# The Costs and Benefits of Government Control:

# Evidence from China's Collectively-Owned Enterprises

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China's collectively-owned enterprises are unconventional, as they are nominally owned by those people residing in the areas where the enterprises are located but effectively controlled by the local governments. This study finds that collectively-owned enterprises, once being privatized, encounter an increase in the *cost of goods sold to sales ratio* but manage to lower down the *managerial expenses to sales ratio*. The findings imply that local government officials may help collectively-owned enterprises gain access to cheaper production inputs, but they may use those enterprises to pursue private benefits, thereby shedding lights on the costs and benefits of government control.

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China's collectively-owned enterprises are unconventional, as they are nominally owned by those people residing in the areas where the enterprises are located but effectively controlled by the local governments. This study finds that collectively-owned enterprises, once being privatized, encounter an increase in the *cost of goods sold to sales ratio* but manage to lower down the *managerial expenses to sales ratio*. The findings imply that local government officials may help collectively-owned enterprises gain access to cheaper production inputs, but they may use those enterprises to pursue private benefits, thereby shedding lights on the costs and benefits of government control.

## 1. Introduction

An unconventional type of enterprises – collectively-owned enterprises – rose unexpectedly in importance in the early stage of China's economic reform and later declined dramatically through privatization or acquisition by China's indigenous private enterprises and foreign multinationals. The share of industrial output contributed by the collectively-owned enterprises increased from 22.37% in 1978 to 39.39% in 1996 and then had a precipitous fall to 6.65% by 2003 (China Statistical Yearbook, various years). It is possible that the rise of collectively-owned enterprises could be partially explained by the 1984 expansion in the scope of national surveys, while the decline in industrial output contribution by collectively-owned enterprises might be due to the imposition of a minimal scale of operation introduced in 1998 for enterprises to be covered in the surveys.[1] Nonetheless, the pattern of the rise and decline of China's collectively-owned enterprises is indisputable.

China's collectively-owned enterprises are unconventional, as they are nominally owned by those people residing in the areas where those enterprises are located but effectively controlled by the local governments. Local government officials or their representatives have the residual rights of control over the operation and management of the enterprises, including asset disposal and profit allocation (Hart, 1995). Thus China's collectively-owned enterprises are really a hybrid of private ownership and government control.

The life-cycle experience of China's collectively-owned enterprises has provided fertile grounds for research about this unconventional organization and, in particular, the costs and benefits of government control, which is the defining characteristics of China's collectively-owned enterprises. Earlier studies were focused on understanding the nature of

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[1] Starting from 1984, collectively-owned enterprises at the village level or below – once counted as agricultural activities – became included in the annual surveys of industrial enterprises. Since 1998, however, only those collectively-owned enterprises with annual sales revenue of 5 million Yuan (about US$ 650,000) or more have been covered in the surveys.

collectively-owned enterprises and the rationale for their rise in the first two decades of

China's economic reform. It has been argued that local governments help collectively-owned

enterprises gain access to production inputs and infrastructural services, and offer them

protection against expropriation throughout the production processes.[2] In other words,

government control affords collectively-owned enterprises with low production costs. Such

benefits of government control were significant in the early stage of China's economic reform

when the input market was underdeveloped and protection of private properties was not yet

formally established, thereby explaining the rise of collectively-owned enterprises during that

period.

With the decline of collectively-owned enterprises in more recent years, however, research

has shifted toward unraveling the costs of government control. Following the political

patronage theory of public enterprises (Shleifer and Vishny, 1994; Boycko et al., 1996), it

could be argued that local government officials may take actions to pursue private benefits at

the expense of enterprise performance. In particular, government control may lead to bloated

management structure and excessive managerial expenses. With China's deepening economic

reform including the development of input market and the protection of private properties,

such costs of government control are expected to outweigh the benefits of government

control, which may then explain the decline of collectively-owned enterprises in more recent

years (Che, 2003).

While the theoretical analysis on the costs and benefits of government control in China's

collectively-owned enterprises is rather appealing, there are few empirical studies in this

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[2] Please read, for example, Byrd (1990), Naughton (1994), Chang and Wang (1994), Weitzman and Xu (1994), Li (1996), Che and Qian (1998a, 1998b), Hsiao et al (1998), Chen and Rozelle (1999), Li and Rozelle (2000, 2004), Tian (2000), Che (2002, 2003) and Li (2003).

direction.[3] The objective of this study is to empirically investigate the costs and benefits of government control using a panel data set of China's 13,733 collectively-owned enterprises for the period of 1998 to 2003. All of the 13,733 sample enterprises were 100% collectively-owned in 1998, but 3,769 of them had irreversible and even increasing privatization in the remaining sample period, i.e., 1999 to 2003. For those sample enterprises that underwent privatization and consequently the phasing out of government control, both the costs and benefits of government control were expected to decrease with the extent of privatization and such changes could be captured by the changes in the breakdowns of enterprise performance around the time of privatization.

Our dataset contains detailed information on the breakdown of enterprise performance. Operating income is decomposed into *gross profit* plus *profit from other businesses* minus *managerial expenses and financial expenses*, while the *gross profit* is further decomposed to *gross sales* minus *cost of goods sold*. Of particular interests to us are two items: managerial expenses and cost of goods sold, which capture, respectively, the costs and benefits of government control as argued above. Meanwhile, there is information about enterprise operation such as size of employment, wage and welfare, and information about tax contributions including both value-added tax and corporate income tax, which allows us to examine the impacts of privatization of collectively-owned enterprises on other stakeholders such as workers and governments.

In investigating the impacts of privatization on enterprise performance, especially with respect to the costs and benefits of government control, we need to pay attention to the sample selection bias problem. This is because China's privatization of collectively-owned

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[3] There are a few exceptions, including Jin and Qian (1998), Chen and Rozelle (1999), Li and Rozelle (2000, 2004) and Li (2003).

enterprises has been a gradual and selective process, and consequently privatized enterprises may have certain unobserved characteristics setting them apart from those that remained 100% collectively-owned. To deal with this problem, we follow Frydman et al. (1999) by focusing on the sub-sample of 3,769 enterprises that were privatized in the sample period (i.e. from 1999 to 2003). We use those enterprises that were not privatized until 2003 as a benchmark, and investigate the changes in operation and performance of those enterprises that were privatized between 1999 and 2002 over the time period of 1998-2002. Furthermore, to account for some unobserved time-invariant factors, we use the enterprise-specific fixed-effects estimation method.

We find that collectively-owned enterprises, once privatized, encounter an increase in the cost of goods sold to sales ratio but manage to lower down the managerial expenses to sales ratio. Our results imply that, along with the privatization of collectively-owned enterprises and the phasing out of government control in those enterprises, there are diminishing benefits of government control (increasing cost of goods sold) on the one hand and diminishing costs of government control (lower managerial expenses) on the other hand. Overall, privatized enterprises enjoy higher operating income to sales as the reduction in the costs of government control outweighs the decrease in the benefits of government control.

Our findings on the costs and benefits of government control are robust in both the subsample of rural collectively-owned enterprises and that of urban collectively-owned enterprises. Meanwhile, it is found that first privatization, even if partial in scope, brought in the most significant changes in the costs and benefits of government control, with subsequent privatizations having only limited additional effects. Furthermore it is found that the impacts of privatization on the costs and benefits of government control remain robust in the long run, even up to four years after the privatization, and that the impact of privatization on operating

income to sales ratio changes from negative to positive, and becomes statistically significant starting from the third year after privatization apparently because of the continuous efforts of lowering down the managerial expenses to cover the loss from the increase in the cost of goods sold. These findings indicate that privatized enterprises take years to absorb the shocks of privatization, but eventually succeed in improving financial performance.

Finally, the impacts of privatization of collectively-owned enterprises on other stakeholders such as workers and governments have also been examined. We find that size of employment decreases with the extent of privatization, but wage and welfare per employee increase with the extent of privatization. Meanwhile, both value-added tax and corporate income tax are found to increase with the extent of privatization, suggesting that the impacts of privatization on enterprise tax contributions are not as worrisome as discussed in the literature.

The plan of the paper is as follows. Data and variables are described in Section 2, while the main analysis on the costs and benefits of government control are presented in Section 3. The paper concludes in Section 4.

## 2. Data and Variables

Our analysis is based on an enterprise-level data set from the annual surveys of industrial enterprises conducted by the National Bureau of Statistics of China from 1998 to 2003, covering all state-owned enterprises, and non-state-owned enterprises with annual sales revenue 5 million Renminbi (about 650,000 US dollar) or more. The number of enterprises covered ranges from 162,000 to 196,000. The dataset contains enterprises' identification information, and their operation and performance information extracted from balance sheets

and income statements.[4] Using uniquely assigned enterprise identification codes, we are able to form a balanced panel of 61,163 enterprises continuously being covered during all the sample years.

According to the classifications by China's National Bureau of Statistics, an enterprise's capital can be of the following five types: state, collectively-owned, private, foreign-owned including those from Hong Kong, Macau and Taiwan, and finally, legal-person, which is further divided into state legal-person and collective legal-person. Out of the balanced panel of 61,163 enterprises, there were 13,733 enterprises whose ownership of capital was 100% collectively-owned at the beginning of our sample period (1998).[5]

In this panel of 13,733 enterprises, 5,479 enterprises kept its 100% collective ownership throughout the sample period, while 8,254 enterprises had ownership changes. China's collectively-owned enterprises are unconventional, as they are nominally owned by the local people but effectively controlled by the local governments. Being a hybrid of private ownership and government control, those collectively-owned enterprises could change to state-owned, or to privately-owned including China's indigenous private ownership and foreign ownership. Indeed, of the 8,254 collective enterprises had ownership changes during the sample period, 1,267 had its collective ownership replaced by state ownership and 6,987 had privatization. Of those that had privatization, 3,769 had its share of collective ownership steadily declining over the sample period, but 3,218 had its collective ownership first decreased and then increased (called reversal cases). To avoid potential ambiguities among private, collective, and state ownership, we focus on the sub-sample of 3,769 enterprises that

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[4] As China has maintained a uniform accounting standard for all types of enterprises since its major accounting overhaul in 1993, data used in this study for the period of 1998 to 2003 are consistent and comparable.
[5] Here collective ownership is referred to collectively-owned capital plus collective legal-person capital.

had irreversible and even increasing privatization (i.e., decreasing and irreversible government control) during the sample period.

The number of collectively-owned enterprises having first-time privatization was 899 in 1999, then decreased to 578 in 2000, 725 in 2001, and 654 in 2002, and finally increased to 913 in 2003. As for the extent of privatization, 2,533 out of the 3,769 enterprises became completely privatized in the first privatization, 435 enterprises had its collective ownership dropped below 50%, and 801 enterprises kept its collective ownership greater than or equal to 50%. Some of those collective enterprises that had partial privatization had subsequent privatization, up to four times, of various degrees. Over time, we see more complete privatization and more enterprises whose collective ownership drops below 50%. For details, please read Table 1.

To investigate the costs and benefits of government control, we examine enterprise performance and its various components before and after the privatization of collectively-owned enterprises. The key explanatory variable for our analysis is the extent of privatization in a collectively-owned enterprise, which is defined by the percentage of private ownership in an enterprise's capital. The dependent variables are various components of enterprise performance. Under China's accounting system, an enterprise's operating income is equal to gross profit, plus profit from other businesses, minus managerial expenses and financial expenses.[6] The gross profit is in turn equal to sales revenue minus cost of goods sold and sales expenses.[7] Thus altogether we have the following five variables: *cost of goods sold to sales, gross profit to sales, managerial expenses to sales, financial expenses to sales,*

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[6] In contrast to the international accounting standard, the operating income is net of the financial expenses in China.

[7] Under China's accounting system, gross profit margin is net of sales expenses. As the survey data provides information on two breakdowns of gross profit margin – sales revenue and cost of goods sold, sales expenses can be readily calculated.

and *operating income to sales.* Of particular interests are two variables: the cost of goods sold (the cost of inputs and production costs[8]) and the managerial expenses (including salaries and welfares, entertainment costs, meeting expenses, and traveling expenses of administrative staff), which capture the benefits and costs of government control respectively.

Besides enterprise performance, we also investigate the impacts of privatization of collectively-owned enterprises on other stakeholders. Indeed, it is the local government officials – not the local people – who have the residual rights of control over those collective enterprises. Local government officials may run the enterprises for social welfare maximization rather than profit maximization. Specifically, local government officials may care about the taxes they could collect from the enterprises and also employment opportunities that could be created for the local people. Consequently, collective enterprises, once privatized, may lay off redundant workers and try to avoid paying taxes. We are thus interested in examining how privatization of collective enterprises affects workers and governments. *Logarithm of employment, wages per employee,* and *welfare per employee* are for measuring the impacts on workers, while *value-added tax* and *corporate income tax* are about the enterprise tax contributions.[9]

Finally, we include a set of control variables in our analysis: *Logarithm of assets* as a control for enterprise size, *capital labor ratio* for variations in production technology, *share of output by state-owned enterprises* (calculated for each region in a given industry) for the extent of state control and market liberalization, *Herfindahl index* (constructed for a given industry) for the impacts of market competition, and *industry gross output* for the impacts of macro-level changes in the concerned industries.

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[8] There is no further breakdown information on the cost of inputs versus production cost.
[9] In China, local governments share the value-added tax with the central government in the ratio of 1:3, but they capture almost all of the corporate income tax.

Table 2 gives the summary statistics of all the variables used in the analysis, and Table 3 has the correlation coefficients of the independent variables.

## 3. Impacts of Privatization

Privatization of China's state-owned and collectively-owned enterprises has been a gradual and selective process (Bai et al., 2000; Lau et al., 2000; Qian, 2000; Bai et al., 2006a, 2009). This naturally raises the question of whether there are some unobserved characteristics distinguishing those privatized collective enterprises from those did not. Thus, in investigating the impacts of privatization, especially with respect to the costs and benefits of government control, we need to carefully choose a control group and use an appropriate econometric approach to deal with the possible selection bias problem. Our approach is to compare performance of collective enterprises that had privatization during the period of 1999-2002 with those that had privatization in 2003 (the last year of the sample period). In this way, we might be able to filter out some of the unobservable characteristics that are common to those privatized enterprises. In addition, we include enterprise-specific fixed effects to account for some omitted time-invariant factors.[10]

Specifically, there were 3,769 collectively-owned enterprises that had privatization during the sample period, 1999-2003. Among them, 2,856 enterprises were privatized from 1999 to 2002, while 913 enterprises were privatized in 2003. We examine the changes in performance of the 2,856 enterprises (the treatment group) before and after their privatization, using the

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[10]  This approach has been used successfully by Frydman et al. (1999) in their study of privatization of state-owned enterprises in Eastern Europe.

913 enterprises as the control group. The regression specification is as follows:

$$Y_{ijt} = \alpha_{ij} + \beta_1 PRV_{ijt-1} + \beta_2 LASS_{ijt} + \beta_3 KL_{ijt} + \beta_4 HHI_{jt} + \beta_5 SOEshare_{jt} + \beta_6 IGO_{jt} + \varepsilon_{ijt}$$

………..(1)

$Y_{ijt}$ stands for the performance indicators of the enterprise $i$ in industry $j$ at time $t$. $\alpha_{ij}$ captures

time-invariant fixed effects of firm $i$ in industry $j$. We are interested in the impacts of

privatization on the performance indicators, i.e., coefficient $\beta_1$ of the extent of privatization

(*PRV*). We use the extent of privatization at the end of the previous year to capture the effect

of privatization on performance indicators of a given year. Meanwhile, controls are made for

time-variant enterprise differences: logarithm of assets (*LASS*) controlling for enterprise size,

and capital-labor ratio (*KL*) controlling for the variations in production technology.

Moreover, we use three variables controlling for time-variant industrial differences:

Herfindahl index (*HHI*) of every 4-digit industry at time $t$, reflecting the degree of industrial

concentration, SOE output share (*SOEshare*) in the total output of every 4-digit industry in

the 2-digit region at time $t$ specially designed to measure the extent of government

intervention and market competition in business, and industrial gross output (*IGO*) of the

3-digit industry at time $t$ controlling for the macro-level changes related to the concerned

industries over time.

To make sure our fixed-effect specification is appropriate, we also estimate random-effect

regressions and have Hausman test between these two specifications. All Chi-square statistics

from Hausman tests are significant at 1% statistic level, indicating that the omitted variables

are not perpendicular to the independent variables and the fixed effect model is more

appropriate than random effect model.

Panel A of Table 4 summarizes the regression results regarding the impacts of privatization

on enterprise performance. It is shown in columns 1 and 2 that collectively-owned enterprises, once privatized, expand in size measured by both assets and sales revenue (each with 1% statistical significance). More importantly, as shown in Panel A of Table 4, the cost of goods sold to sales ratio is found to increase with the extent of privatization, while both managerial expenses to sales ratio and financial expenses to sales ratio decrease with the extent of privatization.

To understand how privatization of collectively-owned enterprises affects enterprise performance and especially the changes in the various components of enterprise performance that are related to the costs and benefits of government control, we need to revisit the ownership and control arrangements in China's collectively-owned enterprises. In terms of formal ownership, collective enterprises are jointly owned by those people residing in the same areas where the enterprises are located. However, because of the large number of owners involved in any collectively-owned enterprise – local people residing in the areas where the enterprises are located, these owners become the nominal owners and they do not have any control over the operation and management of those enterprises. Instead it is the local government officials or their representatives who have the control over the operation and management of the collectively-owned enterprises. So long as an enterprise is collectively-owned, it remains to be controlled by the local government. However, when a collectively-owned enterprise undergoes privatization, the new owners, who could be China's indigenous private owners or foreign multinationals, can get back part or all of the control rights from the local government depending on the extent of privatization, which results in a decrease in the degree of government control in the enterprise.

Our empirical findings (panel A of Table 4) lend support to the theoretical analysis on the costs and benefits of government control. During the earlier stage of China's economic

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reform, many of the production stages in China remained tightly controlled by the central and

local governments, which was a legacy of the planned economy from 1949 to 1977.

Specifically, government control covered the procurement of production inputs and the use of

infrastructural service, and even the sales of goods and service through the state monopoly

distribution system. Under these circumstances, collectively-owned enterprises could only

gain access to cheaper production inputs with the help from the local governments, thereby

enjoying lower costs of goods sold (the benefits of government control). The downside of

government control, however, was the bloated management structure and the associated

excessive managerial expenses, because local government officials or their representatives

often had objectives other than profit maximization. Indeed, our empirical findings show that,

with the privatization of collectively-owned enterprises and the phasing out of government

control in those enterprises, there was a decrease in the costs of government control (lower

managerial expenses to sales after privatization) as well as a decrease in the benefits of

government control (higher cost of goods sold after privatization). Overall the decrease in the

costs of government control was greater than that in the benefits of government control,

resulting in an improvement in the operating income to sales ratio after privatization (with

15% statistical significance).

The impacts of privatization on financial expenses are also interesting, though they may not

be directly related to the costs and benefits of government control. One possible explanation

for the decrease in financial expenses to sales ratio is that privatized enterprises have

difficulties in getting access to external finance. This is because China's financial institutions

including banks and stock exchanges are mainly state-owned, and tightly controlled by the

central and local governments. Because of the ideological biases against the development of

private ownership, there have been formal and informal discriminatory policies against

private enterprises in their access to external finance including listing in the stock exchanges

and borrowing from the banks (Bai et al, 2006b; Du and Xu, 2009). Unlike other inputs, however, prices for financial service have been heavily regulated (for example, the interest rate regulation). As a result, there could be decreases in financial expenses to sales ratio due to the decreases in the amount of bank loans available to the privatized enterprises. The other possible explanation for the decrease in financial expenses to sales ratio is that collectively-owned enterprises, once privatized, may have had more efficient use of the financial resources, or they could become less capital intensive in response to the difficulties in the access to external finance (Jefferson and Su, 2006).

Panels B and C of Table 4 summarizes the impacts of privatization on workers and governments respectively. Total employment has been found to decrease with the extent of privatization, in contrast to the findings of Dong and Putterman (1996) and Ito (2006). Meanwhile both wage per employee and welfare per employee increase with the extent of privatization. These results are consistent with the predictions of the political patronage theory that public enterprises tend to hire more workers, presumably with lower wages and welfare benefits, as a way of securing political support for politicians. Such concerns, however, are no longer relevant when public enterprises are privatized. Meanwhile, there are concerns manifested in public debates that state-owned and collectively-owned enterprises, once privatized, may try to avoid paying taxes to both central and local governments (Cai et al., 2009). However, we find that the both value-added tax and corporate income tax significantly increase with the extent of privatization (10% and 1% significant level, respectively), possibly due to the fact that collective enterprises have expanded after privatization. In terms of tax to sales ratio, which is more accurate in capturing possible tax evasion than absolute amount of tax, we find that there is no noticeable change in the ratio of corporate income tax to sales, but a significant decrease in the ratio of value-added tax to sales.

Notice that there are two kinds of collectively-owned enterprises in China. One is the rural collectively-owned enterprises (also called township and village enterprises, or TVEs) which are owned by people residing in the areas where the enterprises are located, but effectively controlled by the township and village governments. The other is the urban collectively-owned enterprises which by law are owned by people working in these enterprises, but effectively under the supervision of urban community committees or higher governments. To check the robustness of our empirical findings, we divide our sample into two subsamples: one for the rural collectives and the other for the urban collectives, and then repeat the analysis. As shown in Tables 5 and 6, there are no significant differences in the impacts of privatization on enterprise performance and its breakdowns. In particular, in both subsamples, the cost of goods sold to sales ratio increases with the extent of privatization, but the managerial expenses to sales ratio decreases with the extent of privatization. This is because, despite the many possible differences between rural and urban collectively-owned enterprises, they share the same feature of having significant government control in the enterprises (Weitzman and Xu, 1994), and hence the similar patterns in the costs and benefits of government control manifested during the privatization process.

Given the gradual and selective privatization in China's collectively-owned enterprises, we next explore if there are different impacts associated with privatizations of different sequence. The regression specification (1) is modified by replacing the variable of *PRV* (measuring the extent of privatization) by the sequencing dummies of privatization (denoted by *First_PRV, Second_PRV, Third_PRV*, and *Fourth_PRV*).

$$Y_{ijt} = \alpha_{ij} + \delta_1 First\_PRV_{ij} + \delta_2 Second\_PRV_{ij} + \delta_3 Third\_PRV_{ij} + \delta_4 Fourth\_PRV_{ij}$$
$$+ \beta_1 LASS_{ijt} + \beta_2 KL_{ijt} + \beta_3 HHI_{jt} + \beta_4 SOEshare_{jt} + \beta_5 IGO_{jt} + \varepsilon_{ijt}$$

……….(2)

*First_PRV* equals one when collective ownership firstly dropped below 100% and zero when collective ownership kept unchanged at 100% level. *Second_PRV* equals one when collective ownership dropped further after first time privatization, and zero otherwise. Note that, when *Second_PRV* equals to one, *First_PRV* also equals to one. Thus *Second_PRV* measures the incremental effect of privatization instead of the cumulative effect. *Third_PRV* and *Fourth_PRV* are defined in the same way as *Second_PRV*.

As summarized in Table 7, the effects of privatization on the cost of goods to sales ratio and the managerial expenses to sales ratio are strongest after the first privatization, yet impacts remain sizeable and statistically significant in the second privatization.

Finally, as the regression specification (1) presented above focuses on the comparison of enterprise performance immediately before and one-year after privatization, one may ask whether the changes in the costs and benefits of government control take place immediately or they remain robust in the long run. To address these questions, the estimation specification (1) is modified by replacing the extent of privatization by year dummies *Year_k_after* to examine whether performance in the *k*th year after privatization is significantly different from that in the year of privatization. *Year_k_after* is equal to 1 for the year in which enterprise *i* has been in the $k^{th}$ year after the latest privatization. Therefore, in estimating specification (3), we are interested in the coefficient $\lambda_k$.

$$Y_{ijt} = \alpha_{ij} + \sum_{k=1}^{4} \lambda_k Year\_k\_after_{ij} + \beta_1 LASS_{ijt} + \beta_2 KL_{ijt} + \beta_3 HHI_{jt} + \beta_4 SOEshare_{jt} + \beta_5 IGO_{jt} + \varepsilon_{ijt} \qquad \dots (3)$$

As shown in Table 8, the impacts of privatization on the cost of goods sold and the

managerial expenses remain robust in the long run, even up to four years after privatization. The ratio of cost of goods sold significantly increases year by year after privatization, leading to the worsening gross profit margin after privatization. However, with the continuous efforts to improve management efficiency, the ratio of managerial expenses to sales keeps decreasing at the same time. As shown in the last column of Table 8, the impact of privatization on the operating income to sales ratio is negative albeit statistically insignificant in the first year after privatization, but changes to positive in the second year and becomes statistically significant starting from the third year after privatization. These changes in the operating income to sales ratio indicate that privatized enterprises absorb the loss of benefit from government control gradually through continuous improvement in management efficiency, with the decrease in the managerial expenses eventually overweighing the increase in the cost of goods sold and resulting in the significant improvement in overall performance.

## 4. Conclusion

Collectively-owned enterprises are an excellent example of organizational innovations and transformations that are characteristic of China's economic reform since 1978. Despite their unconventional ownership and control arrangements, collectively-owned enterprises had spectacular growth in the early years of China's economic reform. This has led to intensive debates on the costs and benefits of government control. It has been argued that, when markets have yet to be developed and protection of private properties remain imperfect, collective enterprises may thrive as their local governments – which have the control over the operation and management of collectively-owned enterprises – could help the enterprises gain access to production inputs and infrastructural services, and provide them with protection against expropriation from various parties in the society. The assistance from the

local governments confers collectively-owned enterprises with low costs of production over their privately-owned competitors.

In more recent years, with the decline of collectively-owned enterprises, attention has been drawn towards the costs of government control associated with collectively-owned enterprises. From the general literature on the costs of public ownership, it is known that local government officials may pursue their private benefits at the expenses of enterprise performance. Specifically, the management structure of collective enterprises could be unnecessarily large with many redundant management staff, and management expenses could be excessively high. With the acceleration of market liberalization and formal protection of private properties, the benefits of government control become diminished relative to the costs of government control, thereby leading to privatization of collectively-owned enterprises and phasing out of government control in those enterprises.

In this paper, using a large panel data set of collective enterprises for the period of 1998-2003, we explore how the costs and benefits of government control change as the collective enterprises underwent privatization of various extent and sequence. To deal with the problems of selection bias and omitted variables, we apply enterprise-specific fixed-effect model to the balanced panel of 3,769 collective enterprises that were privatized from 1998 to 2003, selecting the 2,856 enterprises privatized from 1999 to 2002 as the treatment group and 913 enterprises privatized in 2003 as the control group. We find that as privatization continues, enterprises experience a decrease in the *benefits of government control (i.e., low cost of goods sold to sales ratio)* but enjoy a reduction in the *costs of government control (i.e., high managerial expenses to sales ratio).* The impacts of privatization on the costs and benefits of government control are found to be robust in both rural and urban collectives. They are most significant in the first privatization and remain robust in the long run. These results shed

lights on the logic behind organizational innovations and transformations in China's collectively-owned enterprises, and may have implications for the theory of organizations in rapidly changing environments.

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**Table 1    Sequence and extent of privatization**

**First-time privatization**

| Type of change in ownership | 1999 | 2000 | 2001 | 2002 | 2003 | Total |
|---|---|---|---|---|---|---|
| 100%→0% | 590 | 355 | 488 | 450 | 650 | 2533 |
| 100%→(0%, 50%) | 106 | 79 | 78 | 67 | 105 | 435 |
| 100%→[50%,100%) | 203 | 144 | 159 | 137 | 158 | 801 |
| **Total** | **899** | **578** | **725** | **654** | **913** | **3769** |

**Second-time privatization**

| Type of change in ownership | 1999 | 2000 | 2001 | 2002 | 2003 | Total |
|---|---|---|---|---|---|---|
| (0%,50%)→0% | | 30 | 43 | 37 | 41 | 151 |
| (0%,50%)→(0%,50%) | | 17 | 16 | 20 | 16 | 69 |
| [50%, 100%)→0% | | 52 | 52 | 51 | 51 | 206 |
| [50%,100%)→(0%, 50%) | | 16 | 20 | 22 | 19 | 77 |
| [50%,100%)→[50%, 100%) | | 43 | 29 | 45 | 45 | 162 |
| **Total** | | **158** | **160** | **175** | **172** | **665** |

**Third-time privatization**

| Type of change in ownership | 1999 | 2000 | 2001 | 2002 | 2003 | Total |
|---|---|---|---|---|---|---|
| (0%,50%)→0% | | | 9 | 11 | 17 | 37 |
| (0%,50%)→(0%, 50%) | | | 15 | 11 | 15 | 41 |
| [50%, 100%)→0% | | | 10 | 3 | 11 | 24 |
| [50%, 100%)→(0%, 50%) | | | 5 | 3 | 5 | 13 |
| [50%, 100%)→[50%, 100%) | | | 14 | 12 | 13 | 39 |
| **Total** | | | **53** | **40** | **61** | **154** |

**Fourth-time privatization**

| Type of change in ownership | 1999 | 2000 | 2001 | 2002 | 2003 | Total |
|---|---|---|---|---|---|---|
| (0%, 50%)→0% | | | | 8 | 4 | 12 |
| (0%, 50%)→(0%, 50%) | | | | 8 | 4 | 12 |
| [50%,100%)→0% | | | | 2 | 1 | 3 |
| [50%,100%)→(0%,50%) | | | | 4 | 1 | 5 |
| [50%,100%)→[50%,100%) | | | | 5 | 8 | 13 |
| **Total** | | | | **27** | **18** | **45** |

**Fifth-time privatization**

| Type of change in ownership | 1999 | 2000 | 2001 | 2002 | 2003 | Total |
|---|---|---|---|---|---|---|
| (0%, 50%)→0% | | | | | 3 | 3 |
| (0%, 50%)→(0%, 50%) | | | | | 3 | 3 |
| [50%, 100%)→0% | | | | | 1 | 1 |
| [50%, 100%)→(0%, 50%) | | | | | 0 | 0 |
| [50%,100%)→[50%, 100%) | | | | | 3 | 3 |
| **Total** | | | | | **10** | **10** |

Notes.

100%: 100% collective ownership;

[50%, 100%): collective ownership greater than or equal to 50%, but less than 100%;

(0%, 50%): collective ownership greater than 0, but less than 50%;

0%: no collective ownership.

**Table 2    Summary statistics of key variables**

| Variable | Obs | Mean | STD | MIN | MAX |
|---|---|---|---|---|---|
| Enterprise Performance Measures | | | | | |
| Logarithm of sales revenue | 18317 | 9.7186 | 0.9842 | 0.6931 | 15.383 |
| Ratio of cost of goods sold to sales revenue | 18837 | 0.8409 | 0.1282 | 0.0000 | 7.6297 |
| Gross profit ratio | 18837 | 0.1113 | 0.1012 | -6.651 | 0.9458 |
| Ratio of managerial expenses to sales revenue | 18837 | 0.0620 | 0.0726 | 0.0000 | 1.8389 |
| Ratio of financial expenses to sales revenue | 18837 | 0.0234 | 0.0434 | 0.0000 | 2.8641 |
| Ratio of operating income to sales revenue | 18837 | 0.0306 | 0.105 | -6.862 | 1.5250 |
| Labor Welfare | | | | | |
| Logarithm of employment | 18836 | 4.9889 | .9282 | 1.7918 | 8.9359 |
| Salary per employee | 18836 | 7.9651 | 7.5539 | 0.0000 | 407.3392 |
| Welfare per employee | 18836 | 1.0876 | 11.1704 | -6.8104 | 1521.603 |
| Enterprise Tax Contributions | | | | | |
| Logarithm of value-added tax | 18838 | 1050.251 | 2875.688 | -7016.5 | 115515 |
| Logarithm of corporate income tax | 18838 | 272.4097 | 1221.891 | -1842.984 | 48854.13 |
| Explanatory Variable | | | | | |
| Privatization | 18845 | 0.3352 | 0.4524 | 0 | 1 |
| Control Variables | | | | | |
| Logarithm of assets | 18838 | 9.4312 | 1.1125 | 4.9463 | 14.536 |
| Capital/labor ratio | 18836 | 47.141 | 87.303 | 0.0000 | 3223.764 |
| SOE output share | 18843 | 0.1154 | 0.1664 | 0.0000 | 0.9896 |
| Herfindahl index | 18845 | 0.0207 | 0.0328 | 0.0009 | 0.6770 |
| Industry gross output | 18845 | 8583.9 | 8305.6 | 21.228 | 57928.94 |

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**Table 3 Correlation of independent variables**

|  | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Privatization | 1.0000 | | | | | |
| Herfindahl Index | 0.0231 | 1.0000 | | | | |
| SOE output share | -0.1330 | -0.0135 | 1.0000 | | | |
| Logarithm of assets | 0.0117 | 0.0421 | -0.0484 | 1.0000 | | |
| Capital/labor ratio | 0.0171 | 0.0127 | 0.0418 | 0.3312 | 1.0000 | |
| Industry gross output | 0.0618 | -0.1055 | 0.1413 | 0.0776 | 0.0271 | 1.0000 |

Note: *Privatization* is one-year lagged.

**Table 4    Regression analysis on the impacts of privatization**

**Panel A. Enterprise performance**

| | Log(sale) | Log(Assets) | Ratio of Cost of goods sold to sales | Ratio of Gross profit to sales | Ratio of Managerial expenses to sales | Ratio of Financial expenses to sales | Ratio of Operating income to sales |
|---|---|---|---|---|---|---|---|
| **Privatization** | .1073*** | .1445*** | .0092*** | -.0058*** | -.0067*** | -.0065*** | .0041+ |
| | (.0101) | (.0088) | (.0023) | (.0021) | (.0012) | (.0009) | (.0025) |
| **Log(Assets)** | .3980*** | - | -.0071*** | .0069*** | .0004 | .0035*** | .0033 |
| | (.0107) | - | (.0024) | (.0023) | (.0012) | (.0009) | (.0027) |
| **Capital/Labor Ratio** | -.0007*** | .0014*** | .0000 | -.0000 | .0001*** | .0000+ | -.0001*** |
| | (.0001) | (.0001) | (.0000) | (.0000) | (.0000) | (.0000) | (.0000) |
| **Herfindahl index** | -.0774 | .0806 | -.0258 | -.0013 | .0125 | -.0086 | .0008 |
| | (.2018) | (1762) | (.0461) | (.0422) | (.0233) | (.0170) | (.0498) |
| **SOE output share** | -.1235*** | -.1348*** | -.0068 | .0060 | -.0059 | -.0011 | .0072 |
| | (.0412) | (.0361) | (.0095) | (.0087) | (.0048) | (.0035) | (.0102) |
| **Industry Gross Output** | 6.69e-06*** | 8.16e-06*** | 5.45e-07** | -3.53e-07* | 1.04e-07 | -2.38e-07*** | -1.76e-07 |
| | (1.02e-06) | (8.92e-07) | (2.34e-07) | (2.14e-07) | (1.18e-07) | (8.62e-08) | (2.53e-07) |
| **Number of Enterprises** | 3769 | 3769 | 3769 | 3769 | 3769 | 3769 | 3769 |
| **Number of Observations** | 15030 | 15062 | 15059 | 15059 | 15059 | 15059 | 15059 |
| **R$^2$** | 0.9014 | 0.9385 | 0.6933 | 0.5944 | 0.7485 | 0.5865 | 0.4852 |
| **Pr>F(k, NT-k)[a]** | 0.0000 | 0.0000 | 0.0000 | 0.0026 | 0.0000 | 0.0000 | 0.0000 |
| **Pr>F[b]** | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Hausman test[c]  $\chi^2$** | 238.20 | 436.68 | 29.06 | 10.83 | 100.80 | 86.03 | 22.11 |

Notes.***,**,* ,+ denote statistical significance level at 1%, 5%,10% and 15% respectively. Standards errors are reported in parenthesis.

a. Joint significance test for all coefficients

b. Joint significance test for enterprise fixed effects, with F-statistic distribution having (N, N(T-1)-k-1) degree of freedom.

c. The null hypothesis of Hausman test is that the omitted variables are perpendicular to independent variables, while the alternative hypothesis is that the omitted variables are not perpendicular to independent variables. When Hausman test rejects the null hypothesis, fixed-effects model is more appropriate than random-effects model

**Panel B    Labor welfare**

| | Log (employment) | Salary per employee | Welfare per employee |
|---|---|---|---|
| **Privatization** | -.0257*** | .6831*** | .0881*** |
| | (.0077) | (.1712) | (.0326) |
| **Log(Assets)** | .3477*** | -.4553** | -.0695** |
| | (.0081) | (.1812) | (.0345) |
| **Capital/Labor Ratio** | -.0028*** | .0579*** | .0070*** |
| | (.0001) | (.0013) | (.0020) |
| **Herfindahl index** | -.0272 | -1.6678 | .0085 |
| | (.1525) | (3.3919) | (.6455) |
| **SOE output share** | .0992*** | -.8598 | -.0504 |
| | (.0313) | (.6965) | (.1325) |
| **Industry Gross Output** | -2.01e-06*** | .0001*** | 4.58e-06 |
| | (7.75e-07) | (.0000) | (3.28e-06) |
| **Number of Enterprises** | 3769 | 3769 | 3769 |
| **Number of Observations** | 15062 | 15062 | 15062 |
| **$R^2$** | 0.9346 | 0.5386 | 0.4811 |
| **Pr>F(k, NT-k)[a]** | 0.0000 | 0.0000 | 0.0000 |
| **Pr>F[b]** | 0.0000 | 0.0000 | 0.0000 |
| **Hausman test[c]   $\chi^2$** | 572.80 | 704.29 | 386.38 |

Notes.***,**,* ,+ denote statistical significance level at 1%, 5%,10% and 15% respectively. Standards errors are reported in parenthesis.

a. Joint significance test for all coefficients

b. Joint significance test for enterprise fixed effects, with F-statistic distribution having (N, N(T-1)-k-1) degree of freedom.

c. The null hypothesis of Hausman test is that the omitted variables are perpendicular to independent variables, while the alternative hypothesis is that the omitted variables are not perpendicular to independent variables. When Hausman test rejects the null hypothesis, fixed-effects model is more appropriate than random-effects model

## Panel C    Enterprise tax contributions

| | Log (Value-added Tax) | Log (Corporate Income Tax) |
|---|---|---|
| Privatization | .0362* | .1889*** |
| | (.0193) | (.0343) |
| Log(Assets) | .4099*** | .4859*** |
| | (.0211) | (.0400) |
| Capital/Labor Ratio | -.0006*** | -.0004* |
| | (.0001) | (.0002) |
| Herfindahl index | .6521* | -.7761 |
| | (.3804) | (.7115) |
| SOE output share | -.1400* | -.5122*** |
| | (.0781) | (.1468) |
| Industry Gross Output | 8.13e-06 *** | .0000*** |
| | (1.90e-06) | (.3.28e-06) |
| | | |
| Number of Enterprises | 3672 | 2921 |
| Number of Observations | 14038 | 8766 |
| $R^2$ | 0.8168 | 0.8256 |
| Pr>F(k, NT-k)[a] | 0.0000 | 0.0000 |
| Pr>F[b] | 0.0000 | 0.0000 |
| Hausman test[c]   $\chi^2$ | 183.96 | 19.67 |

Notes.***,**,* ,+ denote statistical significance level at 1%, 5%,10% and 15% respectively. Standards errors are reported in parenthesis.

a. Joint significance test for all coefficients

b. Joint significance test for enterprise fixed effects, with F-statistic distribution having (N, N(T-1)-k-1) degree of freedom.

c. The null hypothesis of Hausman test is that the omitted variables are perpendicular to independent variables, while the alternative hypothesis is that the omitted variables are not perpendicular to independent variables. When Hausman test rejects the null hypothesis, fixed-effects model is more appropriate than random-effects model

**Table 5    Robustness check for the subsample of rural collectively-owned enterprises**

| | Log(sale) | Ratio of Cost of goods sold to sales | Ratio of Gross profit to sales | Ratio of Managerial expenses to sales | Ratio of Financial expenses to sales | Ratio of Operating income to sales |
|---|---|---|---|---|---|---|
| **Privatization** | 0.1211*** | 0.0089*** | -0.0074*** | -0.0061*** | -0.0067*** | 0.0021 |
| | (0.0124) | (0.0031) | (0.0028) | (0.0011) | (0.0011) | (0.0032) |
| **Log(Assets)** | 0.4003*** | -0.0062* | 0.0051* | -0.0017 | 0.0031*** | 0.0046 |
| | (0.0129) | (0.0031) | (0.0029) | (0.0012) | (0.0012) | (0.0033) |
| **Capital/Labor Ratio** | -0.0009*** | 0.0001* | -3.40E-05 | 4.04E-06 | 1.95E-05** | -4.97E-05* |
| | (0.0001) | (0.0001) | (2.48E-05) | (1.03E-05) | (9.91E-06) | (2.84E-05) |
| **Herfindahl index** | 0.1434 | 0.0177 | -0.0425 | 0.0024 | -0.0131 | -0.0296 |
| | (0.2394) | (0.0583) | (0.0542) | (0.0225) | (0.0216) | (0.0620) |
| **SOE output share** | -0.1036** | -0.0138 | 0.0111 | -0.0027 | -0.0013 | 0.011 |
| | (0.0510) | (0.0125) | (0.0116) | (0.0048) | (0.0046) | (0.0133) |
| **Industry Gross Output** | 6.58E-06*** | -1.60E-07 | 3.55E-07 | 9.90E-08 | -3.06E-07 | 5.53E-07 |
| | (2.15E-06) | (5.27E-07) | (4.90E-07) | (2.04E-07) | (1.96E-07) | (5.60E-07) |
| **Number of Enterprises** | 2617 | 2617 | 2617 | 2617 | 2617 | 2617 |
| **Number of Observations** | 10435 | 10453 | 10453 | 10453 | 10453 | 10453 |
| **R²** | 0.8953 | 0.6162 | 0.5231 | 0.7061 | 0.5679 | 0.4354 |
| **Pr>F(k, NT-k)ᵃ** | 0.0000 | 0.0000 | 0.0026 | 0.0000 | 0.0000 | 0.0000 |
| **Pr>Fᵇ** | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Notes.***,**,* ,+ denote statistical significance level at 1%, 5%,10% and 15% respectively. Standards errors are reported in parenthesis.

a. Joint significance test for all coefficients

b. Joint significance test for enterprise fixed effects, with F-statistic distribution having (N, N(T-1)-k-1) degree of freedom.

**Table 6   Robustness check for the subsample of urban collectively-owned enterprises**

| | Log(sale) | Ratio of Cost of goods sold to sales | Ratio of Gross profit to sales | Ratio of Managerial expenses to sales | Ratio of Financial expenses to sales | Ratio of Operating income to sales |
|---|---|---|---|---|---|---|
| **Privatization** | 0.0911*** | 0.0119*** | -0.0075** | -0.0085*** | -0.0081*** | 0.0048 |
| | (0.0204) | (0.0035) | (0.0031) | (0.0031) | (0.0014) | (0.0043) |
| **Log(Assets)** | 0.3843*** | -0.0122*** | 0.0105*** | 0.0042 | 0.0033** | -0.0002 |
| | (0.0225) | (0.0039) | (0.0034) | (0.0034) | (0.0015) | (0.0048) |
| **Capital/Labor Ratio** | -0.0005*** | -7.33E-06 | 9.79E-06 | 1.32E-05 | -4.59E-06 | 1.49E-06 |
| | (0.0001) | (1.99E-05) | (1.78E-05) | (1.75E-05) | (8.08E-06) | (2.46E-05) |
| **Herfindahl index** | -0.1437 | -0.1545** | 0.1361** | 0.0424 | -0.0082 | 0.1109 |
| | (0.4439) | (0.0768) | (0.0685) | (0.0676) | (0.0311) | (0.0946) |
| **SOE output share** | -0.1121 | 0.0063 | -0.0003 | -0.0224* | 0.0005 | 0.0083 |
| | (0.0822) | (0.0142) | (0.0126) | (0.0125) | (0.0057) | (0.0175) |
| **Industry Gross Output** | 7.97E-06** | 1.40E-06** | -1.06E-06** | 5.11E-07 | -3.55E-07 | -1.04E-06 |
| | (3.42E-06) | (5.91E-07) | (5.27E-07) | (5.20E-07) | (2.40E-07) | (7.29E-07) |
| **Number of Enterprises** | 884 | 884 | 884 | 884 | 884 | 884 |
| **Number of Observations** | 3527 | 3534 | 3534 | 3534 | 3534 | 3534 |
| **R²** | 0.9125 | 0.8493 | 0.7761 | 0.7543 | 0.6442 | 0.6026 |
| **Pr>F(k, NT-k)ᵃ** | 0.0000 | 0.0000 | 0.0026 | 0.0000 | 0.0000 | 0.5967 |
| **Pr>Fᵇ** | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Notes.***,**,* ,+ denote statistical significance level at 1%, 5%,10% and 15% respectively. Standards errors are reported in parenthesis.

a. Joint significance test for all coefficients

b. Joint significance test for enterprise fixed effects, with F-statistic distribution having (N, N(T-1)-k-1) degree of freedom.

**Table 7    The impacts of sequential privatization**

| | Ratio of Cost of goods sold to sales | Ratio of Gross profit to sales | Ratio of Managerial expenses to sales | Ratio of Financial expenses to sales | Ratio of Operating income to sales |
|---|---|---|---|---|---|
| **First privatization** | 0.0141*** | -0.0094*** | -0.0051*** | -0.0074*** | 0.0016 |
| | (0.0018) | (0.0016) | (0.0009) | (0.0007) | (0.0018) |
| **Second privatization** | 0.0119*** | -0.0083** | -0.0017 | -0.0029* | -0.0035 |
| | (0.0039) | (0.0035) | (0.0021) | (0.0015) | (0.0041) |
| **Third privatization** | 0.0035 | -0.0052 | -0.0081+ | -0.0049 | 0.0099 |
| | (0.0095) | (0.0085) | (0.0050) | (0.0037) | (0.0098) |
| **Fourth privatization** | 0.0077 | -0.0215 | -0.0203** | 0.0024 | -0.0077 |
| | (0.0192) | (0.0171) | (0.0102) | (0.0075) | (0.0199) |
| **Log(Assets)** | -0.0062*** | 0.0058*** | 0.0008 | 0.0031*** | 0.0031+ |
| | (0.0019) | (0.0017) | (0.0010) | (0.0007) | (0.0016) |
| **Capital/Labor Ratio** | 0.0000 | -0.0000 | 0.0001*** | 0.0000** | -0.0001*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| **Herfindahl index** | 0.0340 | -0.0129 | 0.0099 | -0.0201 | -0.0016 |
| | (0.0400) | (0.0354) | (0.0211) | (0.0155) | (0.0412) |
| **SOE output share** | -0.0039 | -0.0004 | -0.0026 | 0.0088** | -0.0071 |
| | (0.0079) | (0.0070) | (0.0042) | (0.0031) | (0.0081) |
| **Industry Gross Output** | 0.0000*** | -0.0000*** | -0.0000 | -0.0000*** | 0.0000 |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| **Number of Enterprises** | 3769 | 3769 | 3769 | 3769 | 3769 |
| **Number of Observations** | 18825 | 18825 | 18825 | 18825 | 18825 |
| **R²** | 0.6609 | 0.5699 | 0.7052 | 0.5554 | 0.4632 |
| **Pr>F(k, NT-k)ᵃ** | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0339 |
| **Pr>Fᵇ** | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Notes.***,**,* ,+ denote statistical significance level at 1%, 5%,10% and 15% respectively. Standards errors are reported in parenthesis.

a. Joint significance test for all coefficients

b. Joint significance test for enterprise fixed effects, with F-statistic distribution having (N, N(T-1)-k-1) degree of freedom.

**Table 8   The long-term impacts of privatization**

| | Ratio of Cost of goods sold to sales | Ratio of Gross profit to sales | Ratio of Managerial expenses to sales | Ratio of Financial expenses to sales | Ratio of Operating income to sales |
|---|---|---|---|---|---|
| **Yr_1_after** | 0.0134*** | -0.0091*** | -0.0035*** | -0.0059*** | -0.0002 |
| | (0.0019) | (0.0017) | (0.0010) | (0.0007) | (0.0020) |
| **Yr_2_after** | 0.0167*** | -0.0117*** | -0.0078*** | -0.0098*** | 0.0035 |
| | (0.0024) | (0.0021) | (0.0013) | (0.0010) | (0.0025) |
| **Yr_3_after** | 0.0213*** | -0.0118*** | -0.0093*** | -0.0119*** | 0.0053* |
| | (0.0031) | (0.0027) | (0.0016) | (0.0012) | (0.0032) |
| **Yr_4_after** | 0.0249*** | -0.0142*** | -0.0119***[+] | -0.0132*** | 0.0065[+] |
| | (0.0040) | (0.0036) | (0.0021) | (0.0016) | (0.0042) |
| **Log(Assets)** | -0.0067*** | 0.0060*** | 0.0013 | 0.0036*** | 0.0026 |
| | (0.0019) | (0.0016) | (0.0010) | (0.0007) | (0.0020) |
| **Capital/Labor Ratio** | 0.0000 | 0.0000 | 0.0001*** | 0.0000** | -0.0001*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| **Herfindahl index** | 0.0325 | -0.0122 | 0.0104 | -0.0192 | -0.0020 |
| | (0.0399) | (0.0355) | (0.0211) | (0.0154) | (0.0412) |
| **SOE output share** | -0.0028 | -0.0007 | -0.0037 | 0.0077** | -0.0059 |
| | (0.0079) | (0.0071) | (0.0042) | (0.0031) | (0.0082) |
| **Industry Gross Output** | 0.0000** | -0.0000*** | 0.0000 | -0.0000*** | -0.0000 |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| **Number of Enterprises** | 3769 | 3769 | 3769 | 3769 | 3769 |
| **Number of Observations** | 15059 | 15059 | 15059 | 15059 | 15059 |
| **R²** | 0.6609 | 0.5697 | 0.7055 | 0.5563 | 0.4633 |
| **Pr>F(k, NT-k)[a]** | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Pr>F[b]** | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Notes.***,**,* ,+ denote statistical significance level at 1%, 5%,10% and 15% respectively. Standards errors are reported in parenthesis.

a. Joint significance test for all coefficients

b. Joint significance test for enterprise fixed effects, with F-statistic distribution having (N, N(T-1)-k-1) degree of freedom.