance. On the other hand, the family shareholders, by using their power to extract private benefits, may harm firm performance. [2] Therefore, empirical assessments are essential.

Most of the prior empirical studies use firm value – from the standpoint of accounting measure of profitability, Tobin's q, or abnormal return – as a dependent variable. [3] Some studies analyze the effects of family shareholdings on debt costs (Bargnani et al. (1994), Ellul et al. (2007)). In addition, several studies focus on firm growth or productivity. Lichtenberg and Pushner (1994), for example, by using Japanese manufacturing companies' financial data from 1976 to 1989 analyze the effects of the shareholding structure on productivity. According to the results, board ownership, when the share is from 5% to 15%, has a positive effect on the

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1 Bertrand and Schoar (2006) is an example of a recent survey on family firms.
2 Villalonga and Amit (2006) named the first problem "Agency Problem I" and the second problem "Agency Problem II." Morck et al. (2004) explain pros and cons of family firms.
3 Fukuda et al. (2006) and Saito (2007) are recent examples of this type of analysis for Japanese firms by using Tobin's q as a dependent variable.

total factor productivity (TFP) level.[4]

In this paper, I use measures of productivity (labor productivity and TFP) growth as dependent variables, because the interest here is not to test the agency theory, but to search for firm characteristics affecting productivity. At the same time, I analyze the probability of firm survival by probit estimation.

"Family firms" in this paper are defined as: 1) owner-managed firms and 2) firms at which board members and their family have large shareholdings. The distinctive features of this paper are 1) utilizing a large sample including SMEs, covering both manufacturing and non-manufacturing companies, 2) analyzing medium-term productivity growth, and 3) taking explicit account of firm exits.

The major results can be summarized as follows.
1) In family firms, after controlling for firm size, firm age, and industry, the annual rate of labor productivity growth and TFP growth are around 2% slower than in non-family firms.
2) On the other hand, family firms attach importance to firm survival as a managerial objective. In fact, the probability of survival for six years is around 10% higher than for non-family firms.
3) Even after controlling for the high probability of survival, family firms' productivity growth rate is still relatively lower.

The rest of the paper is organized as follows. In Section 2, I explain the data used for the analyses and the methods of estimation. Section 3 reports the results for growth, productivity, and survival. Section 4 presents conclusions, including some interpretations.

2. Data

The data used in this paper come from the Basic Survey of Japanese Business Structure and Activities (Ministry of Economy, Trade and Industry) and the Survey of Corporate Management (Small and Medium Enterprise Agency).

The Basic Survey of Japanese Business Structure and Activities, an annual survey started in 1991, uses representative statistics covering Japanese firms with 50 or more regular employees, including those engaged in mining, manufacturing, electricity and gas, wholesale, retail, and several service industries. The annual number of firms surveyed exceeds 25,000. In

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4 Palia and Lichtenberg (1999) analyze US manufacturing companies and indicate that manager shareholdings have a positive effect on TFP. Barth et al. (2005), by using survey data on Norwegian companies, show that the TFP level is lower for family-owned firms at which the CEO is a family member.

recent years, the coverage has been expanded to various service industries. The purpose of the survey is to capture a comprehensive picture of Japanese firms including their basic financial information, composition of businesses, R&D activities, IT usage, and foreign direct investments. As the sample firms are coded by perpetual numbers, it is easy to construct a firm-level longitudinal data set.

On the other hand, the aim of the Survey of Corporate Management was to find facts about the structure and governance of Japanese firms. This survey investigates the managerial objectives, influential stake holders, structure of shareholders, internal organization, and so forth. The number of firms surveyed is 10,000 with more than 5,000 responding (the response rate was 51.5%).The survey was conducted in 1998 by using the registered list of the Basic Survey of Japanese Business Structure and Activities. Therefore, the two data can be merged by using the perpetual company numbers.[5]

This paper uses longitudinal data of the Basic Survey of Japanese Business Structure and Activities from 1998 to 2004. As a result, the relationship between firm characteristics in 1998 and medium-term performance by 2004 can be analyzed. In this paper, 1) whether the firm is owner-managed or not and 2) shareholdings of board members and their family are used as major explanatory variables.

In the Survey of Corporate Management, an "owner" is defined as a founder, member of the founding group, a descendant of a founder, and those who have a blood relation with the founder family. An "owner-managed firm" is defined as a firm at which the owner is working as chief executive or chairperson or a firm of which the owner has substantial decision-making rights. If a firm fulfills this definition, a dummy for an owner-managed firm (*ownerdum*) is assigned. Concerning the shareholdings of board members and their family, the variables are categorical - 1) no shareholding, 2) under 5%, 3) 5% to under 10%, 4) 10% to under 20%, 5) 20% to under 50%, and 6) 50% or over. I assign five dummies for each category and "no shareholding" is used as reference. For board ownership, a dummy *board1* corresponds to under 5%, *board2* correspond to 5% to under 10%, and so on. Family ownership dummies are assigned in a similar manner.[6] In addition to these dummies, firm size measured by log of the number of employees (*lnemp_98*), firm age (*age_98*), level of initial productivity (*lntfp_98*), and industry (*ind_98*) are used as control variables. Performance measures used as dependent variables (Δy) are, 1) sales growth (*lndsale_9804*), 2) growth of labor productivity (*lnrvapp_9804*), 3) growth of TFP (*lntfpr_9804*), and 4) survival/exit (*surv_04*).[7]

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5 The number of matched companies in 1998 was around 4,500. In 2004, the number of surviving companies was around 3,500.

6 Unfortunately, as the variables for board and family ownership are categorical, it is impossible to add simply to construct a single measure.

7 TFP is calculated nonparametrically. The detail of the calculation is described in Morikawa (2007).

As data on owner management and distribution of shareholdings are available only for 1998, it is, unfortunately, impossible to analyze effects of the "changes" in ownership. In addition to simple OLS and probit estimations, I use Heckman's two-step estimator to avoid possible attrition bias caused by exits.

In sum, I run simple regressions of the change in growth performances as indicated below.

$$\Delta y = ß_0 + ß_1 \text{lnemp} + ß_2 \text{age} + ß_3 \text{productivity level} + ß_4 \text{ownership dummies}$$
$$+ ß_i \text{industry dummies} \tag{1}$$

$$\Pr(\text{surv\_04}=1) = F(ß_0 + ß_1 \text{lnemp\_98} + ß_2 \text{age\_98} + ß_3 \text{lnkl\_98} + ß_4 \text{rprofit\_98}$$
$$+ ß_5 \text{ownership dummies} + ß_i \text{industry dummies} \tag{2}$$

For equation [1], ownership dummies are 1) *ownerdum*, 2) *board1, board2, board3, board4,* and *board5*, and 3) *family1, family2, family3, family4,* and *family5*. Firm size (*lnemp*), firm age (*age*), and industry dummies (3 digit) are ordinary controls. The initial productivity level (*lnvapp_98, lntfp_98*) is included for productivity growth equations to control for the convergence effect. In some estimation, a dummy for listed firms (*listdum*) is used as an additional explanatory variable. Interaction terms between ownership dummies with a dummy for listed firms are added when necessary. For equation [2], the dependent variable is the survival of a firm in 2004 (*surv_04*).[8] As the high survival probability of larger and older firms is a stylized fact in this field, firm size (*lnemp*) and firm age (*age*) should be controlled. In addition capital intensity (*lnkl*), log of the value of tangible asset divided by the number of employees, initial profit rate on asset (*rprofit*), and industry dummies are included. A list of major variables and the summary statistics are indicated in Table 1.

3. Results

(1) Basic Findings about Family Firms

Among the approximately 5,000 sample firms, owner-managed firms compose 62.6%. The ratio is somewhat higher in non-manufacturing industries (Table 2). The distribution of board ownership and family ownership are indicated in Table 3. By firm size classes, the larger the firm size the lower is the ratio of owner-managed firms, but even for firms of over 1,000 regular employees the ratio is 34.7% and for firms of over 5,000 regular employees the ratio is

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8 Exactly speaking, nonexistence in 2004 does not necessarily mean that the firm shut down the business. Since the data do not cover firms at which the number of employees is below 50.

19.4%. As for board ownership, even for firms of over 1,000 employees, in 16.1% board members possess more than a 10% share. The owner-managed firms' ratio of total sales is 26.2% and the ratio of total employees is 36.5%. Although the figures are smaller than that of the number of firms, family firms represent from one-fourth to one-third of medium- to large-sized firms' activities in Japan.

In comparing the sample mean of owner-managed firms' and other firms' sales growth, labor productivity, and TFP, owner-managed firms are inferior in all these measures to other firms (Table 4). The pictures are similar if we compare the performance measures by shareholding of board members and their family (Table 5). Family firms' growth and productivity performance is, on average, lower.

As the information on ownership and composition of shareholdings are at the beginning of the time period, the possibility of reverse causality - low growth-performance determining firm ownership structure - is not a serious issue.

(2) Growth and Productivity

The findings above are simple comparisons which do not control for the differences in firm size, firm age, industry, etc. This subsection reports results from the regression of equation [1]. Table 6 shows the results using the owner-manager dummy (*ownerdum*) as an independent variable. In order to avoid complexity, coefficients for the three-digit industry dummies are not reported here. After controlling for firm size, firm age, and industry, owner-managed firms' growth in sales, labor productivity, and TFP are significantly lower. As the estimated coefficients are for six years from 1998 to 2004, owner-managed firms' annual productivity growth rates are around 2% lower than for other firms.

When the dummy for listed firms (*listdum*) and the interaction term with the owner management dummy (*listdum*ownerdum*) are added, interesting results emerge (Table 7).[9] Although the coefficients for *listdum* are insignificant, the coefficients for the interaction term are positive and significant for all three estimations. The sizes of the coefficients are similar in magnitude with the negative coefficients of the *ownerdum*. The negative effects of owner manager are completely offset by going public. These results suggest that pressure from the capital market changes the nature of owner-managed firms.

Table 8 shows the regression results using board ownership (*board1, ···, board5*) as an explanatory variable. When firms for which board shareholding is 10% or more, the sales growth rate is significantly low. When the board shareholding is 5% or more, labor productivity and TFP growth rates are significantly low. The larger the board shareholding, the

9 The number of listed firms in the sample is about 400.

lower monotonically is the productivity growth. To convert to an annual rate, productivity growth rates are around 3% lower for a firm whose board ownership is 50% or more. Table 9 shows the results for family ownership (*family1, ···, family5*). A larger shareholding by the family is detrimental to productivity growth. However, the relationship is non-monotonic; the productivity growth is the lowest when the family ownership ratio is from 20% to 50%.

When both board and family ownership are used simultaneously as independent variables the explanatory power of these variables decreases. The reason is simply because these two variables have positive correlation. However, both variables still have significantly negative effects on productivity when the shareholding ratios are 20% or above. The size of the coefficient is larger for board ownership than for family ownership (Table 10).

(3) Probability of Survival

This subsection reports results for firm survival. According to the probit estimation (equation [2]), the probability of survival is significantly higher for owner-managed firms and firms at which shareholdings of board members and their family are high, after controlling for firm size, firm age, industry, and initial profit rate (Table 11). Evaluating by the marginal effects, owner-managed firms' probability of survival is around 5% higher than other firms. When board ownership is 10% or more, the probability of survival is around 10% higher. The results are similar for family ownership.

As mentioned earlier, growth and productivity performance of family firms are lower, but the probability of survival is higher. These two results suggest that managerial objectives of family firms may different from non-family firms. The Survey of Corporate Management asks about firms' most important objectives. The choices are 1) profit, 2) long-term growth, and 3) firm survival. Table 12 shows the results by firm type. The ratio of choosing survival as the most important objective is 43.2% for owner-managed firms, which is higher than other firms (35.9%). The results are similar for the shareholdings of board members and their family. Family firms seem to be risk-averse. According to the numerous empirical studies on firm growth and survival, the stylized facts are that survival rate is higher and growth rate is lower for large and aged firms. Learning and selection mechanisms are behind these facts.[10] Japanese family firms' performance, on average, is not like that of entrepreneur firms but similar to that of large and aged firms.

When the dummy for listed firms (*listdum*) and its interaction term with the

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10 Evans (1987) and Dunne et al. (1989) are representative analyses indicating that the failure rate and the growth rate decline with size and age. Caves (1998) and Bartelsman and Doms (2000) are representative surveys in this area.

owner-manager dummy are added in the probit estimation, the coefficient of *listdum* is negative and significant, but the coefficient of the interaction term is insignificant. Among owner-managed firms, significant effects of going public on the survival rate cannot be found.

(4) Robustness

The results of the previous subsection raise some concerns that the estimation results for growth and productivity may involve an attrition bias. To address this possibility, this subsection checks the robustness of the results by explicitly taking into account survival/exit. The method is the simple Heckman's two-step estimation. In the first stage probit estimation, firm size (*lnemp*), firm age (*age*), and initial profit rate (*rprofit*), all of these are usually thought to be important determinants for firm survival, and ownership dummies are used as explanatory variables. In the second stage OLS estimation, firm size, initial productivity level (*lnvapp_98, lntfp_98*), industry dummies, and ownership dummies are used.

The estimation results are presented in Table 13. Even after correcting for possible selection bias, signs and significances of the coefficients for ownership dummies are not affected. The effects of listing on growth and productivity are also unaffected (Table 14). As the set of dependent variables are different, the sizes of the coefficients are not directly comparable with simple OLS results. However, at least qualitatively, the results for growth and productivity are robust.

On the relationship between the composition of shareholders and firm performance, several studies pointed out possible reverse-causality - firm performance affecting ownership structure - and the possibility of the endogeneity of both variables (Jensen and Warner (1988), Loderer and Martin (1997), Cho (1998), and Himmelberg et al. (1999), among others). However, it is difficult to find an appropriate instrument which affects ownership structure but is independent of firm growth and productivity.[11] The analyses in this paper are not cross-sectional regressions of a single year, but the relationships between initial firm characteristics and medium-term growth of sales or productivity. Consequently, the problem is not as serious as a simple cross-section regression.

4. Conclusions

Family firms hold a large share in the Japanese economy. This paper, by using large,

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11 Himmelberg et al. (1999) describe that "instrumental variables for managerial ownership are difficult to find."

firm-level longitudinal data, investigates empirically the relationship between the composition of ownership and the performance of firms, with particular emphasis on family firms.

Major findings of the analysis can be summarized as follows.

1) After controlling for basic firm characteristics such as firm size, firm age, and industry, family firms' annual productivity growth rate is, on average, around 2% lower.

2) Family firms view survival as an important managerial objective. In fact, the probability of survival for six years is, on average, around 10% higher than for non-family firms. Family firms seem to be risk-averse.

3) Even after correcting for the high propensity to survive, the conclusion that family firms' productivity growth is slower is still valid.

How should we draw implications from the results of family firms' slow productivity growth and high survival probability? If productivity growth is the highest policy priority, family firms may seem undesirable. [12] As the share of family firms is larger in non-manufacturing industries, it is related to the issue of service-sector productivity in Japan. However, this is difficult to judge from a normative viewpoint, because family firms' managerial objectives are different from those of non-family firms and their performance is in line with the objectives. Morck et al. (1988), who find negative effects of higher board ownership and founding family presence on firm value (Tobin's q) in the U.S., argue that the results are "not evidence of inefficiency, since they might just reflect the optimal tradeoff between profits and private benefits." Hence, from a policy perspective, it is important to expand options for family firms to change the structure by removing obstacles to going public or transfer of ownership to third parties.

This paper does not deal with reasons why family firms have different managerial objectives. Institutional factors, such as capital market imperfections and tax policies including inheritance tax and corporate tax, may be related. Clarifying these institutional factors is an important subject for future research.

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[12] Disney et al. (2003) is an example showing the importance of external restructuring－entry, exit and market share change－for productivity growth.

References

Anderson, Ronald C. and David M. Reeb (2003), "Founding-Family Ownership and Firm Performance: Evidence from the S&P 500," *Journal of Finance*, vol. 58, no. 3, pp. 1301-1327.

Bargnani, Elizabeth, Nickolaos T. Milonas, Anthony Saunders, and Nickolaos G. Travlos (1994). "Managers, Owners, and the Pricing of Risky Debt: An Empirical Analysis," *Journal of Finance*, vol. 49, no. 2, pp. 453-477.

Bartelsman, Eric J. and Mark Doms (2000), "Understanding Productivity: Lessons from Longitudinal Microdata," *Journal of Economic Literature*, vol. 38, no. 3, pp. 569-594.

Barth, Erling, Trygve Gulbrandsen, and Pal Schone (2005), "Family Ownership and Productivity: the Role of Owner-Management," *Journal of Corporate Finance*, vol. 11, no. 1, pp. 107-127.

Bertrand, Marianne and Antoinette Schoar (2006), "The Role of Family in Family Firms," *Journal of Economic Perspectives*, vol. 20, no. 2, pp. 73-96.

Bloom, Nicholas and John Van Reenen (2007), "Measuring and Explaining Management Practices Across Firms and Countries," *Quarterly Journal of Economics*, vol. 122, no. 4, pp. 1351-1408.

Caves, Richard E. (1998), "Industrial Organization and New Findings on the Turnover and Mobility of Firms," *Journal of Economic Literature*, vol. 36, no. 4, pp. 1947-1982.

Cho, Myeong-Hyeon (1998). "Ownership Structure, Investment, and the Corporate Value: an Empirical Analysis," *Journal of Financial Economics*, vol. 47, pp. 103-121.

Demsetz, Harold and Kenneth Lehn (1985). "The Structure of Corporate Ownership: Causes and Consequences," *Journal of Political Economy*, vol. 93, no. 6, pp. 1155-1177.

Disney, Richard, Jonathan Haskel, and Ylva Heden (2003), "Restructuring and Productivity Growth in UK Manufacturing," *Economic Journal*, vol. 113, July, pp. 666-694.

Dunne, Timothy, Mark J.Roberts, and Larry Samuelson (1989), "The Growth and Failure of U.S. Manufacturing Plants," *Quarterly Journal of Economics*, vol. 104, no. 4, pp. 671-698.

Ellul, Andrew, Levent Guntay, and Ugur Lel (2007), "External Governance and Debt Agency Costs of Family Firms," FRB International Finance Discussion Papers, 2007-908.

Evans, David S. (1987), "Tests of Alternative Theories of Firm Growth," *Journal of Political Economy*, vol. 95, no. 4, pp. 657-674.

Fukuda, S., M. Kasuya, and J. Nakajima (2006), "Corporate Governance of Non-listed Companies," BOJ Working Paper, 06-J-05. (in Japanese)

Himmelberg, Charles P., R. Glenn Hubbard, and Darius Palia (1999), "Understanding the Determinants of Managerial Ownership and the Link between Ownership and Performance," *Journal of Financial Economics*, vol. 53, no. 3, pp. 353-384.

Jensen, Michael C. and Jerold B. Warner (1988), "The Distribution of Power among Corporate Managers, Shareholders, and Directors," *Journal of Financial Economics*, vol. 20, pp. 3-24.

Lichtenberg, Frank R. and George M. Pushner (1994), "Ownership Structure and Corporate Performance in Japan," *Japan and the World Economy*, vol. 6, no. 3, pp. 239-261.

Loderer, Claudio and Kenneth Martin (1997). "Executive Stock Ownership and Performance Tracking Faint Traces," *Journal of Financial Economics*, vol. 45, pp. 223-255.

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

Millet, Danny, Isabelle Le Breton-Miller, Richard H. Lester, and Albert A. Cannella, Jr. (2007), "Are Family Firms Really Superior Performers?" *Journal of Corporate Finance*, vol. 13, no. 5, pp. 829-858.

Morck, Randall, Andrei Shleifer, and Robert W. Vishny (1988). "Management Ownership and Market Valuation: An Empirical Analysis," *Journal of Financial Economics*, vol. 20, pp. 293-315.

Morikawa, Masayuki (2007), "Is Productivity in the Service Industries Low? An Analysis Using Firm-level Data on the Dispersion and the Dynamics of Productivity," RIETI Discussion Paper, 07-J-048. (in Japanese)

Palia, Darius and Frank Lichtenberg (1999), "Managerial Ownership and Firm Performance: A Re-examination Using Productivity Measurement," *Journal of Corporate Finance*, vol. 5, no. 4, pp. 323-339.

Palmer, John (1973), "The Profit-Performance Effects of the Separation of Ownership from Control in Large U.S. Industrial Corporations," *Bell Journal of Economics*, vol. 4, pp. 293-303.

Radice, H.K. (1971), "Control Type, Profitability and Growth in Large Firms: An Empirical Study," *Economic Journal*, vol. 81, September, pp. 547-562.

Saito, Takuji (2007), "Family Firms and Firm Performance: Evidence from Japan," unpublished manuscript.

Villalonga, Belen and Raphael Amit (2006), "How Do Family Ownership, Control and Management Affect Firm Value?" *Journal of Financial Economics*, vol. 80, no. 2, pp. 385-417.

Tables

Table 1 Summary Statistics

Variable		Obs	Mean	Std. Dev.	Min	Max
Sales Growth	*lndsale_9804*	3,358	0.085	0.420	-2.780	3.488
Labor Productivity Growth	*lndvapp_9804*	3,241	0.179	0.458	-2.875	3.258
TFP Growth	*lndtfp_9804*	3,235	0.141	0.465	-2.908	3.904
Survival in 2004	*surv_04*	5,095	0.689	0.463	0	1
Log Regular employment	*lnemp_98*	4,566	5.066	0.939	3.912	11.126
Firm Age	*age_98*	4,566	38.5	15.4	0.0	106.0
Log Capital-Labor Ratio	*lnkl_98*	4,561	1.798	1.132	-5.486	6.119
Profit Rate on Asset (1998)	*rprofit_98*	4,566	0.017	0.065	-1.323	0.975
Labor Productivity (1998)	*lnvapp_98*	4,556	-0.001	0.456	-3.063	3.008
TFP (1998)	*lntfp_98*	4,551	-0.035	0.417	-3.105	2.919

Table 2 Number of Owner-managed Firms

	Total	Owner Manager Firms	Share
Total	4,981	1,861	62.6%
Manufacturing	3,111	1,871	60.1%
Non-manufacturing	1,870	1,249	66.8%

(note) Industry classification is based on firm activities in 1998.

Table 3 Distribution of Board and Family Ownership

(1) Distribution of Board Ownership

	no shareholdin	under 5%	5% to under 10%	10% to under 20%	20% to under 50%	50% or over
Total	9.7%	17.3%	9.1%	11.6%	22.8%	29.5%
Manufacturing	10.7%	18.9%	8.1%	11.5%	21.5%	29.3%
Non-manufacturing	8.1%	14.6%	10.8%	11.9%	24.8%	29.8%

(note) Industry classification is based on firm activities in 1998.

(2) Distribution of Family Ownership

	no shareholdin	under 5%	5% to under 10%	10% to under 20%	20% to under 50%	50% or over
Total	15.8%	15.7%	10.3%	14.5%	18.7%	25.1%
Manufacturing	17.1%	17.4%	10.2%	14.0%	17.2%	24.0%
Non-manufacturing	13.6%	12.9%	10.5%	15.3%	20.9%	26.9%

(note) Industry classification is based on firm activities in 1998.

Table 4 Comparisons of Sample Mean

	Sales Growth	Labor Productivity Growth	TFP Growth	Change in Profit Rate
Owner Managed Firms	0.053	0.126	0.088	0.012
Other Firms	0.139	0.269	0.230	0.015
t-value	-5.744	-8.570	-8.364	-2.067

(note) Growth rates are from 1998 to 2004.

Table 5 Comparisons of Sample Mean (by Board and Family Ownership)

(1) Board Ownership

	Sales Growth	t-value	Labor Productivity Growth	t-value	TFP Growth	t-value	Change in Profit Rate	t-value	Number of Firms
no shareholding	0.193		0.247		0.192		-0.002		336
under 5%	0.100	-2.46	0.283	0.78	0.231	0.82	0.026	1.548	598
5% to under 10%	0.081	-2.59	0.190	-1.32	0.146	-0.96	0.019	0.812	316
10% to under 20%	0.038	-3.80	0.189	-1.33	0.139	-1.10	0.014	0.723	403
20% to under 50%	0.052	-4.16	0.132	-3.34	0.092	-2.69	0.014	1.020	789
50% or over	0.053	-4.09	0.088	-4.11	0.054	-3.40	0.008	0.576	1,021

(2) Family Ownership

	Sales Growth	t-value	Labor Productivity Growth	t-value	TFP Growth	t-value	Change in Profit Rate	t-value	Number of Firms
no shareholding	0.157		0.233		0.180		0.007		516
under 5%	0.098	-1.89	0.249	0.40	0.202	0.57	0.019	0.782	513
5% to under 10%	0.049	-3.02	0.142	-2.29	0.098	-1.88	0.014	0.326	338
10% to under 20%	0.038	-3.88	0.143	-2.67	0.105	-2.06	0.012	0.232	475
20% to under 50%	0.040	-3.83	0.090	-4.22	0.049	-3.62	0.010	0.209	611
50% or over	0.042	-3.79	0.123	-3.52	0.091	-2.66	0.012	0.349	823

(note) Growth rates are from 1998 to 2004. t-values are based on comparisons with zero ownership firms.

Table 6 Regression Results for Sales and Productivity Growth

	Sales Growth			Labor Productivity Growth			TFP Growth		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
lnvapp_98				-0.3672	-20.37	0.000			
lntfp_98							-0.4526	-23.93	0.000
lnemp_98	0.0003	0.04	0.971	0.0747	9.29	0.000	0.0685	8.75	0.000
age_98	-0.0030	-6.36	0.000	-0.0008	-1.64	0.101	-0.0018	-3.86	0.000
ownerdum	-0.0382	-2.59	0.010	-0.1152	-7.72	0.000	-0.1307	-8.86	0.000
_cons	0.2272	5.34	0.000	-0.0929	-2.15	0.031	-0.0694	-1.65	0.099
industry dummies	yes			yes			yes		
Number of obs	3292			3176			3171		
Adj R-squared	0.1542			0.3324			0.3713		

(note) OLS Estimates

Table 7 Regression Results Including Dummy for Listed Firm

	Sales Growth			Labor Productivity Growth			TFP Growth		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
lnvapp_98				-0.3696	-20.36	0			
lntfp_98							-0.4534	-23.94	0
lnemp_98	-0.0062	-0.68	0.494	0.0698	7.7	0	0.0674	7.58	0
age_98	-0.0030	-6.12	0	-0.0007	-1.52	0.13	-0.0017	-3.51	0
ownerdum	-0.0506	-3.23	0.001	-0.1262	-7.99	0	-0.1431	-9.16	0
listdum	-0.0118	-0.33	0.742	-0.0130	-0.36	0.716	-0.0398	-1.14	0.253
*ownerdum*listdum*	0.1341	2.85	0.004	0.1137	2.44	0.015	0.1184	2.58	0.01
_cons	0.2625	5.46	0	-0.0655	-1.36	0.175	-0.0615	-1.3	0.194
industry dummies	yes			yes			yes		
Number of obs	3292			3176			3171		
Adj R-squared	0.1568			0.3338			0.3723		

(note) OLS estimates. "liustdum" is a dummy for listed firms.

Table 8 Regression Results for Board Ownership

	Sales Growth			Labor Productivity Growth			TFP Growth		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
lnvapp_98				-0.3800	-18.41	0.000			
lntfp_98							-0.4594	-21.54	0.000
lnemp_98	-0.0002	-0.02	0.980	0.0655	6.79	0.000	0.0597	6.37	0.000
age_98	-0.0027	-4.79	0.000	-0.0002	-0.34	0.738	-0.0009	-1.48	0.139
board_1	-0.0234	-0.69	0.489	-0.0106	-0.29	0.769	-0.0345	-0.98	0.329
board_2	-0.0347	-0.93	0.354	-0.0987	-2.48	0.013	-0.1193	-3.04	0.002
board_3	-0.0703	-2.02	0.044	-0.0931	-2.50	0.012	-0.1123	-3.07	0.002
board_4	-0.0543	-1.71	0.088	-0.1265	-3.71	0.000	-0.1411	-4.20	0.000
board_5	-0.0737	-2.40	0.016	-0.1669	-5.08	0.000	-0.1778	-5.49	0.000
_cons	0.2350	4.59	0.000	-0.0508	-0.92	0.359	-0.0461	-0.85	0.393
industry dummies	yes			yes			yes		
Number of obs	2378			2293			2290		
Adj R-squared	0.1569			0.3389			0.3801		

(note) OLS Estimates

Table 9 Regression Results for Family Ownership

	Sales Growth			Labor Productivity Growth			TFP Growth		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
lnvapp_98				-0.3764	-17.36	0.000			
lntfp_98							-0.4664	-20.55	0.000
lnemp_98	0.0053	0.61	0.545	0.0756	7.70	0.000	0.0735	7.67	0.000
age_98	-0.0023	-4.09	0.000	0.0004	0.67	0.502	-0.0001	-0.13	0.897
family_1	-0.0270	-0.98	0.327	-0.0342	-1.15	0.250	-0.0675	-2.30	0.021
family_2	-0.0499	-1.61	0.108	-0.0957	-2.80	0.005	-0.1019	-3.03	0.002
family_3	-0.0549	-1.96	0.050	-0.1079	-3.54	0.000	-0.1260	-4.19	0.000
family_4	-0.0555	-2.02	0.044	-0.1441	-4.79	0.000	-0.1582	-5.33	0.000
family_5	-0.0540	-2.06	0.039	-0.1162	-4.06	0.000	-0.1270	-4.49	0.000
cons	0.1790	3.64	0.000	-0.1544	-2.84	0.005	-0.1752	-3.30	0.001
industry dummies	yes			yes			yes		
Number of obs	2234			2150			2148		
Adj R-squared	0.156			0.3192			0.3616		

(note) OLS Estimates

Table 10 Regression Results for Board and Family Ownership

	Sales Growth			Labor Productivity Growth			TFP Growth		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
lnvapp_98				-0.3958	-17.33	0.000			
lntfp_98							-0.4849	-20.41	0.000
lnemp_98	-0.0014	-0.15	0.882	0.0662	6.13	0.000	0.0656	6.23	0.000
age_98	-0.0026	-4.31	0.000	0.0000	0.03	0.974	-0.0006	-0.98	0.325
board_1	-0.0062	-0.16	0.877	-0.0105	-0.24	0.810	-0.0219	-0.51	0.610
board_2	-0.0175	-0.39	0.695	-0.0772	-1.58	0.113	-0.0851	-1.78	0.075
board_3	-0.0348	-0.82	0.411	-0.0560	-1.21	0.227	-0.0581	-1.28	0.202
board_4	-0.0443	-1.11	0.269	-0.1032	-2.35	0.019	-0.1102	-2.56	0.011
board_5	-0.0763	-1.94	0.053	-0.1593	-3.69	0.000	-0.1623	-3.83	0.000
family_1	-0.0095	-0.29	0.770	0.0075	0.21	0.831	-0.0223	-0.64	0.520
family_2	-0.0142	-0.39	0.700	-0.0158	-0.39	0.697	-0.0211	-0.53	0.595
family_3	-0.0209	-0.61	0.539	-0.0339	-0.91	0.362	-0.0497	-1.36	0.173
family_4	-0.0201	-0.60	0.551	-0.0622	-1.68	0.092	-0.0752	-2.08	0.038
family_5	-0.0567	-1.68	0.094	-0.0785	-2.10	0.036	-0.0959	-2.61	0.009
_cons	0.2441	4.43	0.000	-0.0561	-0.92	0.359	-0.0750	-1.25	0.210
industry dummies	yes			yes			yes		
Number of obs	1968			1894			1892		
Adj R-squared	0.1555			0.3373			0.3836		

(note) OLS Estimates

Table 11 Probability of Survival

(1) Owner-Managed Firms

	Coef.	dF/dx	z-value	P-value
lnemp_98	0.4257	13.0%	14.18	0.000
lnkl_98	0.0731	2.2%	3.60	0.000
age_98	0.0063	0.2%	4.02	0.000
rprofit_98	3.0377	92.8%	7.95	0.000
ownerdum	0.1672	5.2%	3.54	0.000
industry dummies	yes			
Number of obs	4444			
Log likelihood	-2238.1			
Pseudo R2	0.1253			

(note) Probit estimation results

(2) Board Ownership

	Coef.	dF/dx	z-value	P-value
lnemp_98	0.4992	14.21%	13.02	0.000
lnkl_98	0.0627	1.79%	2.28	0.022
age_98	0.0030	0.08%	1.43	0.152
rprofit_98	2.7437	78.11%	5.50	0.000
board_1	0.1238	3.41%	1.10	0.272
board_2	0.1900	5.06%	1.52	0.128
board_3	0.4565	11.10%	3.86	0.000
board_4	0.4069	10.52%	3.88	0.000
board_5	0.4449	11.63%	4.49	0.000
industry dummies	yes			
Number of obs	3106			
Log likelihood	-1484.0			
Pseudo R2	0.1356			

(note) Probit estimation results

(3) Family Ownership

	Coef.	dF/dx	z-value	P-value
lnemp_98	0.4807	13.74%	12.20	0.000
lnkl_98	0.0481	1.37%	1.71	0.088
age_98	0.0026	0.07%	1.21	0.225
rprofit_98	2.9006	82.92%	5.69	0.000
family_1	0.3284	8.52%	3.15	0.002
family_2	0.4281	10.50%	3.79	0.000
family_3	0.5124	12.44%	4.87	0.000
family_4	0.2744	7.28%	2.84	0.004
family_5	0.2397	6.51%	2.66	0.008
industry dummies	yes			
Number of obs	2919			
Log likelihood	-1401.9			
Pseudo R2	0.1337			

(note) Probit estimation results

Table 12 Family Firms' Managerial Objectives

(1) Owner-Managed Firms

	Profit	Growth	Survival	Number of Firms
Owner-Managed Firms	19.3%	37.5%	43.2%	3095
Other Firms	16.9%	47.2%	35.9%	1848

(2) Board Ownership

	Profit	Growth	Survival	Number of Firms
no shareholding	19.9%	44.1%	36.0%	331
under 5%	16.1%	51.4%	32.5%	591
5% to under 10%	15.3%	45.4%	39.3%	313
10% to under 20%	17.2%	37.6%	45.3%	402
20% to under 50%	20.1%	42.3%	37.7%	783
50% or over	19.2%	35.5%	45.3%	1,015
Total	18.3%	41.7%	39.9%	3,435

(3) Family Ownership

	Profit	Growth	Survival	Number of Firms
no shareholding	19.8%	45.2%	35.0%	511
under 5%	17.3%	49.2%	33.5%	508
5% to under 10%	18.8%	41.2%	40.0%	335
10% to under 20%	18.9%	38.0%	43.1%	471
20% to under 50%	21.3%	36.9%	41.8%	607
50% or over	17.3%	35.8%	46.9%	815
Total	18.8%	40.5%	40.7%	3,247

Table 13 Two-Step Estimation Results

(1) Sales Growth

	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
lnemp_98	0.0145	1.41	0.159	0.0243	2.26	0.024	0.0290	2.89	0.004
ownerdum	-0.0302	-1.92	0.054						
board_1				-0.0461	-1.38	0.167			
board_2				-0.0468	-1.25	0.212			
board_3				-0.0597	-1.67	0.096			
board_4				-0.0465	-1.43	0.153			
board_5				-0.0559	-1.75	0.081			
family_1							-0.0139	-0.49	0.624
family_2							-0.0290	-0.90	0.367
family_3							-0.0243	-0.82	0.410
family_4							-0.0463	-1.65	0.099
family_5							-0.0451	-1.68	0.092
industry dummies	yes			yes			yes		
Number of obs	4466			3136			2726		

(2) Labor Productivity Growth

	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
lnrapp_98	-0.3954	-21.51	0.000	-0.4098	-19.72	0.000	-0.4103	-18.99	0.000
lnemp_98	0.0381	4.22	0.000	0.0277	2.64	0.008	0.0407	3.96	0.000
ownerdum	-0.1436	-9.21	0.000						
board_1				-0.0298	-0.84	0.399			
board_2				-0.1322	-3.34	0.001			
board_3				-0.1510	-4.04	0.000			
board_4				-0.1732	-5.11	0.000			
board_5				-0.2188	-6.58	0.000			
family_1							-0.0634	-2.09	0.036
family_2							-0.1258	-3.63	0.000
family_3							-0.1650	-5.26	0.000
family_4							-0.1674	-5.52	0.000
family_5							-0.1400	-4.82	0.000
industry dummies	yes			yes			yes		
Number of obs	4466			3136			2950		

(3) TFP Growth

	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
lntfp_98	-0.4452	-23.72	0.000	-0.4748	-22.78	0.000	-0.4827	-21.81	0.000
lnemp_98	0.0705	7.43	0.000	0.0171	1.64	0.102	0.0382	3.69	0.000
ownerdum	-0.1298	-8.62	0.000						
board_1				-0.0697	-2.00	0.045			
board_2				-0.1661	-4.25	0.000			
board_3				-0.1826	-4.95	0.000			
board_4				-0.1999	-5.95	0.000			
board_5				-0.2390	-7.26	0.000			
family_1							-0.1029	-3.45	0.001
family_2							-0.1366	-4.01	0.000
family_3							-0.1838	-5.91	0.000
family_4							-0.1861	-6.23	0.000
family_5							-0.1537	-5.37	0.000
industry dummies	yes			yes			yes		
Number of obs	4466			3136			2950		

(note) Regression results of the second step of Heckman's two step. Explanatory variables of the selection model are lnemp_98, lnkl_98, age_98, rprofit_98, and ownership dummies.

Table 14 Two-Step Estimation Including Dummy for Listed Firms

	Sales Growth			Labor Productivity Growth			TFP Growth		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
lnvapp_98				-0.3973	-21.48	0.000			
lntfp_98							-0.4459	-23.76	0.000
lnemp_98	0.0113	0.98	0.329	0.0341	3.34	0.001	0.0724	6.92	0.000
ownerdum	-0.0478	-2.86	0.004	-0.1552	-9.55	0.000	-0.1448	-9.16	0.000
listdum	-0.0522	-1.48	0.139	-0.0209	-0.60	0.549	-0.0654	-1.95	0.052
*ownerdum*listdum*	0.1682	3.59	0.000	0.1243	2.67	0.008	0.1391	3.10	0.002
_cons	-0.4822	-1.26	0.209	0.3634	0.98	0.326	-0.0802	-0.22	0.828
industry dummies	yes			yes			yes		
Number of obs	4466			4466			4466		

(note) Regression results of the second step of Heckman's two step. Explanatory variables of the selection model are lnemp_98, lnkl_98, age_98, rprofit_98, and ownerdum.