Interjurisdictional Competition, Ownership, and Firm Taxation

Abstract

The literature documents that informal institutions such as governance mechanisms based on reputation and relationships have helped China's fast-growing private sector to overcome institutional difficulties. This study provides evidence that interjurisdictional competition can serve as another such mechanism. Using a sample of Chinese listed firms from 1999 to 2006, we find that private firms enjoy a lower effective tax rate than local state-owned enterprises. We also find that this preferential tax treatment is mainly driven by private firms located in regions with a relatively lower level of private sector development. Our results show that interjurisdictional competition in regions with a developing private sector leads local governments to devise preferential taxation policy to support the private sector.

Key words: *Interjurisdictional competition; Ownership; Taxation; Institution; China.*

JEL Classification*: H25; G32; G38*

1. Introduction

China has achieved remarkable economic growth over the past thirty years, but it still has weak institutions by international standards. The private sector in particular faces a discriminative environment, and institutional weakness has acted as a brake on its development (Che and Qian, 1998; Brandt and Li, 2003). Nevertheless, China's private sector is growing much faster than its state sector, and drives the nation's economic growth (Allen et al., 2005). An important research question emerges: what factors have helped the private sector to overcome institutional difficulties and achieve rapid growth? The recent literature suggests that informal institutions, such as governance mechanisms based on reputation and relationships, and alternative financing channels, including trade credit, support the growth of the private sector (Allen et al., 2005; Cull et al., 2009).

In this study, we posit that another mechanism, interjurisdictional competition among local governments, can also mitigate the institutional disadvantages faced by the private sector. China's decentralization of the economy in recent decades has resulted in competition among local governments (Lin and Liu, 2000; Qian and Weingast, 1997). This interjurisdictional competition provides incentives for regional governments to compete in reforms to boost local economic and employment growth. In addition, the career path of regional government officials is linked with regional economic performance, which is reflected in such indicators as the GDP growth rate (Li and Zhou, 2005).

The development of the private sector has become one of the main forms of interjurisdictional competition among local governments, which devise feasible policies that mitigate state-level institutional difficulties to help the private sector. In this case,

interjurisdictional competition counterbalances the state-level institutional disadvantages confronted by the private sector.

Tax policy is a feasible and effective way for local governments to exert influence over firms.[1] Taxation has a direct and influential impact on firm profit. In this study, we examine whether local governments give preferential treatment to state-owned or private firms on firm's taxation. There is great heterogeneity in the development of the private sector across regions in China (Qian and Xu, 1993; Fan and Wang, 2004; Jin et al., 2005), which motivates local governments located in regions with different levels of private sector development to implement different preferential policies. This heterogeneity makes China a natural laboratory for a cross-sectional investigation into whether and how interjurisdictional competition leads to preferential taxation treatment of firms based on ownership type.

Using the data of listed firms in China from 1999 to 2006, we find that private firms are taxed at a lower level than local state-owned enterprises (SOEs) after we control the influences of central government's regional and industrial policies and firm characteristics. The difference in the effective tax rate (ETR hereafter) of these companies is about 1.3%, or 6.2% of the average ETR of 21%. This means that the after-tax profits of private firms are 6.2% higher than those of local SOEs, given the same pre-tax profits. This difference in the ETR is likely to have a substantial impact on firm value. Our results are also consistent with reports issued by two government agencies, "State-owned Assets Supervision and Administration Commission of the State Council" and "All-China Federation of Industry &

[1] Since China's tax policy reform of 1994, local governments have the power to offer preferential tax treatment to local firms.

Commerce", in which they assert that SOEs share heavier taxation burden than do private firms.[2]

We also investigate whether interjurisdictional competition, proxied by the level of private sector development, can explain why private firms enjoy preferential taxation over local SOEs. Our results show that such favorable tax treatment is mainly driven by private firms located in regions with a relatively lower level of private sector development. This suggests that interjurisdictional competition motivates local governments in regions with a less developed private sector to develop the private sector through offering private firms preferential tax treatment.

This paper contributes to the literature in the following ways. First, we extend the literature on the mechanisms that can mitigate the institutional difficulties and support the growth of the private sector in transition economies. The literature documents that although private firms in transition economies encounter unfavorable conditions, the private sector in these economies is growing faster than the state sector (McMillan, 1995; Che and Qian, 1998; Brandt and Li, 2003). This surprising phenomenon is explained by the finding that informal institutions, such as governance mechanisms based on the reputation and relationships, and alternative financing channels, such as trade credit, enable the private sector to overcome institutional difficulties (Allen et al., 2005; Cull et al., 2009). In this paper, we present evidence that interjurisdictional competition is another such mechanism.

Second, to the best of our knowledge, this is the first empirical study to examine the

[2] "2009 Review Report" of State-owned Assets Supervision and Administration Commission of the State Council documents that the total taxation collected from SOEs is 5.29 times as that from private firms. In the report of "Comparison of Growth Rate and Performance between SOEs and Private Firms", the All-China Federation of Industry & Commerce documents that the taxation collected from SOEs is 2.95 times as that from private firms (First Financial Daily, 2010).

effect of ownership structure on firm taxation. We extend the literature on ETR determinants (Stickney and McGee, 1982; Porcano, 1986; Wilkie and Limberg, 1990; Gupta and Newberry, 1997; Adhikari et al., 2006) by demonstrating that in addition to financial variables such as firm size, ownership structure and regional budget deficits can also affect the ETR.

Third, this paper contributes to the literature on the impact of interjurisdictional competition on taxation (e.g., Nechyba, 1997; Kellermann, 2006). Our findings show that interjurisdictional competition influences not only firm taxation but also the extent of the difference in ETR between firms of different ownership type.

Finally, this paper also contributes to the literature on the political economy of finance. Several papers document the government influence on corporate activities. Dinc (2005) provides evidence of politically motivated lending at government-owned banks in emerging markets in the form of increased lending in election years. Brown and Dinc (2005) show that governments are less likely to take over failing banks prior to an election. Dinc and Gupta (2010) find that the government significantly delays privatization in regions where the governing party faces more competition from opposition parties in India. Our results reveal the way in which governments give a helping hand to facilitate privatization in transition economies.[3]

The rest of the paper is organized as follows. In Section 2, we present the background

[3] Shleifer and Vishny (1998) argue that government can play one of two roles: a "grabbing hand" role, restricting and preying on productive enterprises and protecting unproductive ones, or a "helping hand" role, supporting productive enterprises and disciplining unproductive ones. Kornai et al. (2003) contend that "it is not rare for firms in private ownership to be rescued from financial straits; this has been particularly evident in post-socialist transition where privatization has by no means ended the practice of bailouts". According to the World Bank (2002), many firms in Eastern Europe have received more government subsidies after privatization than before.

of SOEs and private firms in the Chinese stock market, Chinese income tax policies, and our ownership classification scheme. We analyze the influences of interjurisdictional competition and ownership type on firm taxation and develop our hypotheses in Section 3. In Section 4, we describe our empirical methodology, and cover the data, variables, and regression models. In Section 5, we discuss our empirical results, and in Section 6, we give our conclusions.

2. Institutional Background

2.1. SOEs and private firms in the Chinese stock market

One of China's more important economic reforms since the 1980s has been the corporatization of SOEs that were initially owned by the central and local governments. This has allowed SOEs to sell shares to the public. These shares are listed on the Shanghai Stock Exchange or Shenzhen Stock Exchange, which were established in 1990 and 1991, respectively. Although such shares are sold to individual and institutional investors, the state and its various entities still ultimately control the SOEs. At the same time, in conjunction with the SOE corporatization process, the central government has transferred the control rights in SOEs to local governments to encourage them to develop their local economies. Of the 1,408 Chinese A-share firms at the end of 2006, 902 (64.1%) were SOEs, of which 271 (19.2%) were central SOEs that were ultimately controlled by the central government, and 631 (44.8%) local SOEs ultimately controlled by local governments.

China's private sector has been growing rapidly since the 1990s. According to the *China Statistical Yearbook 2007*, available via the Web site of the National Bureau of Statistics of China, in 2006, China had 149,736 domestic private enterprises with annual

sales of more than RMB 5 million, accounting for 62 percent of the total number of domestic enterprises in China. Private enterprise gross product was RMB 6,724 billion in the same year, contributing 31 percent to the total domestic enterprise gross product. Many private enterprises were also listed on an exchange. By the end of 2006, the number of listed firms ultimately controlled by individuals was 429, accounting for 30.8 percent of the total number of listed firms on China's stock market.

2.2. Chinese income tax policies

China implemented the Corporate Income Tax Code in 1994 to systematically reform its fiscal and taxation policies. Taxes are classified into central and local taxes, and a National Taxation Bureau (Guoshuiju) and provincial bureaus (Dishuiju) are responsible for collecting central and local taxes separately. "Local revenue" has been redefined as revenues from local taxes and the local portion of shared taxes. The major local taxes are the income tax received from all enterprises except central government enterprises, business tax from the sales of services, and personal income tax. Since 2002, the income tax revenue collected from local SOEs and private enterprises has been shared between the central and local governments.[4] Even after this policy change, income tax revenue remains one of the major sources of local government revenue. A tax rate of 33% was imposed on domestic firms before China enacted the uniform version of the Corporate Income Tax Law in 2008. However, the central government and local governments can exercise their discretion to provide many forms of preferential tax policies to the firms under their jurisdictions.

[4] In 2002, the central and local governments each received half of the revenue incremental to that collected in 2001. After 2002, the revenue sharing ratio was adjusted to 60/40 in favor of the central government.

(1) The preferential tax policy of central government

China's central government has offered regional preferential tax policies to accelerate the economic development of specific regions during each stage of the economic reforms undertaken since the 1980s. Enterprises located in specific regions receive favorable tax treatment. For example, firms in five economic specific zones (including three cities of Guangdong province, i.e., Shenzhen, Zhuhai, and Shantou; Xiamen in Fujian province, and Hainan province) were imposed only 15% income tax rate. In the western provinces, firms can also receive some favorable tax treatment.

Another important preferential tax policy is industrial preferential tax policies, which is used to optimize industrial structure and to support and speed the development of key industries. For example, firms belonging to high and new technology industry will enjoy the tax benefit. For the key manufacturing enterprises and those engaged in construction of infrastructures that were encouraged by the state, such as ports, docks, airports, highways, electricity stations, preferential tax treatment were also provided. For those leading companies in the agricultural industries, their income taxes were even exempted to promote the industrialization of agricultural production. We are observing a shift in supporting industries recently, with new legislation geared towards the environmental industry.

The central government provides foreign companies with a relatively low tax rate and a series of preferential policies to encourage foreign direct investment into China. For example, foreign firms were entitled to income tax exemptions in the first and second year of business and were taxed at half the normal rate from the third to the fifth year.[5]

[5] This policy was discontinued after a new taxation law was implemented in 2007.

(2) The preferential tax policy of local government

Other than central government, local governments, especial governments at provincial level, can also grant preferential tax treatment to those firms located in their jurisdictions. One important policy is "Tax Rebate". According to this policy, enterprises were first taxed with the statutory tax rate of 33%, and then a certain proportion of this tax, usually 18%, was returned by the local government. Thus, the real income tax rate for those local firms was 15%.

Even though the "Tax Rebate" policy was discontinued in 2002 by the central government, local governments still have significant authority on the firm taxation. Many forms of central government's preferential policy are executed by local governments. It means that which firms can obtain favorable taxation treatment is subject to the approval from local governments. For example, firms can receive preferential tax benefit after they have attained the "Double Highs" authentications from the local administrative departments of science and technology.[6] Firms in the Ethnic Autonomous Regions will be provided favorable tax treatment after they are approved by local governments.

2.3. Classification of Chinese listed firms by ownership

Based on the standard ownership classification system, listed firm shares in China are classified as state, legal person, individual, foreign, employee, or management shares. Prior research has utilized this classification to investigate the relationship between ownership structure and firm performance (Sun and Tong, 2003; Wei et al., 2005). However, given that legal person shares can be owned by a number of heterogeneous entities ranging from

[6] "Double Highs" authentication requires the company is authenticated as "High and New Technology Enterprise" and it has one product authenticated as "High and New Technology Product".

SOEs to private firms, this standard classification does not reveal the real identity of the ultimate owner, and can lead to erroneous conclusions (Berkman et al., 2010; Chen et al., 2009; Delios et al., 2006).

In this study, we investigate the ownership of listed firms in China based on the real identity of the largest shareholder. We classify Chinese listed firms into four categories: central SOEs, local SOEs, domestic private firms and foreign firms. Central SOEs are ultimately controlled by the central government or its various entities, such as the central State-owned Asset Supervision and Administration Commission, the Ministry of Finance, and the Ministry of Railways. Local SOEs are ultimately owned by local governments or their various entities, such as the local State-owned Asset Management Bureaus and local finance bureaus.[7] Domestic private firms are ultimately controlled by domestic individual, collective enterprises and social entities.[8] Foreign firms are ultimately controlled by foreign individual. Our classification is similar to that used by Liao et al. (2009) and Wang et al. (2008).

Since this study is to investigate the influence of interjurisdictional competition on the firm's taxation, we focus on those firms whose taxation is under control of local governments, i.e., local SOEs and domestic private firms. Central SOEs' taxation is mainly determined by the central government, because central SOEs are ultimately controlled by the central government and tax revenue collected from central SOEs belongs to the central government. Foreign firms enjoy preferential tax treatment, which is also regulated by the

[7] China's government administration has five levels: (1) central, (2) provincial, (3) prefecture, (4) county, and (5) township. In our analysis, we refer to provincial and other lower levels of government as local governments.
[8] The number of firms ultimately controlled by the collective enterprises or social entities is few. When we exclude these samples and re-run our analyses, our conclusion remain the same.

central government.

3. Hypothesis Development

3.1. Interjurisdictional competition and local government tax policy incentives

China's economic reform is characterized by regional decentralization (Granick, 1990; Qian and Xu, 1993; Qian and Weingast, 1997).[9] Until 1979, the Chinese economy was a centrally planned one, with virtually every aspect of the economy carried out according to state plans and material incentives completely suppressed. Regional governments collected all of the surpluses from firms under their jurisdiction and handed them over to the central government. The central government then allocated budgets to the regional governments, but there was no obvious correlation between the surpluses handed over and the budgets allocated. Under this system, there was no incentive for firms and industries to perform well nor was there any incentive for the regional governments to protect local firms or industries. However, the situation has changed significantly since 1979 with the initiation of economic reform and as a result of the fiscal decentralization policy introduced in 1994. This decentralization process has given local governments greater incentive to promote local economic growth (Lin and Liu, 2000). The fiscal incentives created are associated with the rapid development of the non-state sector and further reforms in the state sector at the provincial level (Jin et al., 2005).

Decentralization has also resulted in competition among jurisdictions. Interjurisdictional competition motivates local governments and their officials to devise

[9] For instance, Qian and Weingast (1997) assert that "the critical component of China's market-oriented reform, which began in 1979, is decentralization." Qian and Roland (1998, p. 1156) argue that "one of the most distinct features of China's transition has been associated with devolution of authority from the central to local levels of government."

feasible policies to stimulate local economic development (Qian and Weingast, 1997). On the one hand, local economic growth increases the level of fiscal discretion of the local government. The greater is the economic growth of a region, the more fiscal discretion local governments will have. On the other hand, the political incentives or career concerns of local officials also motivate them to develop their local economies, as their promotion largely depends on the regional GDP growth and unemployment rates during their tenure (Li and Zhou, 2005).

The decentralization reforms have reinforced China's de facto economic federalism, as regulatory responsibility, firm ownership, and economic and financial power are increasingly placed in the hands of provincial governments. Under the name of assistance to the local economy, local governments use their heightened administrative powers (in terms of trade, investment, and budget and price fixation) to implement multiform protection of the firms under their authority (Zhao and Zhang, 1999; Wong, 2003). Djankov et al. (2009) present cross-country evidence that lower effective corporate tax rates have a large and significant positive effect on corporate investment and entrepreneurship. The tax policy reform of 1994 gives local governments the power to offer preferential tax rates to local firms. In addition to the tax rebate policy through which local governments can directly offer local enterprises favorable tax treatment, local governments have the authority to enact other favorable tax policies. Favorable income tax policy is an effective measure for attracting investment and developing the non-state sector, and ultimately leads to the achievement of local officials' goals of a higher GDP growth rate and lower unemployment rate. In sum, interjurisdictional competition motivates local

governments to use income tax policy to promote local economic growth.

3.2. Ownership and tax treatment of firms

When a local government decides to use tax policy to develop its local economy, it must decide whether to provide more assistance to private firms or local SOEs. The private sector, rather than the inefficient state sector, is widely regarded as the engine of China's economic growth since the 1980s. Local economic growth also largely depends on the development of the private sector, which has grown much faster than the state sector (Allen et al., 2005; Jin et al., 2005). Appendix 1A shows that the total gross output contributed by the private sector increases from 42% in 1996 to 69% in 2006. The average growth rate of the private sector is 24% from 1996 to 2006, whereas the average growth rate of the state sector is only 11%. Developing the private sector not only boosts the GDP growth rate but also helps increase employment. The proportion of the total fixed investment made by the private sector rises from 48% in 1996 to 70% in 2006. The private sector also employs about 66% of labor in 2006. Thus, local governments are likely to use tax policy to stimulate private sector development.

****
Appendix 1 about here
****

However, private firms are confronted with a state-level political and economic environment that favors local state-owned firms (Brandt and Li, 2003; Che, 2002). This leads local governments to use local policy as a counterweight to support private firms, whose interests are more aligned with those of local officials. Favorable tax treatment is one of the direct and more effective policies. Thus, we would expect that private firms,

rather than local SOEs, enjoy preferential tax treatment.

Based on the foregoing discussion, we frame our hypothesis on the relationship between ownership and taxation as follows:

H1: Private enterprises are likely to enjoy more favorable tax treatment than local SOEs.

3.3. Interjurisdictional competition and preferential tax treatment of private firms

As discussed, one of the main forms of interjurisdictional competition is competition to develop the private sector. The decentralization reforms undertaken since 1978 have resulted in a high degree of heterogeneity in economic development across China (Jin et al., 2005; Qian and Xu, 1993). Private sector development and the contribution of the private sector to the local economy are also uneven across regions. Hence, interjurisdictional competition can motivate local governments located in regions with different levels of private sector development to enact different policies, including tax policies in favor of private firms.

In regions with less developed private sectors, interjurisdictional competition gives local governments a greater incentive to support private enterprises. However, the incentive to support the private sector might weaken as the sector develops and the contribution of the private sector to the local economy as a whole increases. This is because the magnitude of the incremental gains to be enjoyed by the local government as a result of supporting the private sector decreases as the private sector becomes more dominant. Thus, the level of private sector development could be negatively associated with the favorable taxation treatment of private enterprises over local SOEs. Hence, we present our second hypothesis

as follows:

H2: The preferential tax treatment of private enterprises over local SOEs is likely to be more pronounced in regions with less developed private sectors.

4. Research Design

4.1. Data

Our financial data are taken from the China Stock Market and Accounting (CSMAR) database. We use the same database to source the identity of the ultimate controller for post-2003 observations.[10] For the pre-2003 period, we manually collected data on the identity of the ultimate ownership from annual reports and company Web sites.

We start with an original sample of 1,408 firms and 9,629 firm-year observations from 1999 to 2006 for non-financial A-share listed firms in China. As explained in Table 1, the original sample is reduced by the exclusions described below.

First, we exclude 285 firm-year observations with missing data or with negative assets or negative sales.

Second, we delete 2,184 firm-year observations in which the ultimate owner is classified as the central government and foreign individual, because these firms taxation are mainly determined by the central government, not by local governments.

Third, we exclude 1,032 observations with negative profit before tax.[11] This exclusion is consistent with previous studies (Adhikari et al., 2006; Gupta and Newberry, 1997; Wilkie and Limberg, 1990).

Lastly, 773 observations for firms with an ETR that is negative or exceeds one are

[10] The CSMAR database does not distinguish between central and local SOEs. We therefore manually classify firms when the ultimate owner type is the state.

[11] Tax law allows firms to use current profit to cover net losses from previous years. The results remain the same when we exclude the observations with net operating losses and net operating losses carried forward.

excluded because the ETR analysis could be distorted in either circumstance. This exclusion is also consistent with previous studies (Adhikari et al., 2006; Gupta and Newberry, 1997; Zimmerman, 1983).

The final sample includes 1,145 firms and 5,355 firm-year observations, representing about 55.6% of the initial sample. In the final sample, the numbers of observations for local SOEs and private firms are 3,751 (70.0%), and 1,604 (30.0%), respectively.

****
Table 1 about here
****

4.2. Measure of taxation (ETR)

We use the effective income tax rate (ETR) to measure firm taxation. There are two issues to be considered in relation to the estimation of the ETR measures: which tax to consider and how profit should be measured. To be consistent with previous studies, we use only the current portion of a firm's tax expense for the ETR numerator and exclude the deferred tax portion (Gupta and Newberry, 1997). For the denominator, we have to take into account the special characteristics of Chinese income tax policy. We adopt an approach similar to that of Wang (2003), and calculate adjusted taxable income as (profit before tax + asset depreciation reserves excluding provisions for bad debts – investment returns + cash dividends received + cash bond interest received). Asset depreciation reserves excluding provisions for bad debts are added back to taxable income because, with the exception of provisions for bad debts, they cannot be deducted from taxable income. Investment returns are subtracted from taxable income and cash dividends and cash bond interest received are added, because investment income other than cash dividends and bond interest is not

taxable. We also use cash flow from operations as an alternative to adjusted taxable income when we calculate the ETR in our robustness tests.

4.3. Ownership variables and the proxy for private sector development

We use dummy PRIVATE, to examine the influence of controlling ownership on taxation. PRIVATE equals one if the firm is classified as domestic private firm according to its ultimate controller and zero otherwise.

As a proxy for private sector development level indices, we use indices from the National Economic Research Institute (NERI) marketization indices.[12] Our indices are all sub-indices of the NERI indices. The first index, the non-state sector index (NonstateIndex), measures the level of development in the non-state sector of each province. This index is composed of three sub-indices, including the proportion of gross industrial output contributed by the non-state sector (NonstateGDP), the proportion of fixed investment made by the non-state sector (NonstateINV), and the proportion of labor employed by the non-state sector (NonstateEmploy). A higher index value indicates a more developed non-state sector.

The data of our private sector development indices were obtained from a study conducted by Fan et al. (2007), which includes NERI yearly provincial indices from 2001 to 2005. The 2001 and 2002 data used in the original version of Fan and Wang (2004) were adjusted for their 2007 study. We use one-year lag values for the four indices in our

[12] The NERI marketization indices capture progress in institutional transition and measure the quality of market-supporting institutions at the provincial level. The indices comprise five dimensions, including the relationship between government and the markets, the development of the non-state sector, the development of product markets, the development of factor markets, and the development of market intermediaries and the legal environment. Each of the five principal indices comprises several sub-indices. This gives us 24 sub-indices measuring 24 different institutional dimensions.

regression.[13] We assume the index values for 1999 and 2000 are the same as the 2001 values.

4.4. Regression model

As a formal exploration of how the ETR differs across firm ownership types and regions, we apply regression estimations to the following equation. We estimate the equation using local SOEs as the reference group:

$$\begin{aligned} ETR = {} & \alpha + \beta_1 PRIVATE + \beta_2 PRIVATE*\text{Institutional Index} \\ & + \beta_3 DEFICIT + \beta_4 SIZE + \beta_5 LEV + \beta_6 CAPINT + \beta_7 INVINT + \beta_8 ROA \\ & + \text{Regional dummies} + \text{Industry and Year dummies} + \varepsilon. \end{aligned}$$

The dependent variable, ETR, is the effective tax rate. The explanatory variables include ownership dummy (PRIVATE) and institutional indices.

In addition to ownership and institutional indices, we include a number of variables used in previous studies. The control variables include provincial budget deficit (DEFICIT), firm size (SIZE), capital structure (LEV), capital intensity (CAPINT), inventory intensity (INVINT), firm performance (ROA), and regional, industry, and year dummies. The definitions of these variables are given below and summarized in Table 2.

****
Table 2 about here
****

4.5. Control variables

(1) Provincial budget deficit (DEFICIT)

As income tax revenue is one of the major sources of revenue for local governments, they tend to use income tax policy to adjust their fiscal balance. In particular, local

[13]We also use the 2001 values for all years in our regression, and the results remain the same.

governments with bigger budget deficits levy more taxes on local firms. We predict that the ETR will be higher if the firm is located in a region with a bigger budget deficit. DEFICIT is measured as the natural log of the average annual provincial budget deficit in the past three years.

(2) Financial variables

We include a number of financial variables as well. We use SIZE, the natural log of total asset value, to capture the size effect in our model. Zimmerman (1983) argues that large firms are subject to a greater level of public scrutiny, which results in higher ETRs, whereas Siegfried (1972) suggests that large firms devote more resources to tax planning and political lobbying, which leads to lower ETRs. As such, the empirical evidence of the relation between ETR and firm size is mixed.[14] We include financial leverage (LEV, total debts/total assets) and capital intensity (CAPINT, fixed assets/total assets) in our model. Both of these variables could negatively affect the ETR due to tax-deductible interest payments and accelerated depreciation relative to actual asset lives (Gupta and Newberry, 1997; Porcano, 1986; Stickney and McGee, 1982). We include inventory intensity (INVINT, inventory/total assets) in our analysis because Gupta and Newberry (1997) argue that given the tax benefits associated with capital investments, capital intensive firms should have lower ETRs, and because INVINT can be treated as a substitute for CAPINT, inventory intensive firms should face relatively higher ETRs. Gupta and Newberry (1997) find a positive correlation between ETR and inventory intensity, whereas Adhikari et al. (2006)

[14]Zimmerman (1983) and Wilkie and Limberg (1990) find a significant positive correlation between ETR and firm size, whereas Porcano (1986), and Holland (1998) find a negative link. Stickney and McGee (1982), Shevlin and Porter (1992), and Gupta and Newberry (1997) conclude that no correlation exists between ETR and firm size.

find no significant relation between these two measures. We include ROA (return on assets, a profitability proxy) in our analysis (Gupta and Newberry, 1997; Spooner, 1986).

(3) Regional, industry and year dummies

Regional dummies are included to control for effect of regional tax policy. According to the regional preferential tax policy applied in various forms, we divide China into five regions: the eastern, middle, and western regions, special economic zones, and Shanghai. The eastern region (excluding special economic zones and Shanghai) includes the nine provinces of Beijing, Fujian (excluding Xiamen), Guangdong (excluding Shenzhen, Zhuhai, and Shantou), Hebei, Jiangsu, Liaoning, Shandong, Tianjin, and Zhejiang. The middle region is composed of eight provinces: Anhui, Heilongjiang, Henan, Hubei, Hunan, Jiangxi, Jilin, and Shanxi. The western region consists of twelve provinces: Chongqing, Gansu, Guangxi, Guizhou, Inner Mongolia, Ningxia, Qinghai, Shaanxi, Sichuan, Xinjiang, Xizang, and Yunnan. Special economic zones were created along the southeastern coast to attract foreign capital that would benefit from tax holidays and other preferential tax policies. These zones include Shenzhen, Shantou, Xiamen, Zhuhai, and Hainan province. Shanghai is regarded as being in a separate category because of the special economic significance of Shanghai and its Pudong new district. Dummy variables for Region2 to Region5 represent the middle region, the western region, the specific economic zones, and Shanghai, respectively.

Industry dummies are also included to control for the central government's industrial preferential tax policy. Using the Chinese Securities Regulatory Commission (CSRC) industry classification, we divide our sample into 22 industries in which non-manufacturing

industries are given a one-digit code and manufacturing industries a two-digit code. Year dummies are also included in the model.

5. Empirical Results

5.1. Summary statistics

Table 3 presents the summary statistics for the variables. We winsorize the ETR and all control variables at the 1st and 99th percentiles to mitigate the effect of outliers.[15] The left side of the table reports the statistics for the full sample, while the right-hand section presents the mean values for the variables across the two sub-samples based on the ultimate owner type, as well as the *T*-statistics for the difference test. The average ETR for the full sample is 21.2%. Local SOEs have the average ETR (21.9%), which is higher than that of private firms (19.7%). The *T*-test shows that the difference in the ETR between these two types of firms is significant at 1% level. This result supports some anecdotal evidence. According to a survey undertaken by the Sichuan Financial Bureau in 2000 among 2,158 companies, the actual tax rate for private firms was 24.02%, whereas that for state-owned firms was 29.39% (Sichuan Financial Bureau, 2002). Except for ROA, the other variables between local SOEs and private firms also have significant differences.

****
Table 3 about here
****

We report the results of our correlation analysis in Table 4. The table shows that the four institutional indices, NonstateIndex, NonstateGDP, NonstateINV, and NonstateEmploy, are highly correlated. Thus, to avoid multi-collinearity, we do not include all four variables

[15]We also perform all of our analyses without winsorizing the variables, and the results remain the same.

simultaneously in our multivariate regressions. However, except for the four institutional indices, the correlations among the variables are not strong. We check the variance inflation factor (VIF) of the variables. The VIF values of the variables in the regressions are less than 10, which indicates that multicollinearity is not a problem.

****
Table 4 about here
****

5.2. Controlling ownership type and ETR

Table 5 presents the results of our multivariate regressions. We employ a fixed-effects model. The constant term and industry and year dummies are included in the regressions, but for brevity, the results are not reported in the table. The p-values in our panel regressions are based on the standard errors adjusted for clustering at the firm level (Peterson, 2009).

Our regression results show that the ETRs of local SOEs are higher than those of private firms. In Model (1) of Table 5, the coefficient of PRIVATE is -1.262, which means that the effective tax rate of private firms is 1.26 percent smaller than that of local SOEs. In addition, the coefficient is statistically significant. This supports our first hypothesis, i.e., private firms have less tax rate or enjoy more favorable tax treatment than local SOEs.

The DEFICIT coefficient is positive and significant, which shows that firms located in regions with a bigger budget deficit pay a higher income tax rate. This supports the view that local governments use tax policy to address their fiscal deficits. The coefficient of SIZE is significantly positive, which shows that big firms pay higher tax rates than small firms. The significantly negative coefficient of LEV indicates the effect of capital structure

on tax. CAPINT is significantly negative, whereas INVINT is significantly positive, providing some evidence of the effect of accelerated depreciation on tax. This indicates that, as expected, firms with a higher level of capital investment pay a significantly lower effective tax rate. The significantly negative coefficient of ROA suggests that firms with higher performance levels can get lower tax rates.

The regional dummies (Region2-Region5) reflect the influence of regional preferential tax policy. Their coefficients represent the extent to which each region differs from the benchmark eastern region. Those of all four regional dummies are statistically significant and negative, which suggests that regional policy leads to differential tax treatment for firms located in different regions. The bigger absolute values for Region4 and Region3 indicate that firms in special economic zones and the western region enjoy more favorable tax treatment.

****
Table 5 about here
****

We now examine whether the institutional environment has a direct impact on the ETR. To avoid multi-collinearity, we examine each institutional index individually. Models (2)-(5) in Table 5 present the results for NonstateIndex, NonstateGDP, NonstateINV, and NonstateEmploy, respectively. The coefficient of NonstateIndex is marginally significantly positive, which indicates that firms located in regions with a well-developed non-state sector obtain less favorable tax treatment. For the three sub-indices, the coefficients of NonstateGDP and NonstateINV are both significantly positive, whereas that of NonstateEmploy is insignificant. This suggests that local government tax policy is mainly aimed at increasing GDP and fixed investment levels, whereas employment considerations

may have no direct impact on taxation policy.

5.3. The interaction between ownership and private sector development indices

Table 6 reports the results of the regression models, which include the interaction terms between controlling ownership (PRIVATE) and the four private sector development indices. The coefficients of PRIVATE are significantly negative. Moreover, the interaction terms between PRIVATE and the four non-state development indices are all significantly positive. These results support our second hypothesis, namely, that the preferential tax treatment of private firms over local SOEs is less evident in regions with a well-developed non-state sector. Our finding suggests that private sector development reduces the incentive of local governments to sustain such development via preferential tax policy.

****
Table 6 about here
****

5.4. Cash flow-based ETR measure

To further check the sensitivity of our measure of the effective tax rate, we define the ETR as (tax expenses – deferred tax expenses)/cash flow from operations. Following Gupta and Newberry (1997) and Adhikari et al. (2006), we substitute cash flow from operations for adjusted profit before tax in calculating the ETR. This method can be used to eliminate the effects of different accounting treatments on income. We re-estimate the regressions using the new ETR measure.

As shown in Table 7, the results are similar to those reported in Tables 5 and 6. The coefficients of PRIVATE are all significantly negative, whereas those of the interaction terms of PRIVATE with NonstateIndex, NonstateGDP, NonstateINV and NonstateEmploy

are all significantly positive. These results also support our hypotheses.

****
Table 7 about here
****

5.5. Additional tests

We perform the following additional procedures to test the sensitivity of our findings. For brevity, we do not tabulate the results of these additional tests in this paper.

(1) The influence of the income tax policy changes made in 2002

Two major changes in income tax policy were implemented in 2002. Prior to that year, income taxes payable by local SOEs and private firms were collected exclusively by the local government. This changed in 2002 following the introduction of a model for tax sharing between the central and local governments. The other policy change at the same year is that local governments were no longer allowed to grant tax rebates.[16] These policy changes may have reduced to some extent the tax policy incentives and authorities of local governments.

To control for the influence of these changes in tax policy, we rerun our regression analyses with a sub-sample consisting exclusively of observations post 2002. The coefficient of PRIVATE in the model without any of the interactive terms is marginally significant. This indicates that the policy changes made in 2002 reduce the extent of favorable tax treatment given to private firms by local governments. However, after adding the institutional indices and their interactive terms with ownership dummy (PRIVATE) to

[16] The central government found that its tax policy had been compromised because local governments had offered large tax rebates to attract investment. In 2001, the central government announced a ban on local tax rebates.

the regression model, the results are similar to those reported in Table 6. The coefficients of PRIVATE are negative and significant, whereas those of the interactive terms between PRIVATE and the institutional indices are significantly positive. These results indicate that our hypotheses still hold even after controlling for the major tax policy changes made in 2002.

(2) The impact of firms with B-shares and H-shares

Some firms issue both A-shares and B-shares or both A-shares and H-shares.[17] Some of them enjoy preferential tax treatment under certain specific policies. For example, in 1997, the Ministry of Finance and General Bureau of Taxation issued a notice announcing that nine firms listed on the Hong Kong Stock Exchange in 1993 were to enjoy a preferential income tax rate (No. 38 [1997]). To deal with the potential bias caused by this factor, we add to our regression models two dummies equal to one if the firm has B-shares or H-shares, respectively, and zero otherwise. The regression results show that the coefficients of the two dummy variables are insignificant and thus our conclusions remain the same.

6. Conclusion

This paper investigates whether and how interjurisdictional competition influences the taxation of firms of different ownership. Using a sample of Chinese listed firms from 1999

[17] Chinese B-shares are stocks initially designated for foreign investors. They are denominated in renminbi, the Chinese local currency, and are purchased in foreign currency. B-shares listed on the Shanghai Stock Exchange are quoted in US dollars, whereas those listed on the Shenzhen Stock Exchange are quoted in Hong Kong dollars. Previously, only foreigners were allowed to trade B-shares. Since March 2001, mainland Chinese have also been allowed to trade B-shares in US dollars or Hong Kong dollars. H-shares refer to the shares of companies incorporated in mainland China, which are traded on the Hong Kong Stock Exchange. Many companies obtain dual listing on the Hong Kong stock exchange and one of the two mainland China stock exchanges.

to 2006, we find that the effective tax rates of private firms are lower than those of local SOEs. This finding indicates that interjurisdictional competition motivates local governments to develop the private sector to promote local economic growth and increase regional employment. We also find that the preferential tax treatment of private firms is mainly driven by private firms in regions with a less developed private sector.

This study shows not only how ownership type affects firm taxation but also how interjurisdictional competition shapes the local government tax policy on firms with different ownership structures. Our results provide evidence that interjurisdictional competition can also act as a mechanism that helps to mitigate the institutional difficulties and support the growth of the private sector, in addition to the informal mechanisms based on reputation and relationships documented in the prior literature. The fiscal decentralization reform implemented by the central government in the 1990s has induced local governments to compete with one another for investment to develop their local economy. Tax policy is an effective tool that local governments use to attract private investment to their own jurisdiction. By helping private firms, a local government reaps the benefits of economic and employment growth. In addition, government officials may have personal incentives to support private firms, as the performance of the local economy affects their chance of promotion through the bureaucratic ranks. Our findings suggest that decentralization is the critical driving force behind China's success.

References

Adhikari, A., Derashid, C., and Zhang, H., 2006. Public policy, political connections, and effective tax rates: Longitudinal evidence from Malaysia. Journal of Accounting and Public Policy 25(5), 574-595.

Allen, F., Qian, J., and Qian, M., 2005. Law, finance, and economic growth in China. Journal of Financial Economics 77(1), 57-116.

Berkman, H., Cole, R., and Fu, J., 2010. Political connections and minority-shareholder protection: Evidence from securities-market regulation in China. Journal of Financial & Quantitative Analysis, Forthcoming.

Brandt, L., and Li, H., 2003. Bank discrimination in transition economies: Ideology, information or incentives? Journal of Comparative Economics 31(3), 387-413.

Brown, C. and Dinc, S., 2005. The politics of bank failures: Evidence from emerging markets, Quarterly Journal of Economics 120, 1413-1444.

Che, J., and Qian, Y., 1998. Institutional environment, community government, and corporate governance: Understanding China's township-village enterprises. Journal of Law, Economics, and Organization 14(1), 1-23.

Che, J., 2002. Rent seeking and government ownership of firms: An application to China's township-village enterprises. Journal of Comparative Economics 30, 781-811.

Chen, G., Firth, M., and Xu, L., 2009. Does the type of ownership control matter? Evidence from China's listed companies. Journal of Banking & Finance 33(1), 171-181.

Cull, R., Xu, L.C., and Zhu, T., 2009. Formal finance and trade credit during China's transition. Journal of Financial Intermediation 18, 173-192.

Delios, A., Wu, Z., and Zhou, N., 2006. A new perspective on ownership identities in China's listed companies. Management and Organization Review 2, 319-343.

Dinc, I.S., 2005. Politician and banks: Political influences on government-owned banks in emerging markets, Journal of Financial Economics 77, 453-479.

Dinc, I.S., and Gupta, N., 2010. The decision to privatize:Finance and politics, Journal of Finance, forthcoming.

Djankov, S., Ganser, T., McLiesh, C., Ramalho, R. and Shleifer, A., 2009. The effect of corporate taxes on investment and entrepreneurship. NBER working paper.

Fan, G., and Wang, X., 2004. National Economic Research Institute Index of Marketization of China's provinces. Beijing: Economic Science Press.

Fan, G., Wang, X., and Zhu, H., 2007. National Economic Research Institute Index of Marketization of China's provinces 2006 report. Beijing: Economic Science Press.

First Financial Daily, 2010, All-China Federation of Industry & Commerce doubts the SASAC report: central SOEs' taxation is not 5 times as that of private firms. September 2, 2010 (in Chinese).

Granick, D., 1990. Chinese state enterprises: A regional property rights analysis. Chicago, IL: Chicago University Press.

Gupta, S., and Newberry, K., 1997. Determinants of the variability in corporate effective tax rate: Evidence from longitudinal data. Journal of Accounting and Public Policy 16(1), 1-39.

Holland, K., 1998. Accounting policy choice: The relationship between corporate tax burden and company size. Journal of Business Finance and Accounting 25, 265-288.

Jin, H., Qian, Y., and Weingast, B.R., 2005. Regional decentralization and fiscal incentives: Federalism Chinese style. Journal of Public Economics 89(9-10), 1719-1742.

Kellermann, K., 2006. A note on intertemporal fiscal competition and redistribution. International Tax and Public Finance 13, 151-161.

Kornai, J., Maskin, E., and Roland, G., 2003. Understanding the soft budget constraint. Journal of Economic Literature 41(4), 1095-1136.

Li, H., and Zhou, L., 2005. Political turnover and economic performance: The incentive role of personnel control in China. Journal of Public Economics 89(9-10), 1743-1762.

Liao, G., Chen, X., Jing, X., and Sun, J., 2009. Policy burdens, firm performance, and management turnover. China Economic Review 20, 15-28.

Lin, J.Y., and Liu, Z., 2000. Fiscal decentralization and economic growth in China. Economic Development and Cultural Change 49(1), 1-21.

McMillan, J., 1995. China's nonconformist reforms. In Edward P. Lazear (Ed.), Economic transition in Eastern Europe and Russia: Realities of reform (pp. 419-433). Palo Alto, CA: Hoover Institution Press.

Nechyba, T.J., 1997. Local property and state income taxes: The role of interjurisdictional competition and collusion. Journal of Political Economy 105(2), 351-384.

Porcano, T.M., 1986. Corporate tax rates: Progressive, proportional or regressive. Journal of the American Taxation Association 7(2), 17-31.

Peterson, M.A., 2009. Estimating standard errors in finance panel data sets: Comparing approaches. Review of Financial Studies 22(1), 453-480.

Qian, Y., and Roland, G., 1998. Federalism and the soft budget constraint. American Economic Review 88(5), 1143-1162.

Qian, Y., and Weingast, B.R., 1997. Federalism as a commitment to preserving market incentives. Journal of Economic Perspectives 11, 83-92.

Qian, Y., and Xu, C., 1993. Why China's economic reforms differ: The M-form hierarchy and entry/expansion of the non-state sector. Economics of Transition 1(2), 135-70.

Shevlin, T., and Porter, S., 1992. The corporate tax comeback in 1987: Some further evidence. Journal of the American Taxation Association 14(1), 58-79.

Shleifer, A., and Vishny, R.W., 1998. The grabbing hand: Government pathologies and their cures. Cambridge, MA: Harvard University Press.

Sichuan Financial Bureau., 2002. Analysis on corporate tax burden in 2000: Tax regulation division. Sichuan Finance 5, 40-42. (In Chinese)

Siegfried, J., 1972. The relationship between economic structure and the effect of political influence: Empirical evidence from the federal corporation income tax program. Ph.D. dissertation, University of Wisconsin.

Spooner, G.M., 1986. Effective tax rates from financial statements. National Tax Journal 36, 293-306.

State-owned Assets Supervision and Administration Commission of the State Council, 2010. 2009 Review Report. available on its website http://www.sasac.gov.cn.

Stickney, C.P., and McGee, V.E., 1982. Effective corporate tax rates: The effect of size, capital intensity, leverage and other factors. Journal of Accounting and Public Policy 1(2), 125-152.

Sun, Q., and Tong, W.H.S., 2003. China share issue privatization: The extent of its success. Journal of Financial Economics 70(2), 183-222.

Wang, Q., Wong, T.J., and Xia, L., 2008. State ownership, the institutional environment, and auditor choice: Evidence from China. Journal of Accounting and Economics 46(1), 112-134.

Wang, Y.M., 2003. The effective tax rate of China listed companies: Evidence from firm size, region, and industry. Management World 1, 115-122. (In Chinese)

Wei, Z., Xie, F., and Zhang, S., 2005. Ownership structure and firm value in China's privatized firms: 1991-2001. Journal of Financial and Quantitative Analysis 40(1), 87-108.

Wilkie, P.J., and Limberg, S.T., 1990. The relationship between firm size and effective tax rate: A reconciliation of Zimmerman (1983) and Porcano (1986). Journal of American Taxation Association 11(2), 76-91.

Wong, C., 2003. Economic growth under decentralization: Old wine in new bottles? Another look at fiscal incentives in China. Paper presented at the Workshop on National Integration, organized by the World Bank and China's Development Research Center, State Council, 2003.

World Bank., 2002. World Development Report 2002: Building institutions for markets. Available at: http:// www.worldbank.org.

Zhao, X.B., and Zhang, L., 1999. Decentralization reforms and regionalism in China: A review. International Regional Science Review 22(3), 251-281.

Zimmerman, J.L., 1983. Taxes and firm size. Journal of Accounting and Economics 5(1), 119-149.

Appendix 1A Total gross output contributed by state and no-state sectors

Year	Total gross output	Gross output of state sector	Gross output of non-state sector	Percent of non-state sector	Growth rate of state sector	Growth rate of non-state sector
1996	62740.16	36173.00	26567.16	42.34%		
1997	68352.68	35968.00	32384.68	47.38%	-0.57%	21.90%
1998	67737.14	33621.04	34116.10	50.37%	-6.53%	5.35%
1999	72707.04	35571.18	37135.86	51.08%	5.80%	8.85%
2000	85673.66	40554.37	45119.29	52.66%	14.01%	21.50%
2001	95448.98	42408.49	53040.49	55.57%	4.57%	17.56%
2002	110776.50	45178.96	65597.54	59.22%	6.53%	23.67%
2003	142271.22	53407.90	88863.32	62.46%	18.21%	35.47%
2004	201722.19	70228.99	131493.20	65.19%	31.50%	47.97%
2005	251619.50	83749.92	167869.58	66.72%	19.25%	27.66%
2006	316588.96	98910.45	217678.51	68.76%	18.10%	29.67%
Average	134148.91	52342.94	81805.98	56.52%	11.09%	23.96%

Appendix 1B Total fixed investment made by state and no-state sectors

Year	Total fixed investment	Investment of state sector	Investment of non-state sector	Percent of non-state sector	Growth rate of state sector	Growth rate of non-state sector
1996	22913.55	12006.21	10907.34	47.60%		
1997	24941.11	13091.72	11849.39	47.51%	9.04%	8.64%
1998	28406.17	15369.30	13036.87	45.89%	17.40%	10.02%
1999	29854.71	15947.76	13906.95	46.58%	3.76%	6.67%
2000	32917.73	16504.44	16413.29	49.86%	3.49%	18.02%
2001	37213.49	17606.97	19606.52	52.69%	6.68%	19.46%
2002	43499.91	18877.35	24622.56	56.60%	7.22%	25.58%
2003	55566.61	21661.00	33905.61	61.02%	14.75%	37.70%
2004	70477.42	25027.61	45449.81	64.49%	15.54%	34.05%
2005	88773.61	29666.92	59106.70	66.58%	18.54%	30.05%
2006	109998.16	32963.39	77034.78	70.03%	11.11%	30.33%
Average	51538.79	20248.70	29621.80	55.35%	10.75%	22.05%

Appendix 1C Total labor employed by state and no-state sectors

Year	Total employers	Employers of state sector	Employers of non-state sector	Percent of non-state sector	Growth rate of state sector	Growth rate of non-state sector
1996	11172.10	7404.30	3767.80	33.73%		
1997	10887.30	7131.10	3756.20	34.50%	-3.69%	-0.31%
1998	8612.10	5220.40	3391.70	39.38%	-26.79%	-9.70%
1999	8036.30	4733.20	3303.10	41.10%	-9.33%	-2.61%
2000	7507.80	4265.40	3242.40	43.19%	-9.88%	-1.84%
2001	7052.30	3809.20	3243.10	45.99%	-10.70%	0.02%

2002	6876.20	3381.90	3494.30	50.82%	-11.22%	7.75%
2003	6796.80	3066.70	3730.10	54.88%	-9.32%	6.75%
2004	6850.40	2841.40	4009.00	58.52%	-7.35%	7.48%
2005	7064.06	2569.55	4494.51	63.63%	-9.57%	12.11%
2006	7768.10	2615.70	5152.40	66.33%	1.80%	14.64%
Average	8056.68	4276.26	3780.42	48.37%	-9.61%	3.43%

Source: China Statistical Year Book
Note: The statistics are based on both state-owned and non-state-owned enterprises whose sales are greater than 5 million RMB.

Table 1 Sample selection process

	1999	2000	2001	2002	2003	2004	2005	2006	Total
Original non-financial listed firms	918	1054	1130	1192	1251	1343	1342	1399	9629
Less									
Firms with missing data or with negative assets or negative sales	-127	-117	-7	-6	-6	-9	-7	-6	-285
Firms whose ultimate controllers are central government or foreign individual	-177	-219	-266	-277	-288	-309	-311	-337	-2184
Firms with negative profit before tax	-56	-70	-128	-134	-128	-160	-213	-143	-1032
Firms with a negative ETR or an ETR exceeding one	-40	-73	-154	-127	-87	-138	-56	-98	-773
Final sample	518	575	575	648	742	727	755	815	5355
By ultimate owner type:									
Local SOEs	406	439	439	478	533	484	495	477	3751
Private firms	112	136	136	170	209	243	260	338	1604

Table 2 Definitions of the variables

Code	Definition
ETR	Effective tax rate (tax expenses – deferred tax expenses)/(profit before tax + asset depreciation reserves excluding provisions for bad debts – investment returns + cash dividends received + cash bond interest received).
PRIVATE	Dummy variable: one if the firm is ultimately controlled by domestic individual, or collective enterprises or social entity,otherwise zero.
NonstateIndex	The index, constructed by Fan, Wang, and Zhu (2007), measures the development of the non-state sector, including the proportions of gross industrial output, fixed investment, and labor force employment accounted for by the non-state sector. A higher index value indicates a more highly developed non-state sector.
NonstateGDP	The index is one of the sub-indexes of NonstateIndex. It measures the proportion of gross industrial output contributed by the non-state sector. A higher index value indicates a higher percentage of gross industrial output contributed by the non-state sector.
NonstateINV	The index is one of the sub-indexes of NonstateIndex. It measures the proportion of fixed investment made by the non-state sector. A higher index value indicates a higher percentage of fixed investment made by the non-state sector.
NonstateEmploy	The index is one of the sub-indexes of NonstateIndex. It measures the proportion of labor employed by the non-state sector. A higher index value indicates a higher percentage of labor employed by the non-state sector.
DEFICIT	Budget deficit: the natural log of the average annual budget deficit of the province where the firm is located over the past three years.
SIZE	Firm size: the natural log of (total assets).
LEV	Financial leverage: total debts divided by total assets.
CAPINT	Capital intensity: fixed assets divided by total assets.
INVINT	Inventory intensity: inventory divided by total assets.
ROA	Return on assets: net income divided by total assets.
Region2	Regional effect dummy: one if the firm is located in the middle region (including Anhui, Heilongjiang, Henan, Hubei, Hunan, Jianxi, Jilin, and Shanxi provinces) and zero otherwise.
Region3	Regional effect dummy: one if the firm is located in the western region (including Chongqing city and Gansu, Guangxi, Guizhou, Inner Mongolia, Ningxia, Qinghai, Shaanxi, Sichuan, Xinjiang, Xizang, and Yunnan provinces) and zero otherwise.
Region4	Regional effect dummy: one if the firm is located in one of the special economic zones (including Shenzhen, Shantou, Xiamen, and Zhuhai and Hainan province) and zero otherwise.
Region5	Regional effect dummy: one if the firm is located in Shanghai and zero otherwise.

Table 3 Summary statistics for the variables

Variable	Total sample							Mean by ownership type		
	Mean	Standard Deviation	Min	P25	Median	P75	Max	Local SOEs	Private firms	T value for difference test
ETR (%)	21.222	15.113	0	10.945	18.064	30.167	68.199	21.894	19.653	2.241***
NonstateIndex	7.202	3.004	-2.43	4.79	7.35	9.7	12.1	6.942	7.810	-0.868***
NonstateGDP	6.009	2.892	-0.52	3.8	5.53	8.87	11.01	5.785	6.532	-0.747***
NonstateINV	8.546	3.447	-9.26	6.62	9.19	11.13	15.38	8.301	9.116	-0.815***
NonstateEmploy	7.160	3.761	0	4.01	6.8	9.77	17.94	6.802	7.995	-1.192***
DEFICIT	2.814	0.566	0.647	2.432	2.859	3.248	3.917	2.774	2.907	-0.133***
SIZE	21.158	0.894	14.937	20.566	21.093	21.705	25.183	21.275	20.885	0.390***
LEV	0.464	0.174	0.086	0.336	0.469	0.588	0.922	0.456	0.481	-0.025***
CAPINT	0.372	0.194	0.017	0.224	0.356	0.518	0.785	0.394	0.319	0.075***
INVINT	0.152	0.131	0.001	0.062	0.120	0.198	0.592	0.148	0.162	-0.014***
ROA (%)	4.069	3.044	0.135	1.756	3.472	5.560	15.228	4.074	4.056	0.018

Note: The definitions for all variables are presented in Table 2. The left part of the table reports the statistics for the total sample. The right part presents the mean values for the two sub-samples based on ownership, as well as the T-statistics for the mean difference test. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Table 4 Pearson correlation matrix of the variables

	ETR	NonstateIndex	NonstateGDP	NonstateINV	NonstateEmploy	DEFICIT	SIZE	LEV	CAPINT	INVINT
NonstateIndex	0.101***									
	(0.001)									
NonstateGDP	0.087***	0.917***								
	(0.001)	(0.001)								
NonstateINV	0.110***	0.924***	0.766***							
	(0.001)	(0.001)	(0.001)							
NonstateEmploy	0.074***	0.898***	0.778***	0.752***						
	(0.001)	(0.001)	(0.001)	(0.001)						
DEFICIT	0.085***	0.356***	0.240***	0.417***	0.363***					
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)					
SIZE	0.127***	0.197***	0.133***	0.233***	0.172***	0.168***				
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)				
LEV	0.027**	0.099***	0.049***	0.127***	0.087***	0.100***	0.161***			
	(0.049)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)			
CAPINT	-0.040***	-0.073***	-0.080***	-0.020	-0.099***	0.109***	0.161***	-0.099***		
	(0.003)	(0.001)	(0.001)	(0.148)	(0.001)	(0.001)	(0.001)	(0.001)		
INVINT	0.114***	0.113***	0.088***	0.100***	0.124***	0.024*	0.078***	0.264***	-0.517***	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.078)	(0.001)	(0.001)	(0.001)	
ROA	-0.137***	-0.018	0.020	-0.040***	-0.024*	-0.090***	-0.001	-0.385***	0.065***	-0.121***
	(0.001)	(0.185)	(0.136)	(0.003)	(0.077)	(0.001)	(0.945)	(0.001)	(0.001)	(0.001)

Note: The definitions for all variables are presented in Table 2. The numbers in parentheses are p-values. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Table 5 Regression analysis of ETR with ownership type and institutional variables

	Model 1	Model 2	Model 3	Model 4	Model 5
PRIVATE	-1.262**	-1.271**	-1.259**	-1.263**	-1.250**
	(0.011)	(0.010)	(0.011)	(0.011)	(0.012)
NonstateIndex		0.241*			
		(0.066)			
NonstateGDP			0.278**		
			(0.012)		
NonstateINV				0.204**	
				(0.047)	
NonstateEmploy					-0.064
					(0.480)
DEFICIT	1.123**	0.849	0.826	0.799	1.188**
	(0.027)	(0.108)	(0.112)	(0.133)	(0.021)
SIZE	1.657***	1.663***	1.674***	1.648***	1.654***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LEV	-5.685***	-5.698***	-5.663***	-5.804***	-5.726***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CAPINT	-5.119***	-5.063***	-4.942***	-5.197***	-5.151***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
INVINT	9.631***	9.572***	9.597***	9.555***	9.643***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.652***	-0.659***	-0.660***	-0.657***	-0.650***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Region2	-1.044*	-0.106	0.087	-0.284	-1.303**
	(0.051)	(0.886)	(0.901)	(0.665)	(0.045)
Region3	-5.208***	-4.074***	-3.942***	-4.148***	-5.494***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Region4	-8.469***	-8.623***	-8.692***	-8.539***	-8.385***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Region5	-4.081***	-4.057***	-3.712***	-4.120***	-4.032***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sample Size	5355	5355	5355	5355	5355
Adj. R^2	0.127	0.128	0.128	0.128	0.127

Table 6 Regression analysis of ETR with ownership, institutional variables, and their interactive terms

	Model 1	Model 2	Model 3	Model 4
PRIVATE	-5.164***	-3.755***	-5.414***	-3.957***
	(0.000)	(0.000)	(0.000)	(0.000)
NonstateIndex	0.089			
	(0.521)			
PRIVATE * NonstateIndex	0.513***			
	(0.001)			
NonstateGDP		0.155		
		(0.199)		
PRIVATE * NonstateGDP		0.397***		
		(0.009)		
NonstateINV			0.070	
			(0.523)	
PRIVATE * NonstateINV			0.464***	
			(0.000)	
NonstateEmploy				-0.170*
				(0.080)
PRIVATE * NonstateEmploy				0.351***
				(0.003)
DEFICIT	0.917*	0.889*	0.858	1.202**
	(0.082)	(0.087)	(0.107)	(0.019)
SIZE	1.703***	1.693***	1.694***	1.686***
	(0.000)	(0.000)	(0.000)	(0.000)
LEV	-5.557***	-5.572***	-5.618***	-5.650***
	(0.000)	(0.000)	(0.000)	(0.000)
CAPINT	-5.052***	-4.985***	-5.110***	-5.168***
	(0.000)	(0.000)	(0.000)	(0.000)
INVINT	9.325***	9.435***	9.271***	9.435***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.663***	-0.665***	-0.662***	-0.652***
	(0.000)	(0.000)	(0.000)	(0.000)
Region2	-0.162	0.035	-0.364	-1.308**
	(0.827)	(0.960)	(0.580)	(0.044)
Region3	-4.106***	-3.992***	-4.195***	-5.481***
	(0.000)	(0.000)	(0.000)	(0.000)
Region4	-8.505***	-8.607***	-8.487***	-8.264***
	(0.000)	(0.000)	(0.000)	(0.000)
Region5	-4.003***	-3.726***	-4.064***	-3.954***
	(0.000)	(0.000)	(0.000)	(0.000)
Sample Size	5355	5355	5355	5355
Adj. R^2	0.130	0.129	0.130	0.129

Note: The definitions for all variables are presented in Table 2. The p-values, presented in the parentheses below the estimates, are based on the standard errors adjusted for clustering by firm, with *, **, and *** indicating significance at the 10%, 5%, and 1% levels.

Table 7 Regression analysis of cash flow-based ETR

	Model 1	Model 2	Model 3	Model 4	Model 5
PRIVATE	-0.013**	-0.049***	-0.036***	-0.049***	-0.040***
	(0.018)	(0.000)	(0.002)	(0.001)	(0.000)
NonstateIndex		0.000			
		(0.799)			
PRIVATE * NonstateIndex		0.005***			
		(0.004)			
NonstateGDP			0.002		
			(0.169)		
PRIVATE * NonstateGDP			0.004**		
			(0.026)		
NonstateINV				0.000	
				(0.979)	
PRIVATE * NonstateINV				0.004**	
				(0.011)	
NonstateEmploy					-0.002*
					(0.085)
PRIVATE *					0.004***
NonstateEmploy					(0.006)
DEFICIT	0.006	0.005	0.004	0.005	0.007
	(0.288)	(0.405)	(0.541)	(0.393)	(0.222)
SIZE	0.017***	0.017***	0.017***	0.017***	0.017***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LEV	-0.050***	-0.049***	-0.049***	-0.049***	-0.050***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
CAPINT	-0.060***	-0.060***	-0.059***	-0.060***	-0.061***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
INVINT	0.094***	0.092***	0.093***	0.092***	0.092***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.007***	-0.007***	-0.007***	-0.007***	-0.007***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Region2	-0.009	-0.002	0.003	-0.005	-0.012*
	(0.131)	(0.773)	(0.712)	(0.476)	(0.092)
Region3	-0.050***	-0.042***	-0.037***	-0.045***	-0.053***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Region4	-0.091***	-0.091***	-0.092***	-0.091***	-0.088***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Region5	-0.044***	-0.043***	-0.040***	-0.044***	-0.043***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sample Size	5234	5234	5234	5234	5234
Adj. R^2	0.115	0.117	0.117	0.116	0.116

Note: The definitions for all variables are presented in Table 2. The p-values, presented in the parentheses below the estimates, are based on the standard errors adjusted for clustering by firm, with *, **, and *** indicating significance at the 10%, 5%, and 1% levels. The sample size is less than that of Table 5 is because of missing cash flow data.