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*Collective Ownership and Privatization of
China's Village Enterprises*

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Collective Ownership and Privatization of China's Village Enterprises

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preliminary; please do not quote; comments welcome

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rural industrial employment in collective enterprises (township- or village-owned) varied from 98 percent in Shanghai to 24 percent in Hainan.

In the mid-1990s, there reportedly has been widespread privatization of TVEs, even in areas with a strong collective heritage (Kung, 1996), as well as conversion of TVEs to joint stock cooperatives (Vermeer, 1996). At the same time, management authority within collective enterprises has been decentralized as witnessed by the marked shift from fixed-wage contracts to profit-sharing and fixed-rent contracts for managers (Chen and Rozelle, 1996; Nugent et al., 1996). Some have begun to speculate that collective firms are a transitional ownership form that will be phased out rapidly in coming years. This speculation raises the important question of what factors have been most important in the decision to privatize. This study is the first of which we are aware to describe and analyze China's TVE privatization movement of the mid-1990s.

We utilize data from a national village-level survey conducted in 1993 and 1995 to test empirically competing theories explaining ownership and contractual choice for China's rural industries. Our work follows the spirit of Jin and Qian (1997), which examines TVE ownership using aggregate provincial data from 1986 to 1993. They find support for many of the theories that have been proposed to explain collective ownership of rural enterprises. This paper differs from theirs by investigating ownership choice at the local level where these choices are actually being made. The village-level data captures intra-provincial variation that we expect to be important and includes variables on the number, education, and age of cadres, market development, labor force characteristics, infrastructure, and location that are unavailable or can be proxied only crudely using aggregate data. The data also covers a later period when privatization was more important.

Collective Ownership and Privatization of China's Village Enterprises

Introduction

Recently, much attention has been paid to the rapid growth achieved by rural collective enterprises in China despite the lack of private ownership or clearly defined property rights (Jin and Qian, 1997; Che and Qian, 1997; Li, 1996; Walder, 1995; Naughton, 1994; Chang and Wang, 1994).¹ Research also has attempted to explain the nature of contracts between local governments and collective enterprise managers (Chen and Rozelle, 1996; Whiting, 1995). These efforts are a response to the empirical challenge to accepted theories of property rights implicit in the remarkable success of China's township- and village-owned enterprises (TVEs). Employment in rural collective enterprises grew from 433 million in 1985 to 606 million by 1995, which accounted for 62 and 47 percent of workers employed in all rural enterprises.²

The great spatial and temporal variation in the ownership structure of China's rural enterprises provides fertile ground for increasing our understanding of how institutions respond to changing economic and political environments, a process which has great bearing on economic performance (North, 1995). Yet there has been little work that has attempted to explain this variation in China empirically.³ In the survey examined in this paper, China's village enterprises are divided into six ownership categories: collective (*jiti*), stock (*gufen*), private (*siying*), partnership (*hehuo*), joint venture (*sanzi*), and other (*qita*). In addition, many of China's rural enterprises, especially its largest ones, are owned by township governments.⁴ In 1995, the share of

¹ From 1978 to 1996, rural enterprises (cite statistics on growth rate and share of industrial output).

² *China Statistical Yearbook 1996*, p. 388.

³ The notable exception is Jin and Qian (1997), discussed below.

⁴ In 1995, township and village enterprises each accounted for 50 percent of total employment in rural collective enterprises (*ibid*).

complete data on firm income. Before 1993, the village survey instrument did not disaggregate data on firm number and income by ownership type or by contractual form.

In this paper, "partnership" firms are considered to be "private" because of their close similarity in formation, size, and type of activity. Firms categorized as "other" are excluded from the analysis because of concern that in many villages this category includes businesses that are not actually firms.⁵ Thus, the total firm number for each village is the sum of collective, stock, and private (including partnership) firms. It is important to note that township-owned enterprises are not captured at all in the survey even though they may be located within villages and employ laborers and managers from villages.

In addition to data on firm income and ownership, the village survey provides information on a broad range of village characteristics, including location, infrastructure, population and labor force characteristics, agricultural production, collective income and expenditures, and village leader characteristics. These data can be used to analyze the factors affecting institutional choice. They are supplemented by published provincial data from statistical yearbooks that reflect the availability of bank credit for collective enterprises and commercial marketing activity.

Patterns and Trends

There are remarkable differences in village enterprise ownership structure across space and time in the sample. In Tables 1-3, we compare summary information by ownership type on the number of firms per village, firm income per village, and firm size in different regions for 1993 and 1995. For villages with complete data in both years, the

⁵ Chinese statistics classify businesses as firms if they employ 8 or more workers. Researchers at RCRE report that in many survey villages, small household businesses with less than 8 workers were listed as

The paper is organized as follows. Section 2 describes the village and secondary data used in the paper. Section 3 presents patterns of ownership and trends in institutional change as revealed by the survey data. Section 4 reviews theories of ownership and contractual choice in China's rural enterprises and describes the empirical specification for testing these theories. Section 5 presents the estimation results, and describes the extent to which different factors are responsible for spatial and temporal variation in institutional form. Section 6 concludes.

Data

The data used in this paper come mainly from a national village survey conducted in 1993 and 1995 under the supervision of the Research Center for Rural Economics of the Ministry of Agriculture. The villages (as well as households and enterprises) were surveyed annually beginning in 1986 and biannually since 1991. The long-term presence of research teams in these villages and their clear non-affiliation to local governments is expected to increase data reliability.

In both 1993 and 1995, 297 villages in 28 provinces were surveyed. Nearly all of the villages (288) were the same in the two years. Of these villages, those with at least one firm numbered 194 in 1993 and 175 in 1995; thus, on average 36 percent of villages had no enterprises. Because of the focus on firm ownership, these villages are excluded from the sample. Collective firms are divided into two contractual types: those that are collectively-managed (*jiti jingying*) and those contracted to managers (*chengbao*). Within these types, there is undoubtedly a diversity of contractual arrangements. The survey collected data on the number of firms of each ownership and contractual type and income data for each ownership type except for "other." Data on the number of firms is complete for all villages, but about one third of the villages lack

gross income increases from 0.32 million yuan to 0.35 million yuan (10 percent). While private firms remain less than one fifth the size of collective firms in 1995, their size increased by 62 percent since 1993, compared to only 16 percent for collective firms. This difference can be explained by more robust growth of private enterprises (in terms of size) or by privatization of collective firms, which are much larger than typical private firms. Reportedly, the pattern in many areas has been to privatize smaller enterprises, or "let the small go" (*zhuada fangxiao*) (Kung, 1996).

In which types of villages is the share of enterprises that are collectively owned likely to be greatest? Figure 1 shows that the share of collective firms is much lower when there are more firms in the village, and that the strength of this relationship is greater in 1995 than in 1993. For villages with only one firm, 77 percent have collective firms in 1993 and 71 percent in 1995. In 1993, as the number of firms increases, the share of firms that is collective falls gradually at first and then much more rapidly when the number of firms exceeds 10. The pattern is similar in 1995, except that the more rapid decrease begins after only 3 firms. The collective shares in 1995 are lower for all firm number groupings, but the differences are greatest in the villages with four to ten firms. This suggests that village leaders feel that having one or several collective firms is important as a source of collective revenues and rents that they can control (through employment, profits, etc.). The revenue extraction rate (village enterprise payments as a share of enterprise net income) also varies inversely with the number of collective firms (Lee and Park, 1998).

Evidence on the village characteristics associated with privatization can be found in Table 4, which compares villages in which the number of collective enterprises increased, stayed the same, and fell from 1993 to 1995. Compared to villages that gained collective enterprises, villages experiencing reductions in the number of collective

average number of firms per village in the whole sample increases from 10.3 to 11.0 over the two year period. The share of firms that are collective falls sharply from 31 percent to 21 percent, with the absolute number of collective firms per village falling in 5 of the 8 regions. This is evidence of privatization or a much higher failure rate for collective versus private firms during the macroeconomic retrenchment that began in 1994. Meanwhile, the share of firms that are private increases from 60 percent to 73 percent. Interestingly, the data show a decrease in the share of joint stock companies from 9 percent to 5 percent, suggesting that the growing prevalence of this newer ownership form may have been exaggerated or be concentrated at the township level.

Worth noting, too, is the great variation across regions in ownership shares. In 1993, collective ownership is highest in the city provinces (90 percent of firms), followed by the northeast (67), south central (51), northwest (47), southwest (42), and north central (40).⁶ The collective share of firms is lowest in the central coast (26) and southern coast (7). In 1995, the share of collective firms falls in all regions except for the northwest. The reduction is most dramatic in the central regions.

Measured by income rather than firm number, the change in ownership shares is even more striking. For the full sample, the collective share decreases from 51 percent to 36 percent, while the joint stock share falls from 32 percent to 21 percent and the private share shoots up from 17 percent to 43 percent. These patterns imply that the relative size of private firms increased from 1993 to 1995, which is shown to be the case in Table 3.

The data on firm size reported in Table 3 confirms striking differences in firm size and changes in firm size. For the full sample, the average firm size measured by annual

"other." Also, because joint venture firms are included only in the 1995 survey and only 3 villages report a joint venture, we lump these in the excluded "other" category.

⁶Provinces in each region are listed in Tables 1-3.

valuable benefits to the firm when markets are underdeveloped and property rights insecure. These benefits may outweigh disincentive effects of reduced managerial autonomy and liability. The types of potential benefits provided by village leaders are numerous: managerial skills, access to bank credit, collective land, energy inputs such as electricity and water, input and output marketing channels (especially links to state-owned and other collective enterprises), and greater security from adverse changes in the policy environment for private enterprises (Li, 1997).

These benefits of collective ownership must be weighed against negative incentive effects, the magnitude of which depend on the monitoring ability of cadres. Monitoring ability, as well as management ability, may depend on the number, education, and experience of cadres, as well as the technological sophistication of enterprise activities. The ability to monitor firms determines the village leader's capability both to evaluate the manager's decisions and to extract revenues for the collective. This may explain why villages with large brigade enterprises before reforms are more likely to have collective enterprises. The richness of the data set utilized in this paper makes it possible to test virtually all of the above effects, and unlike previous work, to quantify them.

Empirical Specification

The processes underlying ownership structure in a village are complex. Given the central role played by village leaders in village economic life, the easiest way to conceptualize ownership choice is to assume that the village leader decides on the desired number and size of all collective and private enterprises in the village. This may be a reasonable assumption for collective enterprises, since the village leader plays a key role in collective investments or privatization decisions. However, it probably is not a

enterprises had the following initial characteristics: more collective firms (twice as many), slightly larger collective firms (by 20 percent, but smaller than firms experiencing no change), smaller payments to the collective as a share of net income, more firms per cadre, slightly older and better educated village leaders (or cadres), more developed product markets, and higher incomes (Table 4). These descriptive statistics presage many of the later estimation results. For villages that reduce the number of collective firms, the average size of collective firms more than doubles, from 0.47 million yuan to 1.14 million yuan, consistent with the tendency to sell off smaller firms. In these villages, the size of private firms also nearly doubles, unsurprising since privatized collective firms are likely to be much larger than existing private firms.

Ownership and Contractual Choice

Previous work has identified a number of possible determinants of ownership and contractual choice in China's rural enterprises (see summary in Che and Qian, 1997). Village leaders in China consider industrial development a top priority (Rozelle, 1995) for at least three reasons: increasing collective revenues, providing employment opportunities, and increasing farmer income (Jin and Qian, 1997; Svejnar, 1990). The first two reasons, in addition to personal rent-seeking, may result in leaders' establishing collective enterprises even when they are not efficient or are less efficient than private enterprises. Collective revenues and control over jobs in collective enterprises increase the influence, and often the wealth, of village leaders.

In theory, furthering the welfare of farmers occurs when profits are maximized by the most efficient, competitive firms, whether collective or private. A number of explanations have been given for why collective ownership should be preferred on efficiency grounds. Most are based on the assumption that local leaders can provide

income per capita, firm number share, and firm income share.⁹ The explanatory variables can be divided into four categories: political objectives (P), market development (MD), monitoring ability (MA), and regional and time dummies (D). The independent variable names and definitions are summarized in Table 5, and summary statistics are presented in Table 6. We review briefly the rationale for including each variable and the theoretical predictions for the sign of the coefficients.

Political Variables

To proxy for the revenue objective of village leaders, we include the independent variable CINC—collective revenue per capita from sources other than collective firms. We exclude revenue from collective firms to mitigate the endogeneity problem. Our hypothesis is that villages with other sources of revenue will have less pressing revenue imperatives to operate collective firms, although we recognize that the lack of collective firm revenue might also lead leaders to exert greater effort in raising revenues elsewhere.

We include the variable LANLAB—the ratio of cultivated land to number of laborers in the village—to proxy for the premium placed on non-farm work opportunities, which we expect to correlate positively with the political motivation to provide collective work opportunities. Availability of labor, of course, will also affect the competitive position of firms, which offers additional interpretations of the coefficient.

Market Development Variables

A set of variables is provided to test the effect of the development of input and output markets on ownership and management choices. The main hypothesis is that market development should be associated with private ownership since with well-

⁹ The log-linear specification produces results consistent with those from linear specifications but more robust, suggesting that the transformation captures an important nonlinearity in the relationship between dependent and independent variables. [explain lack of inclusion of firm income shares]

good assumption for private firms, since most private firms are initiated by entrepreneurs rather than village leaders and typically are much smaller than collective enterprises.⁷ Neither village leaders nor entrepreneurs can guarantee that any enterprise will remain profitable, so that there is an important distinction between desired and actual numbers of enterprises.

Because these different processes are inseparable, it is appropriate to think of the establishment or existence of firms of different ownership types as being mutually determined and in reduced form being a function of a common set of village characteristics. These explanatory factors may be of greater or lesser importance in explaining different ownership types. Thus, we focus on estimating separately the effect of village characteristics on the prevalence of each ownership form rather than on shares. We are particularly interested in explaining the extent of collective ownership, and believe that village leaders care about the absolute number and size of collective enterprises, not the share of enterprises in the village that are collective. We include regressions using shares for purposes of comparison.

Our main results come from estimating versions of the following equation:⁸

$$OWN_i = f(P_t, MD_t, MA_t, D_t)$$

Ownership type (OWN) includes collective (i=c), stock (i=s), and private (i=p) enterprises and is measured in four ways: log of the number of firms per capita, log of firm gross

⁷ Village leaders can refuse to rent land or give license approval to private firms, but this is rarely done in practice unless the private firms compete directly with established village-owned enterprises (Kung, 1996).
⁸ We include squared terms because we suspect relationships may be nonlinear. The squared terms have been dropped when they are not significant and do not effect the estimates. Results are fairly robust to specification changes, with the direction of almost all signs unchanging and slight changes in the significance of and magnitude of the coefficients.

change regressions, we also include income per capita (INCPC), which we exclude in the level regressions because of concerns about endogeneity.

We include several variables that measure output market development and general market development. TRADE, provincial rural retail sales divided by rural social output value, captures the development of the market for goods, both inputs and outputs. CASH, the share of sown area devoted to cash crops, proxies for the degree of commercialization in the village. WATER, the share of households with running water, and ELEC, the share of households with electricity, proxy for the availability of basic utilities required by most enterprises. If freely available, these utilities should support the development of all types of firms. If controlled by local leaders, they make collective leaders more valuable. Finally, we include a number of location variables that are likely to correlate with the level of market development: the distance to the main road (DIST), whether or not the township seat is located in the village (TOWN), whether or not the village is in a suburb (SUBURB), whether or not the village is in hilly terrain (HILL), and whether or not the village is in mountainous terrain (MTN).

Monitoring Ability Variables

For collective enterprises to be successful and to further the goals of village leaders, the village cadres must be able to effectively monitor the operation and performance of the firms. Knowledge and understanding of a firm's operations will both increase the extent to which the leader can support the firm's healthy development and increase his or her ability to extract revenue from the enterprise. Unlike Jin and Qian (1997) who examine provincial data, we are able to test whether the characteristics of village cadres in the village affect ownership choice. To capture monitoring ability, we include variables that measure the cadres' education level (CEDUC), their age (CAGE),

¹⁰ We exclude in-migrants working at the type of firm being analyzed to mitigate the endogeneity problem.

functioning markets, entrepreneurs benefit little from the intervention or assistance of village leaders but are provided poorer incentives under collective ownership due to poorly defined property rights. Rozelle and Chen (1995) show that market development can predict the nature of contractual terms governing the relationship between local leaders and managers of collective enterprises. Managers of township enterprises in their sample are more likely to have greater control rights and residual claims to profits when markets are well-developed. In addition to conducting a similar test for our sample on management arrangement, we hypothesize that these same factors should affect ownership choice itself. Private firms guarantee greater control rights and residual profit claims to managers than collective firms, which is more desirable on efficiency grounds the more developed the market environment.

We include variables for each of the key input markets: land, labor, and capital. Land market development (LNDMKT) is measured as the share of households renting in or renting out land. Labor market development (LABMKT) is captured by the number of laborers migrating into or out of the village as a share of total laborers.¹⁰ Credit market development is captured by two variables. BANK, a provincial variable defined as the amount of outstanding loans from the Agricultural Bank and Rural Credit Cooperatives to rural enterprises divided by rural social output value, is a measure of the depth of formal financial intermediation. We expect greater formal credit for TVEs to increase the importance of local leaders, who often are essential intermediaries for accessing formal credit (Che and Qian, 1997). PRASSET, household fixed assets per capita in the village, is a proxy for the amount of personal financial resources in the village, which should make it easier to start private enterprises and reduce the necessity of cooperating with local leaders under collective ownership to access capital. In the

$$\text{OWN}_{vt}^i = 0 \text{ if } \text{OWN}_{vt}^{*i} \leq 0,$$

$$\text{OWN}_{vt}^i = \text{OWN}_{vt}^{*i} \text{ if } \text{OWN}_{vt}^{*i} > 0.$$

Here, X_{vt} is the vector of independent variables. For the share regressions, the dependent variable takes on values ranging from 0 to 1, which we capture in a Probit model (which assumes a normal distribution).

One concern about the use of Tobit and Probit estimation is that there is no straightforward way to include instruments. This is especially concerning if we believe that many village characteristics are affected by the ownership of village enterprises. Partly due to a lack of convincing instruments for village outcomes, we decide to avoid instrumenting and instead take care to define independent variables in a way that minimizes endogeneity problems.

Explaining Institutional Variation

Collective Ownership

The Tobit and probit estimates for collective firm number, collective firm income, collective firm number share, and collective firm income share confirm many of our predictions. The estimation results are presented in Table 7, and elasticity estimates for per capita firm number and firm income are calculated in Table 11. Overall, the results support the hypotheses that collective ownership is associated with revenue and employment objectives, less market development, and greater monitoring ability of cadres.

Collective revenues from non-firm sources (CINC) enters negatively in the income and two share regressions as expected, but with a small positive coefficient on the squared term. The reported elasticity of collective firm income with non-firm

the number of cadres per capita (CNUM), and the number of collective firms per cadre (FIRMCAD). This last variable, FIRMCAD, is only included in the change regressions because of obvious endogeneity problems. Finally, we include a measure of the education of the local labor force (LEDUC), which we posit increases the technological sophistication (and likely capital-intensity) of possible enterprise activities, putting a greater premium on the assistance of local leaders.

Regional and Time Controls

Regional dummies and a time dummy for 1995 are included in the pooled regressions. We divide China into eight regions. One of the provincial-level unobservables captured by the dummies is historical legacy or differing political or cultural norms. We later find some of the coefficient estimates to be consistent with casual empiricism concerning regional differences in propensity for collective versus private activity.

Estimation

When the dependent variable is firm number per capita or firm income per capita, for some villages the number of firms of a specific type of ownership is zero. The sample excludes villages that have zero total firms but not those that have zero firms of specific ownership types. Thus there is a truncation point at zero, which can be a source of bias in OLS estimation. We address this problem by estimating a Tobit model which defines an index variable, or latent variable, OWN^* , such that

$$OWN^*_{it} = \beta X_{it} + \varepsilon_{it},$$

The estimates for DIST and HILL are consistent with the market development hypothesis, but the positive SUBURB variable is not, since suburban areas are likely to have more developed markets. One possible explanation for the positive coefficient on SUBURB is the reported strong connections between collective enterprises and state-owned enterprises. Earlier work has found a general positive relationship between collective ownership and proximity to urban areas (Naughton, 1996). Jin and Qian (1997) find that state-owned enterprise (SOE) activity positively predicts collective ownership but find no effect of urban location conditional on SOE activity.

Finally, we turn to the monitoring ability variables. We find that the better educated (CEDUC) and older cadres (CAGE) are strongly associated with greater collective ownership. According to the elasticity estimates (Table 11) a ten percent increase in the share of cadres with middle school degrees increases the number of collective firms by 4 percent and the income of collective firms by 27 percent. The comparable magnitudes for age (share of cadres above 45) is 0.6 and 11 percent. The number of cadres per capita also enters positively in the number regression. Finally, the education level of the workforce (LEDUC) is positively associated with collective ownership, but less so at low levels of education. This suggests that there is some threshold level above which educated labor makes possible new possibilities that are associated with a greater need for cadre supervision, as explained earlier. Overall, collective ownership is strongly predicted by measures of the monitoring ability of village cadres as predicted by theory.

The last set of estimates we report are those for the regional dummies. There is some evidence for more collective ownership in the northeast and central coast, and less in the southern coast, which fit our stylized conception of these regions.

collective revenues is -0.6, implying that where there is other revenue sources there is less pressure to run collective firms or that given the absence of viable collective firms, leaders come up with alternative revenue sources. The nonlinearity also implies, sensibly, that the effect of revenue concerns becomes less important as revenue increases. Cultivated land per laborer (LANLAB) enters negatively in the number share regression only, consistent with a reduced employment motivation.

Labor market development has a negative effect on collective ownership in both the number and income regressions. Labor market development might also reduce the political incentive to provide employment opportunities for villagers. Regarding credit, formal credit (BANK) has a positive coefficient, but so does private assets (PRASSET) in the number regression, perhaps reflecting the fact that collective enterprises also can draw on the community for capital or that at the village level, higher household deposits may correlate positively with formal loan availability. In one of the share regressions, goods market development (TRADE) has a negative effect on collective ownership.

Water supply (WATER) has significant coefficients on both the level and squared terms in the number and share regressions. At low levels of water availability, greater availability is positively associated with collective ownership, but at higher levels, it becomes increasingly less so. This is consistent with a story of cadres having control over water when it is in shortage or of extreme shortage precluding viable enterprise activity. At higher levels of availability water is easy to get and the role of the village leader is less important, so the prevalence of collective firms does not respond.

Some of the location variables also enter significantly. Distance (DIST) is positively associated with collective ownership in the income and number share regressions; suburban location (SUBURB) enters significantly positive in all specifications, and hilly areas (HILL) are associated with more collective enterprises.

and none of the variables for monitoring ability matter. These suggest that cadre involvement in contracted firms has much less to do with their prevalence or success.

Private Ownership

The factors affecting the success and prevalence of private enterprises are much different than for collective enterprises. As expected, revenue goals have no significant effect on private enterprises. The land to labor ratio negatively affects the number and income private enterprises evaluated at sample means, suggesting that with less land available, individuals turn to private enterprise activity. This is increasingly true as the amount of land falls (positive coefficient on the squared term). Land markets increase firm number share and labor markets increase firm number. Formal credit has a negative effect on private enterprise growth, perhaps because it attracts funds away from private enterprises or makes it harder to compete against collective enterprises. Private assets increase firm income, and developed goods markets have a positive effect on private ownership in 3 of the 4 specifications. Electricity availability has a strong positive effect on private enterprise activity, as seen in the high estimated elasticities (Table 10).¹³ Unlike collective enterprises, distance from the main road is negatively related to private ownership. Suburban location has a positive effect on private income and mountainous terrain has a negative effect on firm income share. The education and number of cadres has a negative effect on private enterprise incomes and income share. Thus, the estimated coefficients for the private ownership regressions are in many cases the exact opposite of those for the collective ownership

¹³ Since in most villages electricity is available to all households (Table 6), this coefficient suggests that in the few places without electricity, private enterprises cannot survive. It is interesting that the same was not true for collective firms.

Management of Collective Enterprises

The survey provides information on the number of collective firms that are contracted out to individuals or partnerships and the number that are managed directly by the collective. This makes it possible to examine the effect of village characteristics on the management form chosen for collectively owned enterprises. As for ownership choice, we expect contracting to be associated with less political incentive to pursue revenue or employment objectives, greater market development, and poorer monitoring ability. Table 8 reports estimation results for the following dependent variables: collectively-managed firm number per capita, contracted firm number per capita, and share of collectively-owned firms that are collectively managed.

The results for collectively-managed firms are similar to those for all collective firms. Higher numbers of collectively-managed firms are associated negatively with labor market development, positively with water availability, positively with suburban location, positively with hilly terrain, positively with measures of cadre monitoring ability (CEDUC, CAGE, CNUM) and negatively with the education of the labor force (LEDUC).¹¹ Almost all of these variables are also significant when the dependent variable is the share of collectively-owned firms that are collectively managed.¹² In the contracted firm number regression, the land to labor ratio becomes significant and negative (in a nonlinear way). PASSET has a significantly positive coefficient as does HILL. While the coefficients on these variables are similar to the regression for collective ownership, there are important differences. WATER and SUBURB are not significant

¹¹ As before, this relationship is nonlinear. Education is less important at lower levels of education.

¹² Variables that become significant in the share regression are PRASSET, MNT, and dummies for the northeast and northwest. Variables that become insignificant are WATER, HILL, and CNUM, although none of the signs change.

suggested by the data. We regress the rate of increase in the number of firms of each ownership category (collective, private, stock) using the same set of regressors as before, but with two additions. We add initial income per capita and firm number per cadre (including squared terms) as additional proxies for wealth and monitoring ability—change regressions avoid the endogeneity problems that would arise in including these variables in level regressions. Results are presented in Table 13. By looking at changes, we have reduced our sample size by more than one half (some observations are omitted because the village had zero firms in 1993), which we expect to reduce the precision of the estimates.

Village revenue from non-firm sources is negatively related to the growth in collective firm number when evaluated at the sample means (as before, the relationship is nonlinear). This is similar to the level regressions, but many of the other independent variables do not display the same consistency. The estimation results suggest that areas seeing slower growth in collective firms (or faster privatization) are villages with lower land-to-labor ratios, higher incomes, more sown area to cash crops, township seats located in their vicinity, and well-educated cadres—in other words, relatively affluent areas. These results are consistent with the provincial changes in ownership structure reported in Table 1 and in the description of villages broken down by change in collective firm number (Table 4). Thus, even though educated cadres predict higher levels of collective activity (in levels), it is also true that villages with educated cadres in 1993 are more likely to have privatized firms by 1995. This could be due to the fact that such areas are changing the fastest. For example, villages reporting a decrease in collective firms exhibited greater progress in goods market development and a much smaller relative increase in the education level of their cadres (Table 4). Another

regressions. Market development plays an important role in private enterprise success while formal credit and monitoring ability by cadres, if anything, have a negative effect.

Stock Ownership

We run the same set of regressions for stock ownership as we do for collective and private ownership. However, because so few villages have large numbers of stock enterprises and because some of them tend to be quite large, we are cautious in interpreting the coefficient estimates. As noted earlier, stock firms accounted for 9 percent of firms in 1993 and only 5 percent by 1995. But they are relatively large, accounting for 32 and 21 percent of firm income in 1993 and 1995.

Despite their large size, stock enterprises more resemble private than collective enterprises in how they are affected by village characteristics. Like private firms, village revenue goals are not important, enterprise success is hurt by a high land to labor ratio, hurt by formal credit availability (perhaps stock firms are an alternate financing mechanism), helped by strong goods markets, and hurt by the monitoring ability of cadres. Many of the other regressors do not register significantly, which perhaps is to be expected given the small number of villages with stock companies in the sample. Although the trend toward privatization seems to be outpacing the move to set up stock companies, the joint stock companies appear to have been used to attack ownership of reform of large firms while privatization has focused on smaller collective firms.

Change in Ownership and Management from 1993 to 1995

Our last set of regressions examines how changes in ownership and management from 1993 to 1995 were determined by initial conditions in 1993. Changes over this period is of particular interest because of the significant changes in ownership

privatized and unprivatized firms is required to develop a better understanding of these processes and there implications for performance and reform.

possibility is that other unobserved regional, time-varying changes have occurred in richer areas, such as a marked shift in governmental attitudes toward privatization.

The change in the number of private firms is related to only a few variables. It is positively related to goods market development, positively related to distance from the main road, and negatively related to education level of the work force. Only the second result raises questions. It could be explained by higher growth rates in remote areas because such areas are starting from such low base levels, or there might be an unobservable in areas where villages tend to be further from roads that is promoting private sector development.¹⁴

Conclusions

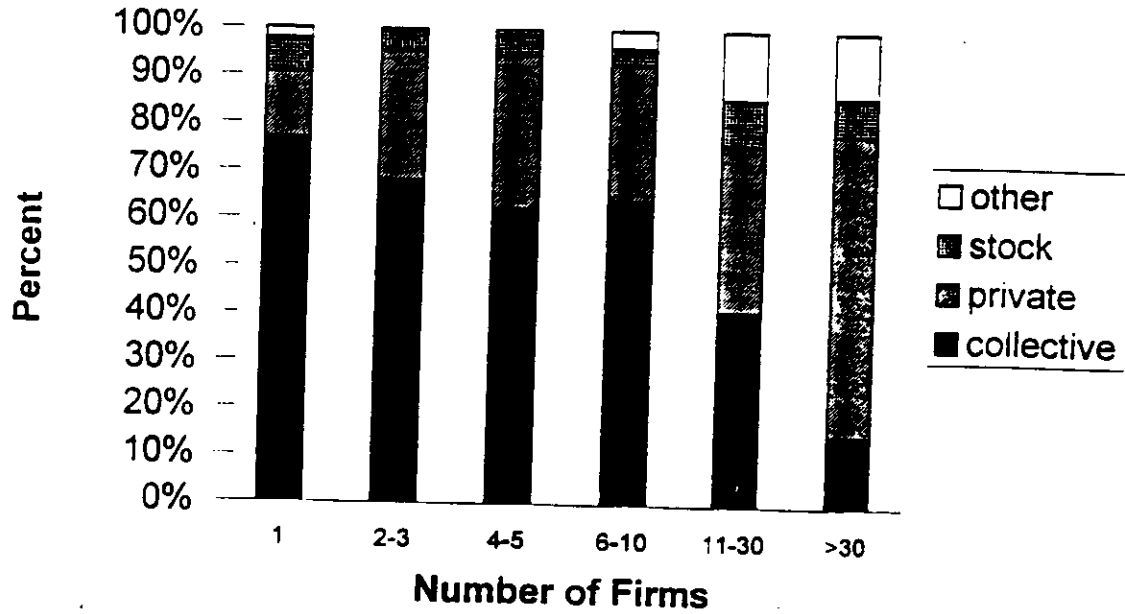
This paper describes recent ownership changes in China's village enterprises and explains institutional variation over space and time by analyzing data from a national survey of villages in 1993 and 1995. We find descriptive evidence of widespread privatization, especially in richer regions during this period. Detailed data on various aspects of the village economy and its leaders can be used to construct measures of political objectives, market development and monitoring ability by cadres. We test how these factors affect ownership and management choice as well as change over time.

We find a consistent story of collective enterprise activity occurring in areas where markets are less developed and the ability of cadres to monitor collective enterprises is weaker. We find, however, that privatization appears to be happening fastest in rich areas led by well-educated leaders—areas that previously had seen a great deal of collective activity. More work, especially enterprise-level surveys of

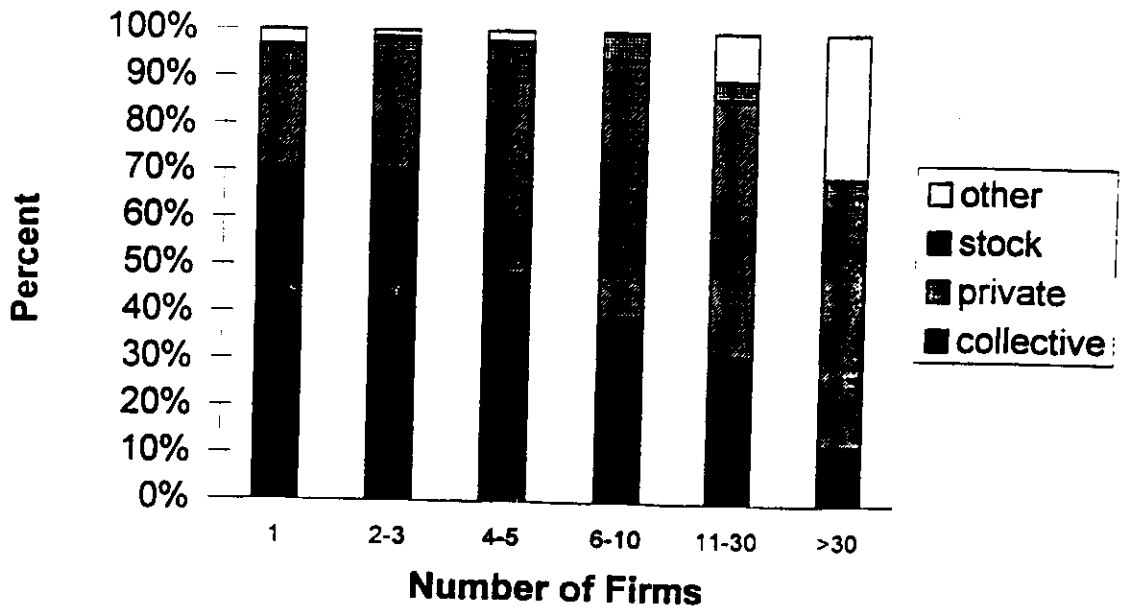
¹⁴ We ran the regression for stock companies but found little of interest to report. Stock companies are growing less rapidly (or declining faster) in areas with more developed land markets, less formal credit, and in hilly and mountainous areas.

Figure 1

Ownership Structure and Total Number of Firms in 1993



Ownership Structure and Total Number of Firms in 1995



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Table 2
Firm Income Per Village and Ownership Structure, 1993 and 1995 (weighted averages)

Region	1993				1995					
	Obs	Firm Income Per Village (million yuan)	Collective Share	Stock Share	Private Share	Obs	Firm Income Per Village (million yuan)	Collective Share	Stock Share	Private Share
Cities	8	4.66	0.98	0.00	0.02	8	6.12	0.91	0.04	0.04
Northeast	15	5.69	0.86	0.09	0.05	15	3.65	0.94	0.00	0.06
North Central	23	3.13	0.32	0.36	0.32	23	4.03	0.10	0.14	0.76
South Central	32	0.86	0.79	0.06	0.15	32	1.12	0.63	0.01	0.36
Central Coast	23	7.08	0.31	0.59	0.09	23	8.30	0.22	0.51	0.27
South Coast	8	4.29	0.17	0.17	0.65	8	7.99	0.01	0.00	0.99
Northwest	4	0.82	0.76	0.13	0.11	4	1.00	0.82	0.00	0.18
Southwest	10	1.53	0.52	0.17	0.31	10	4.48	0.38	0.00	0.62
Total	123	3.56	0.51	0.32	0.17	123	4.36	0.36	0.21	0.43

Source: MOA data

Note: Cities include Beijing, Tianjin, and Shanghai; Northeast includes Liaoning, Jilin, and Heilongjiang; North Central includes Henan, Hebei, Shanxi, Shaanxi, and Inner Mongolia; South Central includes Anhui, Jiangxi, Hubei, and Hunan; Central Coast includes Jiangsu, Zhejiang, Fujian, and Shandong; South Coast includes Guangdong and Hainan; Northwest includes Gansu, Qinghai, Ningxia, and Xinjiang; Southwest includes Guangxi, Sichuan, Guizhou, and Yunnan.

Table 1
Number of Firms Per Village and Ownership Structure, 1993 and 1995 (weighted averages)

Region	1993				1995						
	Obs	Number of Firms Per Village	Collective Share	(of which: Contracted Share)	Private Share	Stock share	Number of Firms Per Village	Collective Share	(of which: Contracted Share)	Stock share	Private Share
Cities	9	4.89	0.91	0.13	0.09	0.00	3.89	0.74	0.27	0.06	0.20
Northeast	27	5.89	0.67	0.15	0.23	0.10	5.63	0.64	0.37	0.04	0.32
North Central	37	5.16	0.40	0.53	0.42	0.18	11.03	0.17	0.72	0.12	0.72
South Central	44	4.48	0.51	0.59	0.45	0.04	5.77	0.32	0.64	0.02	0.66
Central Coast	38	13.26	0.26	0.50	0.66	0.08	15.47	0.15	0.69	0.06	0.78
South Coast	10	65.30	0.07	0.95	0.83	0.10	50.40	0.03	0.82	0.00	0.97
Northwest	11	6.00	0.47	0.55	0.45	0.08	5.36	0.51	0.67	0.02	0.47
Southwest	22	10.55	0.43	0.78	0.50	0.07	8.41	0.31	0.70	0.09	0.61
Total	198	10.33	0.31	0.51	0.60	0.09	11.04	0.21	0.60	0.05	0.73

Source: MOA data

Note: Cities include Beijing, Tianjin, and Shanghai; Northeast includes Liaoning, Jilin, and Heilongjiang; North Central includes Henan, Hebei, Shanxi, Shaanxi, and Inner Mongolia; South Central includes Anhui, Jiangxi, Hubei, and Hunan; Central Coast includes Jiangsu, Zhejiang, Fujian, and Shandong; South Coast includes Guangdong and Hainan; Northwest includes Gansu, Qinghai, Ningxia, and Xinjiang; Southwest includes Guangxi, Sichuan, Guizhou, and Yunnan.

Table 4
Village Summary Statistics (means) by Change in the Number of Collective Enterprises from 1993 to 1995

	Unit	Obs	Increase 1993	Obs	1995	Obs	No change 1993	Obs	1995	Obs	Decrease 1993	Obs	1995
Firm number	number	33	7.64	94	16.70	94	9.09	94	12.54	73	15.81	73	14.47
Collective	number	33	2.64	94	4.73	94	1.44	94	1.44	73	5.59	73	2.40
Stock	number	33	0.27	94	0.30	94	0.82	94	0.74	73	1.33	73	0.48
Private	number	33	3.12	94	10.27	94	5.82	94	6.82	73	7.99	73	8.55
Firm number/population	number	33	0.0038	94	0.0074	94	0.0047	94	0.0061	73	0.0078	73	0.0063
Collective	number	33	0.0012	94	0.0023	94	0.0010	94	0.0010	73	0.0030	73	0.0012
Stock	number	33	0.0001	94	0.0001	94	0.0004	94	0.0004	73	0.0004	73	0.0002
Private	number	33	0.0014	94	0.0041	94	0.0027	94	0.0030	73	0.0035	73	0.0042
Firm income/pop	yuan	17	517	63	1054	63	3158	63	2257	47	2578	47	2595
Collective	yuan	17	360	63	777	63	494	63	441	47	1951	47	1207
Stock	yuan	17	62	63	4	63	1664	63	1318	47	282	47	163
Private	yuan	17	95	63	274	63	1000	63	499	47	345	47	1224
Firm income/firm	yuan	13	0.384	59	0.216	59	0.938	59	0.816	47	0.467	47	0.906
Collective	yuan	12	0.414	39	0.331	39	0.543	39	0.425	47	0.463	47	1.139
Stock	yuan	2	0.676	12	0.139	12	4.380	12	7.941	7	1.896	7	2.834
Private	yuan	6	0.210	32	0.060	32	0.308	32	0.317	20	0.307	20	0.588
Payments to collective/collective firm income	share	12	0.63	39	0.58	39	0.69	39	0.38	47	0.23	47	0.13
Collective firm number/cadre	number	33	0.32	94	0.62	94	0.20	94	0.21	73	0.75	73	0.32
Number of cadres/population	people	33	0.0051	94	0.0047	94	0.0055	94	0.0054	73	0.0057	73	0.0058
Share of cadres graduated middle school	share	33	0.75	94	0.86	94	0.73	94	0.80	73	0.78	73	0.77
Share of cadres above 45 years old	share	33	0.27	94	0.29	94	0.30	94	0.30	73	0.30	73	0.30
Provincial product market development	share	33	0.039	94	0.049	94	0.045	94	0.057	73	0.066	73	0.084
Provincial credit market development	share	33	0.19	94	0.21	94	0.21	94	0.19	73	0.21	73	0.21
Income per capita	yuan	33	1125	94	1235	94	1105	94	1308	73	1323	73	1464

Source: MOA data

Table 3
Income Per Firm, 1993 and 1995 (weighted averages)

Region	1993				1995				Unit: million yuan	
	Obs	All	Collective	Stock	Private	Obs	All	Collective		Stock
Cities	7	0.886	0.951	0.000	0.127	7	1.561	1.717		0.515
Northeast	13	0.883	1.036	0.700	0.308	13	0.769	0.872		0.113
North Central	21	0.283	0.535	0.267	0.239	21	0.158	0.140	0.186	0.099
South Central	30	0.227	0.362	0.224	0.064	30	0.186	0.395	0.069	0.089
Central Coast	22	0.692	0.721	3.335	0.175	22	0.800	1.154	4.656	0.215
South Coast	6	0.054	0.037	0.070	0.051	6	0.220	0.046		0.098
Northwest	4	0.156	0.191	0.109	0.089	4	0.133	0.218		0.048
Southwest	8	0.169	0.218	1.302	0.088	8	0.385	0.649		0.110
Total	111	0.318	0.590	0.852	0.075	111	0.354	0.684	1.884	0.121

Source: MOA data

Note: Cities include Beijing, Tianjin, and Shanghai; Northeast includes Liaoning, Jilin, and Heilongjiang; North Central includes Henan, Hebei, Shanxi, Shaanxi, and Inner Mongolia; South Central includes Anhui, Jiangxi, Hubei, and Hunan; Central Coast includes Jiangsu, Zhejiang, Fujian, and Shandong; South Coast includes Guangdong and Hainan; Northwest includes Gansu, Qinghai, Ningxia, and Xinjiang; Southwest includes Guangxi, Sichuan, Guizhou, and Yunnan.

Table 6
Summary Statistics for Independent Variables

Variable Name	Obs	Unit	Mean	S.D.	Min	Max
BANK	346	share	0.20	0.10	0.11	0.55
CAGE	346	share	0.30	0.20	0.00	0.89
CASH	346	share	0.23	0.17	0.00	1.00
CEDUC	346	share	0.79	0.22	0.00	1.00
CINC	346	yuan	120	258	0	2578
CNUM	346	number	0.005	0.003	0.001	0.022
DIST	346	km	2.16	3.32	0.00	27.00
ELEC	346	share	0.97	0.11	0.00	1.00
HILL	346	0-1	0.33	0.47	0.00	1.00
LABMKT	346	share	0.16	0.25	0.00	2.93
LANLAB	346	mu	3.35	4.82	0.00	39.46
LEDUC	346	share	0.45	0.17	0.03	0.89
LNDMKT	346	share	0.064	0.133	0.000	1.038
MTN	346	0-1	0.21	0.41	0.00	1.00
PRASSET	346	share	627	771	9	5601
SUBURB	346	0-1	0.18	0.38	0.00	1.00
TOWN	346	0-1	0.24	0.43	0.00	1.00
TRADE	346	share	0.058	0.052	0.013	0.413
WATER	346	share	0.43	0.43	0.00	1.00

Source: MOA data

Note: sample is the one used for collective ownership regressions

Table 5
Independent Variable Definitions

Variable	Variable Description	Unit	Definition
POLITICAL VARIABLES			
CINC	Collective Revenue Per Capita	yuan	Collective revenue (not including income from collective firms)/ population
LANLAB	Cultivated Land Per Laborer	mu	Cultivated land/number of laborers
MARKET DEVELOPMENT VARIABLES			
LNDMKT	Land Market Development	share	Households renting land in or out/total households
LABMKT	Labor Market Development	share	(Outmigrants + immigrants working in firms (not including those working at firm type being analyzed))/total laborers
BANK	Formal Credit Availability	share	Provincial TVE loans from Agricultural Banks and Rural Credit Cooperatives/ provincial TVE output value
PRASSET	Private Assets Per Capita	yuan	Household fixed assets/pop
INCPC	Income Per Capita	yuan	
TRADE	Goods Market Development	share	Provincial rural retail sales value/provincial rural social output value
CASH	Cash Crop Development	share	Cash crop sown area/total sown area
WATER	Water Availability	share	Share of households with running water
ELEC	Electricity Availability	share	Share of households with electricity
DIST	Distance to Road	km	
TOWN	Location of Township	dummy	Is township seat located in the village?
SUBURB	Suburban Location	dummy	
HILL	Hilly Area	dummy	
MTN	Mountainous Area	dummy	
MONITORING ABILITY VARIABLES			
CEDUC	Cadre Education	share	Share of cadres graduated from middle school
CAGE	Cadre Age	share	Share of cadres older than 45
CNUM	Cadre Number	share	Number of cadres/pop
FIRMCAD	Collective Firms Per Cadre	number	Number of collective firms/number of cadres
LEDUC	Education of Labor Force	share	Laborers graduated from middle school/total laborers

* Regional dummies are DCIT (cities), DNE (northeast), DNCEN (north central), DSCEN (south central), DCCST (central coast), DSCST (south coast), and DNW (northwest). Regions are defined in Tables 1-3. D95 is time dummy for 1995.

Table 7
Collective Ownership Estimation Results, continued

Dependent Variable	Log(firm number/pop)	Log(firm income/pop)	Firm number share	Firm income share
Estimation Method	tobit	tobit	probit	probit
CEDUC	0.54 (2.219)**	3.46 (2.899)*	1.44 (2.933)*	1.24 (2.205)**
CAGE	0.20 (0.77)	3.64 (2.66)*	1.01 (1.706)***	1.28 (1.877)***
CNUM	64.52 (4.01)*	-13.87 (-0.166)	19.13 (0.485)	26.57 (0.535)
LEDOC	-2.26 (-1.699)***	-9.51 (-1.369)	-5.15 (-1.447)	-7.14 (-1.644)***
LEDOC(square)	2.96 (2.199)**	12.85 (1.803)***	6.20 (1.617)***	7.79 (1.719)***
DCIT	0.32 (0.715)	1.06 (0.455)	0.44 (0.513)	0.25 (0.269)
DNE	-0.01 (-0.037)	2.03 (1.704)***	1.88 (2.312)**	1.22 (1.416)
DNCEN	-0.14 (-0.746)	-0.94 (-0.983)	-0.04 (-0.101)	-0.20 (-0.445)
DSCEN	0.13 (0.75)	0.90 (1.065)	0.33 (0.899)	0.40 (0.939)
DCCST	0.19 (0.967)	2.38 (2.354)**	1.37 (2.799)*	1.07 (1.935)**
DNCST	0.15 (0.577)	-2.36 (-1.822)***	-0.49 (-0.997)	-0.59 (-1.09)*
DNW	-0.13 (-0.47)	-0.06 (-0.044)	-0.23 (-0.388)	0.27 (0.767)
D95	-0.12 (-1.185)	0.09 (0.171)	0.20 (0.217132)	0.14 (0.578)
Constant	-7.53 (-11.87)*	-5.79 (-1.709)***	-1.14 (-0.905)	-0.89 (-0.64)
Obs	346	283	346	280
Log likelihood	-338.533*	-702.59*	-114.178*	-89.6917*
Pseudo-R2	0.12	0.08	0.28	0.26

Notes: *Significant at 1% level, **significant at 5% level, ***significant at 10% level.

Criteria for excluding outliers: CINC>2900 yuan, PRASSET>2000 yuan, collective firm number>30.

Table 7
Collective Ownership Estimation Results

Dependent Variable	Log(firm number/pop)	Log(firm income/pop)	Firm number share	Firm income share
Estimation Method	tobit	tobit	probit	probit
CINC	-0.0005 (-0.898)	-0.0057 (-2.062)**	-0.0032 (-2.811)*	-0.0032 (-2.591)*
CINC(square)	0.0000003 (1.064)	0.0000027 (2.131)**	0.0000012 (2.336)**	0.0000013 (2.29)**
LNDLAB	-0.03 (-0.899)	0.05 (0.283)	0.07 (0.902)	-0.08 (-0.33)
LNDLAB(square)	-0.0001 (0.943)	-0.0066 (-1.395)	-0.0040 (-1.792)***	0.0213 (0.742)
LABMKT	-0.90 (-2.74)*	-1.89 (-1.988)**	-0.58 (-1.227)	-0.65 (-1.39)
BANK	1.13 (1.764)***	-0.97 (-0.289)	-0.16 (-0.101)	0.34 (0.18)
PRASSET	0.0003 (1.739)***	0.0012 (1.469)	0.0002 (0.667)	0.0001 (0.316)
PRASSET(square)	-0.0000001 (-1.486)	-0.0000003 (-1.542)***	-0.0000001 (-0.99)	-0.0000001 (-0.689)
TRADE	-1.34 (-0.854)	-5.61 (-0.714)	-4.83 (-1.6)***	-3.50 (-1.115)
CASH	0.05 (0.168)	4.82 (3.064)*	1.83 (2.298)**	1.50 (1.63)***
WATER	-0.03 (-0.055)	7.34 (2.532)*	2.88 (2.132)**	3.70 (2.344)***
WATER(square)	0.25 (0.44)	-6.09 (-2.08)**	-2.74 (-1.942)**	-3.51 (-2.15)**
ELEC	0.07 (0.042)	-10.68 (-1.082)	3.01 (0.921)	1.44 (0.358)
ELEC(square)	0.03 (0.02)	11.12 (1.373)	-2.23 (-0.783)	-0.17 (-0.047)
DIST	0.01 (0.396)	0.15 (2.073)**	0.08 (1.776)***	0.07 (1.451)
TOWN	0.03 (0.24)	-0.48 (-0.846)	-0.14 (0.545)	-0.30 (-1.021)
SUBURB	0.34 (2.634)*	1.65 (2.276)**	1.00 (2.472)**	0.68 (1.545)***
HILL	0.28 (2.38)**	0.41 (0.652)	0.31 (1.161)	0.31 (0.951)
MTN	0.18 (1.239)	-0.61 (-0.841)	-0.03 (-0.111)	-0.06 (-0.169)

Table 8
Management of Collectively-Owned Firms Estimation Results, Continued

Dependent Variable	Log (collectively- managed firm number/pop)	Log(contractured firm number/pop)	Collectively- managed firm number share
Estimation Method	Tobit	Tobit	probit
CEDUC	1.00 (2.434)**	0.03 (0.078)	0.98 (2.357)**
CAGE	1.04 (2.337)**	-0.42 (-1.185)	1.24 (2.745)*
CNUM	82.92 (3.186)*	19.41 (0.908)	34.00 (1.212)
LEDUC	-4.77 (-2.27)**	-0.89 (-0.494)	-4.91 (-2.075)**
LEDUC(squared)	5.03 (2.402)**	1.01 (0.56)	5.30 (2.17)**
DCIT	0.52 (0.795)	-0.02 (-0.024)	0.48 (0.588)
DNE	0.63 (1.548)	-0.63 (-1.857)***	0.86 (2.044)**
DNCEN	-0.38 (-1.061)	0.19 (0.756)	-0.36 (-1.1)
DSCEN	0.31 (1.037)	0.14 (0.638)	0.11 (0.381)
DCCST	0.45 (1.325)	0.16 (0.607)	0.28 (0.85)
DNCST	-0.34 (-0.574)	0.39 (1.158)	-0.37 (-0.777)
DNW	0.34 (0.751)	-0.42 (-1.162)	0.72 (1.588)***
D95	-0.37 (-2.139)**	-0.03 (-0.211)	-0.48 (-2.769)*
Constant	-10.43 (-3.106)*	-7.82 (-9.848)*	-3.76 (-0.982)
Obs	346	346	346
Log likelihood	-200.192*	-283.411**	-191.482*
Pseudo-R2	0.23	0.08	0.19

Notes: *Significant at 1% level, **significant at 5% level, ***significant at 10% level.
Criteria for excluding outliers: CINC>2900 yuan, PRASSET>2000 yuan, collective firm number>30.

Table 8
Management of Collectively-Owned Firms Estimation Results

Dependent Variable	Log (collectively- managed firm number/pop)	Log(contractd firm number/pop)	Collectively- managed firm number share
Estimation Method	Tobit	Tobit	probit
CINC	-0.00064 (-0.728)	0.00073 (0.763)	-0.00056 (-0.548)
CINC(squared)	0.0000005 (1.245)	-0.0000009 (-1.241)	0.0000005 (0.938)
LNDLAB	-0.07 (-1.011)	0.17 (2.06)**	-0.07 (-1.313)
LNDLAB(squared)	0.00 (-0.186)	-0.01 (-1.917)**	0.00 (0.746)
LNDMK	-1.22 (-1.464)	-0.66 (-1.339)	-0.16 (-0.274)
LABMKT	-2.19 (-2.704)*	-0.01 (-0.033)	-0.61 (-1.924)**
PRASSET	0.00033 (1.158)	0.00034 (1.726)***	0.00081 (2.133)**
PRASSET(squared)	-0.00000009 (-1.045)	-0.00000053 (-1.116)	-0.00000295 (-2.103)**
TRADE	-0.83 (-0.372)	-1.71 (-0.74)	-1.06 (-0.385)
CASH	-0.47 (-0.925)	0.33 (0.788)	0.51 (0.945)
WATER	-1.35 (-1.363)	0.08 (0.102)	-0.09 (-0.092)
WATER(squared)	1.75 (1.764)***	-0.02 (-0.032)	0.21 (0.217)
ELEC	7.08 (0.789)	-2.56 (-1.125)	9.51 (0.939)
ELEC(squared)	-4.67 (-0.797)	2.31 (1.162)	-6.23 (-0.953)
DIST	0.01 (0.374)	-0.01 (-0.311)	0.03 (1.208)
TOWN	0.16 (0.881)	-0.08 (-0.574)	0.08 (0.437)
SUBURB	0.63 (3.126)*	0.15 (0.85)	0.60 (2.653)*
HILL	0.35 (1.725)***	0.38 (2.427)**	0.19 (0.952)
MTN	0.26 (1.063)	0.26 (1.366)	0.38 (1.623)***

Table 9
Private Ownership Estimation Results, continued

Dependent Variable	Log(firm number/pop)	Log(firm income/pop)	Firm number share	Firm income share
Estimation Method	tobit	tobit	probit	probit
CEDUC	-0.46 (-1.068)	-3.96 (-1.968)**	0.03 (0.059)	-1.08 (-2.232)**
CAGE	0.09 (0.192)	-0.37 (-0.172)	0.31 (0.586)	-0.32 (-0.614)
CNUM	0.76 (0.025)	-236.75 (-1.589)***	-56.11 (-1.438)	-34.69 (-0.972)
LEDUC	2.87 (1.091)	13.17 (1.125)	-5.47 (-1.923)**	3.43 (1.233)
LEDUC(square)	-3.55 (-1.334)	-13.77 (-1.171)	5.11 (1.787)***	-3.05 (-1.079)
DCIT	-2.18 (-2.283)**	-9.79 (-2.41)**	-3.73 (-1.648)***	-1.71 (-2.068)**
DNE	-0.86 (-1.917)**	-4.32 (-2.091)**	0.18 (0.343)	-0.61 (-1.297)
DNCEN	-0.0035 (-0.01)	-0.02 (-0.011)	0.06 (0.155)	-0.08 (-0.213)
DSCEN	-0.33 (-1.099)	-1.98 (-1.365)	-0.31 (-0.844)	-0.49 (-1.427)
DCCST	-0.65 (-1.801)***	-3.19 (-1.921)**	-0.66 (-1.444)	-0.95 (-2.348)**
DNCST	0.48 (0.952)	1.79 (0.859)	-0.96 (-1.535)***	0.37 (0.659)
DNW	0.75 (1.528)***	0.34 (0.143)	1.06 (1.846)***	-0.19 (-0.297)
D95	0.15 (0.831)	1.14 (1.365)	-0.47 (-2.092)**	0.14 (0.705)
constant	-6.50 (-5.726)*	2.18 (0.437)	-0.49 (-0.191)	9.06 (1.075)
obs	331	316	331	260
log likelihood	-339.613*	-634.463*	-193.711*	-88.5417**
Pseudo-R2	0.09	0.07	0.15	0.26

Notes: *Significant at 1% level, **significant at 5% level, ***significant at 10% level.

Criteria for excluding outliers: CINC>2900 yuan, PRASSET>2000 yuan, collective firm number>30.

Table 9
Private Ownership Estimation Results

Dependent Variable	Log(firm number/pop)	Log(firm income/pop)	Firm number share	Firm income share
Estimation Method	tobit	tobit	probit	probit
CINC	-0.0003 (0.284)	-0.0010 (-0.232)	0.0035 (2.322)**	0.0007 (0.588)
CINC(square)	0.0000003 (0.535)	0.0000003 (0.149)	-0.0000028 (-1.879)***	-0.0000003 (-0.654)
LNDLAB	-0.09 (-1.5380)***	-0.72 (-2.317)**	-0.27 (-3.026)*	-0.14 (-1.892)***
LNDLAB(square)	0.003 (2.195)**	0.018 (1.606)***	0.005 (1.885)***	0.002 (0.986)
LNDMK	-0.39 (-0.556)	1.30 (0.47)	1.51 (2.268)**	0.04 (0.059)
LABMKT	0.79 (2.079)**	-0.73 (-0.314)	0.55 (1.063)	-0.08 (-0.188)
BANK	-3.39 (-2.549)*	-11.67 (-2.123)**	-2.19 (-1.547)***	-1.95 (-1.527)
PRASSET	0.000324400 (1.198)	0.0022 (1.778)***	-0.000000676 (-0.002)	0.0004188 (1.334)
PRASSET(square)	-0.000000055 (-0.895)	-0.000000347 (-1.18)	0.000000002 (0.024)	-0.000000051 (-0.674)
TRADE	5.72 (1.832)***	24.81 (1.781)***	11.25 (1.778)***	3.89 (1.403)
CASH	0.01 (0.014)	-1.50 (-0.607)	-1.10 (-1.738)***	-0.44 (-0.716)
WATER	-0.17 (-0.166)	3.13 (0.657)	0.49 (0.405)	0.96 (0.844)
WATER(square)	0.68 (0.648)	-0.49 (-0.102)	0.08 (0.066)	-0.77 (-0.672)
ELEC	-7.24 (-2.177)**	-25.35 (-1.768)***	0.30 (0.045)	-21.75 (-1.044)
ELEC(square)	6.93 (2.356)**	22.36 (1.794)***	1.35 (0.285)	14.02 (1.105)
DIST	-0.07 (-2.218)**	-0.20 (-1.549)***	-0.07 (-1.659)***	-0.03 (-1.138)
TOWN	-0.21 (-1.049)	-0.08 (-0.087)	-0.19 (-0.82)	0.07 (0.329)
SUBURB	-0.11 (-0.444)	2.11 (2.003)**	-0.32 (-1.138)	0.08 (0.281)
HILL	0.19 (0.904)	0.76 (0.771)	-0.13 (-0.532)	-0.18 (-0.738)
MTN	0.27 (1.059)	-1.55 (-1.265)	-0.09 (-0.285)	-0.62 (-2.117)**

Table 10
Stock Ownership Estimation Results, continued

Dependent Variable	Log(firm number/pop)	Log(firm income/pop)	Firm number share	Firm income share
Estimation Method	tobit	tobit	probit	probit
CEDUC	-0.29 (-0.32)	-3.81 (-0.478)	-1.04 (-2.474)**	-0.40 (-0.569)
CAGE	0.85 (0.671)	5.81 (0.66)	-0.22 (-0.505)	0.24 (0.292)
CNUM	-26.66 (-0.409)	-1139.29 (-1.786)***	-12.07 (0.671)	-66.39 (-1.142)
LEDUC	-4.42 (-0.815)	-75.05 (-1.908)**	2.39 (1.036)	-7.31 (-2.066)**
LEDUC(square)	4.79 (0.919)	77.58 (1.999)**	-2.51 (-1.074)	7.70 (2.233)**
DCIT	-4.33 (-1.217)	-44.18 (-1.432)	-2.10 (-2.645)*	-5.55 (-1.692)***
DNE ¹	1.06 (1.091)	2.70 (0.3480)	-1.01 (-2.484)**	0.17 (0.261)
DNCEN	0.91 (1.094)	3.61 (0.588)	-0.31 (-0.973)	-0.13 (-0.236)
DSCEN	0.75 (0.957)	1.43 (0.251)	-0.59 (-2.021)**	-0.17 (0.339)
DCCST	-0.04 (-0.042)	-1.24 (-0.189)	-1.01 (-2.987)*	-0.32 (-0.523)
DSCST	-0.82 (-0.704)	-11.81 (-1.283)	0.12 (0.207)	-1.33 (-1.572)***
DNW	2.09 (1.936)**	12.81 (1.302)	0.43 (0.913)	2.06 (2.128)**
D95	-0.88 (-2.235)**	-8.07 (-2.223)**	0.23 (1.346)	-0.91 (-2.62)*
constant	-785.08 (-0.505)	-1956.12 (-0.307)	2.08 (1.904)**	-254.13 (-0.381)
obs	342	330	350	260
log likelihood	-148.472*	-200.78*	-119.351*	-145.899*
Pseudo-R2	0.17	0.11	0.22	0.18

Notes: *Significant at 1% level, **significant at 5% level, ***significant at 10% level.

Criteria for excluding outliers: CINC>2900 yuan, PRASSET>2000 yuan, collective firm number>30.

Table 10
Stock Ownership Estimation Results

Dependent Variable	Log(firm number/pop)	Log(firm income/pop)	Firm number share	Firm income share
Estimation Method	tobit	tobit	probit	probit
CINC	0.01 (2.145)**	0.02 (0.885)	-0.00032 (-0.337)	0.00047 (0.202)
CINC(square)	-0.0000042 (-1.803)***	-0.0000205 (-0.965)	0.0000001 (0.265)	-0.0000008 (-0.438)
LNDLAB	-0.29 (-1.974)**	-2.95 (-2.13)**	-0.12 (-2.168)**	-0.29 (-2.113)**
LNDLAB(square)	0.005 (1.063)	0.064 (1.599)***	0.004 (2.335)**	0.007 (1.845)***
LNDMK	2.77 (2.618)*	21.01 (2.366)**	-0.58 (-0.863)	2.15 (2.371)**
LABMKT	0.52 (0.63)	2.38 (0.257)	0.26 (0.694)	0.38 (0.486)
BANK	-2.20 (-0.959)	-45.35 (-1.991)**	-2.61 (-2.263)**	-5.53 (-2.472)**
PRASSET	-0.0001 (-0.104)	0.0014 (0.313)	0.0002 (0.617)	0.0002 (0.578)
PRASSET(square)	0.00000006 (0.486)	-0.00000005 (-0.05)	-0.00000002 (-0.224)	-0.00000003 (-0.299)
TRADE	14.78 (1.485)	152.58 (1.729)***	4.43 (1.617)***	19.09 (2.075)**
CASH	-0.83 (-0.755)	-8.34 (-0.904)	-0.30 (-0.578)	-0.80 (-0.889)
WATER	1.26 (0.579)	11.69 (0.645)	0.22 (0.222)	0.86 (0.527)
WATER(square)	-0.22 (-0.104)	-2.69 (-0.153)	0.18 (0.185)	-0.21 (-0.131)
ELEC	1551.29 (0.491)	3820.94 (0.293)	-3.22 (-1.124)	503.38 (0.369)
ELEC(square)	-775.55 (-0.483)	-1858.99 (-0.279)	2.64 (1.105)	-247.50 (-0.356)
TOWN	-0.18 (-0.429)	-2.81 (-0.79)	-0.06 (-0.338)	-0.28 (-0.848)
SUBURB	-0.13 (-0.266)	-3.02 (-0.723)	0.33 (1.403)	-0.26 (-0.618)
HILL	-0.17 (-0.393)	-0.77 (-0.202)	0.15 (0.72)	0.02 (0.068)
MTN	0.40 (0.783)	2.49 (0.58)	-0.23 (-0.972)	0.42 (0.969)

Table 12
Rate of Firm Number Change by Ownership and Management Estimation Results

Dependent Variable	Rate of change in collective firm number	Rate of Change in private firm number
Estimation Method	Tobit	Tobit
CINC	0.0012 (1.587)***	0.0004 (0.286)
CINC(square)	0.00 (-1.643)***	0.00 (0.328)
LNDLAB	0.14 (3.269)*	-0.10 (-1.465)
LNDLAB(square)	-0.0026 (-2.035)**	0.0033 (1.529)
LNDMKT	0.44 (1.283)	0.38 (0.57)
LABMKT	0.05 (0.14)	-0.42 (-0.562)
BANK	-0.85 (-1.068)	0.25 (0.175)
PRASSET	0.0001233 (0.394)	-0.0003034 (-0.486)
PRASSET(square)	-0.00000005 (-0.471)	0.00000021 (0.955)
INPCPC	0.0007 (1.631)***	0.0007 (0.854)
INPCPC(square)	-0.00000019 (-1.744)***	-0.00000022 (-1.248)
TRADE	-1.18 (-0.552)	7.00 (1.808)***
CASH	0.81 (1.975)**	-0.61 (-0.836)
WATER	-0.37 (-0.496)	-1.77 (-1.327)
WATER(square)	0.51 (0.657)	1.45 (1.053)
ELEC	-0.90 (-0.478)	26.32 (0.954)
ELEC(square)	0.35 (0.228)	-15.32 (-0.946)
DIST	0.02 (1.219)	0.04 (1.709)***
TOWN	0.24 (1.757)***	-0.16 (-0.648)
SUBURB	0.12 (0.56)	0.22 (0.614)
HILL	0.32 (1.925)**	0.40 (1.367)
MTN	0.51 (2.976)*	0.18 (0.606)

Table 11
Elasticity Estimates for Firm Number and Firm Income

	Collective firm number/pop	Stock firm number/pop	Private firm number/pop
CINC	-0.05	0.52**	-0.03
LANLAB	-0.10	-0.87**	-0.22**
LNDMK	-0.05**	0.17*	-0.02
LABMKT	-0.14*	0.09	0.13**
BANK	0.23***	-0.45	-0.68*
PRASSET	0.12***	0.01	0.16
TRADE	-0.08	0.86	0.33*
CASH	0.01	-0.20	0.00
WATER	0.08	0.46	0.17
ELEC	0.13	39.97	6.07**
DIST	0.01	-0.21	-0.14**
CEDUC	0.42**	-0.23	-0.36
CAGE	0.06	0.20	0.03
CNUM	0.35*	-0.14	0.00
LEDUC	0.17**	-0.04	-0.15

	Collective firm income/pop	Stock firm income/pop	Private firm income/pop
CINC	-0.63**	2.02	-0.12
LANLAB	0.00	-8.54***	-1.91**
LNDMK	-0.24**	1.30**	0.08
LABMKT	-0.30**	0.41	-0.12
BANK	-0.20	-9.03**	-2.37**
PRASSET	0.49***	0.82	1.10***
TRADE	-0.33	8.84**	1.44***
CASH	1.14*	-2.00	-0.36
WATER	0.93**	3.95	1.17
ELEC	10.83	195.17	17.79***
DIST	0.32**	-1.66	-0.44***
CEDUC	2.66*	-2.99	-3.11**
CAGE	1.11*	1.75	-0.11
CNUM	-0.08	-6.09***	-1.25***
LEDUC	0.76***	-2.44**	0.33

Note: Calculated at sample means.

Table 12
Rate of Firm Number Change by Ownership and Management Estimation Results, Continued

Dependent Variable	Rate of change in collective firm number	Rate of Change in private firm number
Estimation Method	Tobit	Tobit
CEDUC	-0.80 (-2.807)*	0.49 (0.996)
CAGE	0.33 (1.043)	0.02 (0.043)
CNUM	-45.43 (-2.022)**	-60.88 (-1.639)***
LEDUC(squared)	-4.75 (-2.538)*	9.91 (2.673)*
FIRMCAD	-1.64 (-3.865)*	-0.24 (-0.519)
FIRMCAD(squared)	0.81 (3.235)*	0.01 (0.081)
DCIT	0.30 (0.684)	-0.80 (-0.989)
DNE	-0.92 (-2.674)*	0.09 (0.159)
DNCEN	0.14 (0.542)	0.63 (1.273)
DSCEN	-0.02 (-0.077)	0.23 (0.512)
DCCST	0.02 (0.065)	0.69 (1.207)
DNCST	-0.12 (-0.351)	0.79 (1.077)
DNW	-0.18 (-0.458)	1.07 (1.547)***
constant	-1.56 (-2.183)**	-10.27 (-0.883)
obs	112.00	105.00
log likelihood	-85.357*	-114.77
Pseudo-R2	0.31	0.15

Notes: *Significant at 1% level, **significant at 5% level, ***significant at 10% level.

Criteria for excluding outliers: CINC>2900 yuan, PRASSET>2000 yuan, collective firm number>30.