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EMPLOYEE OWNERSHIP AND PROFIT SHARING AS POSITIVE FACTORS IN THE REFORM OF CHINESE STATE-OWNED ENTERPRISES

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Discussion paper

WORKER PRESSURES IN THE ERA OF REFORM

In China, state-owned enterprises (SOEs) dominate heavy industry and have long been renowned for extreme inefficiency. By the early 1990s, enterprise money losses and non-performing bank loans were threatening the continued stable development of nearly every province. For example, a finance department study in Liaoning Province indicated that 70% of the province's firms had hidden losses, which were on average 1.4 times greater than profits (Sender, 1993). By 2001, official publicized estimates of China's unpaid SOE debt reached $218 billion or 27% of total national bank lending (Chandler, 2002). Most Western analysts pegged the actual figures at double or more of these values. Ernst & Young estimated a total of $480 billion in unpaid SOE debts for 2001 or 44% of the national economy's $1.08 trillion output for that year (ibid).

To try to staunch the loss of money the state has over the past decade and a half promoted enterprise reforms aimed at gradually eliminating lifetime employment guarantees for workers and cutting back on their vast array of social benefits (including food subsidies, very low cost housing, medical care, free vacations, child schooling, adult continuing education, etc.)[1]. Workers' benefits packages are now frequently bought out by their firms with one-time lump sums; thereafter, employees are completely on their own (Lee, 1999). In hiring new workers a growing number of SOEs are passing over urban residents entirely in favor of rural migrants, to whom substantially less need be paid and often the provision of social benefits may be entirely neglected (ibid). More and more, firms are opting for piece rate compensation of workers as opposed to wage rate compensaiton, making employee income susceptible to the vagaries of product markets (ibid).

Despite such efforts, China's SOEs remained uncompetitive relative to other types of enterprises, most notably township-and-village enterprises (TVEs) and small private firms, both of which were unburdened by onerous financial obligations to workers, operated unhindered by well-intentioned but often wrong-headed state reforms to which only SOEs were bound[2] and pursued business primarily according to the dictates of the market without state interference. Between 1996 and 1998 China's total number of SOEs began to decline through closures and mergers from 36,173 to 33,621 with a drop in total employment from 112.4 million to 90.6 million (values from *China Statistical Yearbook,* 1997 and 1999). At the same time, thanks to the growth of other sectors, the total number of industrial jobs in China increased from 688 million to 699 million, compensating for the loss of jobs in the state sector (ibid). That, however, will almost certainly not be the case in the future.

The rate of SOE closure will probably accelerate. The state has contracted with a consortium led by Morgan Stanley to recover what it can of the bad loans of 254 debt-stricken firms with a face value of $1.3 billion (Lague, 2001). The state has also decided to begin to divest itself of SOEs through a10% reduction of its holdings in firms listed on China's stock markets (ibid). In 2001, 1,504 bankruptcies and mergers were officially approved (Cheng, 2001). In 2002, 28 cities held auctions to sell off the assets of failed SOEs (Chandler, 2002). As China integrates into the WTO, more pressures will be brought to bear on all types of enterprises. The growth of the private sector will almost certainly not be able to compensate for contractions elsewhere. Resultantly, it is estimated that over the next decade10 million jobs will be eliminated annually while only 7 million will be created annually (Roberts, Einhorn and Balfour, 2002).

Even now, the current official urban jobless rate of 3.6% is contradicted by many economists, who estimate a realistic rate of 15% nationally and 25% in the industrial cities of the "rust belt" Northeast (ibid). Not surprisingly, therefore, labor unrest has been on the rise over recent years (ibid). In July 1997, 4,000 silk workers in Mianyang, Sichuan, demonstrated when their plants were shut down (ibid). In August 2000, workers fearful of losing their jobs in a Tianjin foreign joint venture took three expatriate managers hostage for several days (ibid). In March 2002, tens of thousands of workers in Daqing, Fushun and Liaoyang in the Northeast protested layoffs and unpaid unemployment benefits (ibid).

Clearly, Chinese state-employed workers are under siege no less than their SOEs. Externally, there are the competitive forces of the open market that assail profit level and, thereby, employment level. Internally, there are the budgetary needs to save money through reduction of employee wages and benefits.

THE EFFICACY OF CHINESE EMPLOYEE STOCK OWNERSHIP AND PROFIT SHARING

With very limited access to credit from state-owned banks and encouraged by official decrees supporting peasant investment in enterprises, TVEs started selling shares to workers and local residents in the early 1980s. By 1986, then premier Zhao Ziyang ordered an expansion of stock capitalization, and by 1988, there were about 3,880 shareholding enterprises in both the rural and urban sectors. Through stock capitalization firms had a means other than bank loans for raising critical investment funds. Predictably, a 1994 study of SOEs indicated that 97% of these firms were motivated by investment considerations and only 3% undertook conversion for the purpose of enhancing worker incentive (Cao, 1994).

Somewhat unexpectedly, many joint-stock SOEs discovered that partial employee buy-outs seemed to promote efficiency and profitability, at least initially. Consider Beijing Orient Electronics (Group) Co. Ltd. where the sales of just 3% of total shares to the work force seemingly turned chronic annual losses into 60% annual gains in gross income in each of the first two years of reform (Chen Yan-shun, pers. comm., 1994). At Bohai Steel Construction Materials, a Shangdong corporate group of 30 enterprises, the sale of just over 20% of shares to employees in 1993 coincided with a boost in gross profits of 83.4% over the previous year (Bohai Steel Construction Materials Corp Group, 1994).

In the small Shangdong city of Zhucheng a 1992 survey revealed that local enterprise money loss exceeded total income by 50% (China Market Economy Research Centre, 1995). In 1993, Zhucheng Electrical Equipment, a small generators producer with 277 workers, was selected by the local government for trial reform. The work force voted for 100% buy-out with a bid of 2.7 million yuan. Within four months, profits had jumped more than 100%. In 1994 output value and gross sales rose by 51% and 80% respectively (Sun Hua Chu, 1994). By July 1994, 248 Zhucheng firms had undertaken total employee buy-outs and 2 more firms partial buy-outs. Several years after reform, however, productivity gains seemed to dampen (Sun Yuyan, pers. comm. 1999).

Numerous such stories of quick and impressive if not necessarily sustained success can be found throughout the country. To the Western observer with expertise in employee ownership, initial performance boosts coincidental with employee buy-outs may seem puzzling and perhaps more likely attributable to other factors. Afterall, in most cases only minority portions of stocks are sold to employees, and for the non-publicly traded firms (the vast majority of Chinese joint stock firms) stock prices are set somewhat arbitrarily by management (not determined through formal valuation by third party entities with accredited expertise, such as banks and consulting firms) and fixed at a given level indefinitely, offering stakeholders no opportunity for equity gains over time given improved enterprise performance. What possible incentive for "employee-owners" to do better at their jobs?

However, in light of the very precarious position of workers within their SOEs it seems reasonable that stock acquisition should enhance worker motivation by virtue of their heightened sense of job security. Owners cannot be so easily dismissed as pure employees. Moreover, the standard model for Chinese "stock cooperatives" provides stake holders with annual shares of profit, which can in good years substantially boost total compensation especially considering the modest levels for average annual state sector wages , for example 3,289 RMB yuan ($396 U.S.) in 1998 (*China Statistical Yearbook,*1999). In a small proportion of Chinese stock cooperatives, management retains the option to call on stake holders during years of budget deficit to even help make up for

losses. Another strong inducement to effort. Hence, it is hypothesized that, despite its peculiarities and unique form, employee stock ownership in Chinese SOEs has a substantial positive effect upon enterprise performance.

RELEVANT WESTERN RESEARCH

In 1993, Kruse analyzed over two dozen econometric investigations of profit-sharing in the U.S., U.K., France, Germany, Japan and Korea since the early 1980s as well as contributing with his own substantial study. These studies all utilize a Taylor production function augmented by additional variables, many of them dummies, to express factors relavant to employee ownership systems. Overall, a strong positive relationship was found between productivity (as measured by sales, sales per employee, value added per employee, etc.) and the use of profit sharing. Assuming no relationship between productivity and profit sharing, the probability of the random attainment of such results is infinitesimally small (Weitzman and Kruse, 1990).

It was also found that productivity gains tended to dissipate after the first two years (Kruse, 1993), which accords with Chinese anecdotal evidence. As it turns out, profit sharing has greater positive effect in non-union settings due to lower base pay and, therefore, higher compensation represented by profit share (Cooke, 1994). Along similar lines, large profit shares exert a strong positive influence whereas small profit shares are insignificant, and plans with annual cash awards are effective whereas deferred plans are not (Kruse, 1993). These findings agree with the Chinese experience in which base pay is low and annual cash profit shares can be very meaningful to workers.

Since the size of annual profit shares relative to wages is important, it follows that as firms increase in size and, thereby, annual profit share per employee dwindles, so too will dwindle the incentive value of profit sharing. However, Kruse found a significant positive effect for both the smallest and largest firms of his sample (1993). Presumably, the largest firms have better personel departments to internally promote incentive programs. Corporate culture and solidarity might also be stronger. In China, with its millenia-old tradition of Confucian group cohesion, firm size may be less a factor than in the West.

The sharing of internal financial information was found to have no significant positive impact on performance (Kruse, 1993). Substantial positive effects upon productivity were evidenced to derive from the interactions between profit sharing and participation (Fitzroy and Kraft, 1987) and between stock ownership and participation (Rosen and Quarrey, 1987; U.S. GAO, 1987). Other personel policies found not to have a significant impact upon enterprise performance were the use of employee attitude surveys, job enrichment,

autonomous work teams, special employment security provisions, suggestion systems and productivity-related gainsharing (Kruse, 1993).

SAMPLING CHARACTERISTICS

A pilot study was undertaken to examine more closely the phenomenon of Chinese SOE reform through employee ownership. Given limited research funds it was decided to concentrate primarily on eastern Shangdong, where Zhucheng is located. Since Zhucheng has no unreformed SOEs for comparison purposes, EO firms and SOEs were also surveyed in the major industrial and resort city of Qingdao only approximately 80 kilometers to the east of Zhucheng, .

From an initial query of 93 enterprises—30 in Zhucheng, 55 in Qingdao and 8 in Qingdao's satellite city of Pingdu—75 surveys were returned. Of these, 55 contained at least some potentially useful information—19 from Zhucheng, 33 from Qingdao and 3 from Pingdu. In terms of employment, the Shangdong firms ranged in size from a minimum of 18 to a maximum of 4,196 (1997 figures) with a mean of 703. In terms of annual sales, the firms ranged in volume from 860,000 yuan to 1.6 billion yuan (1997 values) with a mean of 89 million yuan.

Table 1. The distribution of Shangdong study firms across industrial sectors.

Sector	**No. of Firms**
Construction	2
Manufacturing	46
Wholesale	3
Retail	1
Services	3

The relatively small number of firms surveyed across several industrial sectors and sub-sectors was a limitation upon the study. However, data for several years was obtained, which effectively increased sample size without loss of fidelity when dummies to account for year were incorporated into econometric models.

Generally, the EO firms of the sampling conformed to the standard model of Chinese employee stock ownership of mandatory stock purchase, fixed stock price, annual cash profit shares and the possibility of shared financial responsibility for annual losses [6].

ECONOMETRIC MODEL

For the 8 Qingdao EO firms and 12 Zhucheng EO firms that responded to a follow-up survey, gains in profitability in the first year of reform turned to losses in the second year (see Table 2). Thereafter, profitability seemed to rebound, albeit only slightly for the Zhucheng firms. Such trends are not surprising given the haphazard nature of Chinese EO systems (i.e. unreliable annual profit sharing due to fluctuating market circumstances, an absence of pre-specified performance goals, etc.). It was not expected that EO parameters would necessarily yield a significant positive impact upon enterprise performance.

Table 2. Mean change in profitability for Qingdao and Zhucheng EO firms in the 1st full year of reform, 2nd year of reform and 1999.

	Mean % change of profit for Qingdao EO firms (min / max)	Mean % change of profit for Zhucheng EO firms (min / max)
1st year of EO reform ($n_{qingdao}$=8, $n_{zhucheng}$=12)	19 % (-50% / 160%)	14.1 % (2% / 52%)
2nd year of EO reform (n_q=6, n_z=11)	-46.8% (-248% / 32%)	-14.6% (-99% / 12%)
1999 (n_q=8, n_z=10)	18% (-1.8% / 52%)	1.46% (-8% / 10%)

Nevertheless, the study proceeded to test this possibility using an augmented Taylor production function, which relates a value added term to capital inputs and labor costs, with dummy variables for employee ownership and the six years of data collection ('92-'97).

$$\ln(P) = \ln(C) + \ln(L) + OWN +$$
$$YR92 + YR93 + YR94 + YR95 + YR96 + YR97$$

where P=profit (sales minus capital inputs)
C=capital stock,
L=labor costs (sum of wages, indirect compensations and bonuses)
OWN=1 for employee ownership, 0 for SOE
YR92 to YR97=dummies for the years of data

The model focused on Qingdao, and only manufacturing sector cases were included. The model proved statistically significant (adj. R^2=0.803; F=21.369); however, none of the year dummies were individually significant. Testing the null hypothesis that the coefficients for the year dummies were all equal to zero, F=0.838, which was far below $7.06<F(6df, 45df)<7.14$ for the 5% significance level. Hence, the null hypothesis was accepted, allowing the model to be revised:

$$\ln(P) = \ln(C) + \ln(L) + OWN.$$

The estimation results using standardized coefficients were

$$\ln(P) = 0.432\ln(C) + 0.54\ln(L) + 0.178OWN$$

$N=45$; $R^2=0.842$; $F=63.338$; Sig.=0.000

$t_{lnC}=2.72$, sig.=0.009

$t_{lnL}=3.22$, sig.=0.002

$t_{OWN}=2.38$, sig.=0.022

All coviariances were on the order of 10^{-2}, suggesting a low degree of multicollinearity. The White Test yielded NR^2=4.77, below $\chi^2_{0.05}$=5.99 (2 df), and the more restrictive Breusch-Pagan Test yielded RSS/2=5.79, just below $\chi^2_{0.05}$=5.99. Hence, the null hypothesis of homoscedasticity was accepted. In short, results were robust.

The model seemed to indicate that efficiency among Qingdao firms was dependent as much on labor costs, which here included wages as well as indirect compensations, as capital. Early in the reform era SOE managers, without the power of dismissal over underperforming workers, had to try to coax cooperation through ever increasing levels of indirect compensations, such as housing and standard of living subsidies (Reynolds, 1987; Walder, 1987). Perhaps for stock cooperatires with their more secure employee-owners cooperation had also to be financially coaxed.

The significance of OWN suggested that EO reform was meaningful to labor despite all the shortcomings of the system. Roughly speaking, for every positive increment of exponential change in profit, about 15% of that change could possibly be accounted for by EO reform. That results were strong despite the inclusion of a wide range of different types of manufacturing firms (low N precluded focusing on a single industrial sub-sector) was all the more impressive.

The model was expanded to include Zhucheng. The estimation results using standardized coefficients were

$$\ln(P) = 0.507\ln(C) + 0.375\ln(L) + 0.12OWN$$

$$N=83;.\ R^2=0.729;\ F=71.803;\ Sig.=0.000$$

$$t_{lnC}=4.213,\ sig.=0.000$$

$$t_{lnL}=3.103,\ sig.=0.003$$

$$t_{OWN}=2.066,\ sig.=0.042$$

Covariances were of the same order of magnitude as before. For the White Test, NR^2=2.075, well below $\chi^2_{0.05}$=5.99. For the Breusch-Pagan Test, RSS/2=2.47, also below 5.99.

Recall that the model included data from 1996 and 1997, two years of great duress for Chinese enterprises due to the Asian financial crisis. The question is raised whether the EO firms of the sampling were perhaps unusually credit worthy or at a significant advantage in some other way. In other words, was there a self-selection bias in which

relatively successful EO firms were more likely to respond to our survey than unsuccessful ones? Did the model compare typical SOEs and super EO firms?

Self-Selection Bias

In an attempt to partially compensate for self-selection bias, it was decided to examine EO firms only, precluding the possible distortion due to inclusion of comparatively inefficient SOEs. Concentrating on 12 Zhucheng and 8 Qingdao firms that provided detailed information on ownership system, a separate model was constructed to test various aspects of EO reform.

To the standard Taylor relationship were added parameters for the extent of equity ownership by employees (EOWN), manager dominance (MAN), employee participation in governance (GOV), employee participation at the shop floor level (IMPACT) and financial information sharing within the firm (INFO). Each of these parameters was to a degree problematic.

EOWN, or percentage of total equity owned by employees, is a superior parameter to the dummy OWN. MAN was a dummy for the handful of cases (two firms, a few years) in which managers appeared in the process of buying out employees. GOV was a dummy for firms with at least one employee-dominated decision-making assembly, such as a workers' assembly (comprised of most or all workers) or a workers' congress (comprised of departmental representatives), as well as employee representation on at least one executive body, such as a board of directors or management committee. For the shop floor participation parameter IMPACT, first preference was the sum of the implementation rates of technician and worker suggestions. Unfortunately, data for only one year was obtained,, The influence of worker critiques upon manager promotions and retention as ranked on a 5 point scale was used for IMPACT. That survey respondents were managers with managerial biases was not ideal. Be that as it may, some measure of shop floor participation was needed regardless of potential shortcomings.

INFO was a dummy for firms presumably combining formal information sharing (through meetings and/or memos) with informal employee access to their managers for the purpose of discussing company financials.

The two standard Taylor parameters presented problems for this sub-set of firms. Ln(C) and ln(L) were significantly negatively correlated (-0.912). Possibly with limited funds due to the stricter requirement to repay old loans and the lesser availabity of fresh credit (in contrast to SOEs) labor inputs could only be expanded at the expense of capital inputs and vice versa.

The estimation results for the model using standardized coefficients were

$$\ln(P) = 1.002\ln(C) - 0.236\ln(L) + 0.123EOWN + 0.220MAN - 0.197GOV + 0.294IMPACT - 0.061INFO$$

$N=48$; $R^2=0.871$; Adj. $R^2=0.849$; $F=39.676$; Sig.$=0.000$

$t_{lnC}=6.034$, sig.$=0.000$

$t_{lnL}=-1.401$, sig.$=0.169$

$t_{EOWN}=2.014$, sig.$=0.051$

$t_{MAN}=3.027$, sig.$=0.004$

$t_{GOV}=-2.613$, sig.$=0.012$

$t_{IMPACT}=4.104$, sig.$=0.000$

$t_{INFO}=-0.785$, sig.$=0.437$

The sign of the coefficient of ln(L) was predictable. The insignificance of INFO was also not surprising given both Western research and the sporadic and unsystematic character of information sharing in Chinese EO firms. Testing the null hypothesis that the coefficients for ln(L) and INFO were jointly equal to zero, $F=2.40$, which was far below $F(2,60)=19.5$ for the 5% significance level. Accepting the null hypothesis and deleting ln(L) and INFO from the model, the estimation results using standardized coefficients were

$$\ln(P) = 0.772\ln(C) + 0.119EOWN + 0.216MAN - 0.229GOV + 0.276IMPACT$$

$N=48$; $R^2=0.861$; Adj. $R^2=0.845$; $F=53.306$; Sig.$=0.000$

$t_{lnC}=11.483$, sig.$=0.000$

$t_{EOWN}=1.949$, sig.$=0.058$

$t_{MAN}=2.985$, sig.$=0.005$

$t_{GOV}=-3.643$, sig.$=0.001$

$t_{IMPACT}=3.853$, sig.$=0.000$

At first glance, it might seem that the relative influence of EOWN was secondary to the other non-standard parameters. However, EOWN was a scalar parameter, not a dummy. Its standardized coefficient of 0.119 speaks to the relative influence of a one percent change in employee ownership of total equity. For example, according to the model a 5% increase in employee ownership would result in a relative impact of 0.595 upon performance, far outweighing the effect of, say, manager buy out. It seems likely that EO is a substantial positive factor in the reform of Chinese SOEs.

The positive contribution of the other scalar IMPACT indicated that shop floor level participation was similarly important. This was also somewhat contradictory to findings in Western research.

The negative effect of the employee governance parameter GOV is in agreement with Western research and seems in possible accord with the positive effect of the manager dominance factor MAN. It makes sense that employees untrained in business would make poor strategic decisions in comparison to experienced managers. There is, however, another possible interpretation for the negative effect of GOV. Employee assemblies and employee representation in executive bodies might in most EO firms be purely nominal, that is fictitious, with the real power still residing with managers. In this case, GOV might trend negatively due to its disincentive.

The significant positive effect of MAN is somewhat contradictory to the Russian experience where manager dominance of EO firms seemed to alienate workers and thereby undermine performance (Blasi, 1996 & 1994).

DISCUSSION

The econometric findings of this study support the idea that employee stock ownership and profit sharing may exert signficant positive effect within reformed Chinese SOEs. Indeed, the impact of ownership and profit sharing may possibly be greater than among Western firms. The apparent positive effect of some types of shop floor participation within Chinese firms, something not generally evidenced in the West, attests to this possibility.

The downturn in enterprise performance a few years after reform does conform to Western research. However, in the Chinese case there is also to be considered the timing and affect of incidental regional and global economic downturns beginning in the late 1990s. To distinguish whether reductions of efficiency are internally or externally induced will require more research.

Further with regards to future research, current results warrant an expansion of effort, focusing on several different regions within China such as Sichuan, Guangdong, Zhejiang and Beijing. Data should be collected on a greater number of firms in each region. More cases in industrial sectors other than manufacturing would be helpful.

Interestingly, many of the EO firms and SOEs sampled had in place all the major components of advanced Western EO systems (employee ownership, employee participation in management and financial information sharing). They simply lacked systematic integration. Consider the American Open-Book Management (OBM) model. To motivate employees to focus on short-term problems, OBM firms set one or two critical cash flow related goals every year (Case, 1995; Maxwell, McKeever and Weeden, 1998). Meeting cash flow goals trigger pre-specified quarterly or even monthly bonuses, providing worker incentive on a more or less continuous basis. Without a great deal of adjustment, Chinese EO firms could similarly harness the power of short-term incentive through better-conceived profit sharing systems.

Equity ownership serves to tie the personal interests of employees to the long-term interests of the firm. If the firm's equity value rises, so too do employees' stock holdings. Both private and publicly traded OBM firms typically set a specific growth related goal each year (e.g. debt reduction) to encourage employees to focus on long-term prospects and problems. For non-public firms, this type of scheme requires periodic valuation of stocks, admittedly a significant departure from the current status quo in China but hardly an insurmountable obstacle.

FOOTNOTES

1. Between 1979 and 1984 the national income due to urban workers increased by but 9.3% whereas total wages and benefits for urban workers more than doubled (Xia Xiaoxun and Li Jun, 1987). Between 1976 and 1985, expenditure for capital construction directly related to production increased by a mere 6% but expenditure for housing increased by 70% and that for other non-productive ends by 59% (Reynolds, 1987).
2. Consider the early "floating wages" system, which made workers' total compensation heavily dependent upon bonuses linked to output. This fostered counterproductive tendencies, as vividly illustrated by the 1980 case of a chemical fertilizer plant that increased its output but at higher production costs and, thereby, a loss of profits.

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