

# Capital Mobility and Taxation: State-Business Collusion in China<sup>1</sup>

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## Abstract

Do more mobile firms pay lower taxes? Conventional wisdom argues that capital mobility creates downward pressure on corporate taxes, as firms can threaten to exit. Nevertheless, empirical findings are highly mixed and hard to reconcile, partly due to a lack of data at the micro-level. Using two comprehensive panel data sets with more than 780,000 Chinese firms over two decades, we find that firms with higher shares of mobile capital pay higher effective tax rates. We contend that this counter-intuitive finding results from the strategic interaction between firms and governments. Knowing their vulnerability and sunk cost, firms with more fixed assets were more active in protecting themselves by bribing and colluding with local officials. Meanwhile, officials were more willing to seek bribes from these firms in exchange for tax cuts. In contrast, mobile firms were disadvantaged. Although capital mobility may provide additional bargaining power, firms with fixed assets can overcome this advantage through state-business collusion. Our quantitative and qualitative evidence show that fixed firms paid lower taxes in cities with cozy government-business relations. However, such advantages decreased after the launch of anti-corruption campaigns and in cities with higher fiscal transparency.

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# 1 Introduction

Over the last half-century, political economists have grappled with the idea that capitalist countries' power to tax corporations is limited, with capital mobility being a crucial constraining factor. Economic growth in capitalist societies is dependent on the investment of private actors. Even in closed economies, politicians have to trade off maximizing revenues and increasing taxes such that capital owners do not limit private investment. In other words, the state is *structurally dependent on capital* (Przeworski and Wallerstein, 1988). As capital becomes more mobile, capital owners can threaten to move to other jurisdictions, further exerting downward pressure on tax rates. Standard theoretical arguments, therefore, expect higher capital mobility to lead to lower corporate tax rates.

This classic argument in political economy, however, has both theoretical and empirical shortcomings. Theoretically, the argument overlooks other strategic interactions between firms and governments (Kim, 2017). While capital mobility can provide firms with more bargaining power under some conditions, such mobility can also create disadvantages. Empirically, existing research has arrived at contradictory findings. While some studies confirm the conventional wisdom that capital mobility and corporate taxes are inversely related, others cast doubt on such a claim and even find that the reverse is true. The relationship between capital mobility and taxation varies considerably across contexts, with political and economic variables – ranging from regime type to levels of economic development – playing a role. Therefore, one crucial challenge is to tease out the conditions in which a negative relationship between capital mobility and taxation may exist.

The difficulties in reconciling the mixed findings are likely caused by the lack of comprehensive data at the micro-level. Much of the research investigating the relationship between capital mobility and tax rates has used country-level data on average or statutory tax rates, which can mask key relationships among variables and are often weak predictors of effective tax rates. In contrast, we use comprehensive panel data sets with individual firms' effective tax rates across China. We test our argument at the firm level in a single country, where local governments with high autonomy compete to attract and retain investments.

This research design allows us to hold constant other potential confounding factors, such as the political system. The fine-grained data on each firm's actual tax payments and total profits allow us to calculate a yearly effective tax rate for each firm instead of relying on statutory tax rates at the country level.

In this context, we find that, contrary to conventional expectations, firms with higher mobile capital shares pay higher effective tax rates than firms with a higher proportion of fixed assets. We contend that this positive relationship between mobility and tax rates results from the strategic interactions between firms and governments under the condition of state-business collusion instead of the conventional scenario of state-business bargaining. Firms with low asset mobility are aware that they are vulnerable to predatory taxation. In exchange for tax reductions, they thus spend extra effort in bribing and building connections with government officials over the long run. Given the start-up cost associated with fixed assets, these firms also have stronger incentives to invest in such behavior. By contrast, mobile firms may be more willing to pay higher taxes in the short run and use their bargaining power instead of investing in long-term resources to build connections.

Government officials, meanwhile, also have more incentives to create connections with fixed asset firms. Officials are more likely to offer tax cuts in exchange for bribery and long-term economic benefits when they anticipate firms to reside in their jurisdiction for a long time. On the other hand, with more mobile firms, officials may become opportunistic and extract as much as they can through the already established channel of taxation. While mobile firms may have some bargaining power, fixed asset firms can effectively overcome their own disadvantages in cozy state-business environments. Only when state-business collusion is substantially constrained, do mobile firms have significant advantages over fixed asset firms.

We investigate our argument using two firm-level data sets containing data on asset types and yearly tax payments. The first data set is based on the *China National Survey of Industrial Firms* and contains data on over 780,000 firms in 477 Chinese cities between 1995 and 2007. As a second source, we use the *China Stock Market and Accounting Research Database* for data on effective tax payments by 3,628 firms in 285 cities between 2009 and

2017. The two data sets allow us to investigate the relationship between capital mobility and tax rates on two different samples of firms, as well as two unique time periods.

Using these data, we first establish that the overall relationship between capital mobility and effective tax rates in China is consistently positive across two different data sets and several different empirical specifications. We then empirically explore the strategic interactions between governments and firms as a potential explanation for our findings, drawing on quantitative and qualitative evidence.

First, we show that the relationship between capital mobility and effective tax rates differs by city-level government-business relations. The advantage of fixed asset firms is stronger in cities with better relations between firms and city tax bureaus. Second, we present evidence that the anti-corruption campaign launched by President Xi Jinping in 2013 has significantly weakened the relationship between mobility and effective tax rates, compared to the pre-campaign period. Xi's campaign has substantially tightened the control on government-business collusion and reduced the options of government business interactions compared to the pre-Xi period. As we show, more mobile firms paid higher taxes before the anti-corruption campaign, but this difference was significantly smaller after 2013, even when accounting for firm fixed effects. Finally, we show that the relationship between capital mobility and higher effective tax rates only exists in cities with low fiscal transparency. In cities with high fiscal transparency, the advantage of fixed asset firms disappears.

Overall, our evidence suggests that when widespread government-business collusion is allowed, fixed asset firms have lower effective tax rates due to their commitment to networking and building relationships with local governments. However, anti-corruption and pro-transparency reforms have constrained the choice of collusion, leveled the playing field, and weakened the advantages of fixed asset firms.

Our findings illustrate that when studying the relationship between capital mobility and taxation, we need to consider both the advantages and disadvantages of mobile and fixed asset firms. The relationship is highly dependent on firm-government interactions and the political and economic environment. The conventional wisdom about mobile firms' advantages is not wrong in highly transparent and clean settings, where state business

collusion through bribery is constrained. Nevertheless, where government business collusion is prevalent, mobile firms may pay higher costs, and fixed asset firms' advantages may dominate.

## 2 Capital Mobility and Taxation

Much theoretical work suggests that capital mobility constrains the extractive ability of the state and ought to lower taxes on capital. To put simply, firms with mobile capital can choose to *exit* in the face of higher tax rates. Increasing capital mobility should, therefore, exert downward pressure on effective tax rates (Hirschman, 1970) and may change distributive outcomes. All else equal, governments may attempt to attract mobile capital by lowering taxes and providing investment incentives, which can result in a “race to the bottom” (Rodrik and van Ypersele, 2001).

Even though this theoretical expectation is well known and straightforward, the empirical results are mixed. On the one hand, research suggests that capital mobility has indeed shifted taxation from capital to labor, generating distributional consequences by lowering effective tax rates on capital and raising taxes on labor (Garrett, 1995; Rodrik, 1997; Bretschger and Hettich, 2002). Statutory corporate tax rates have continuously fallen in OECD countries since the mid-1980s (Devereux, Griffith and Klemm, 2002). On the other hand, others question the supposed effect of globalization on tax competition, finding little support for a race to the bottom for capital tax rates (Quinn, 1997; Hays, 2003; Basinger and Hallerberg, 2004; Plümper, Troeger and Winner, 2009).

Moreover, the relationship between capital mobility and tax rates differs considerably across countries and regions, depending on factors such as resource endowment, regime type, and level of economic development. Cai and Treisman (2005) argue that countries' resource endowments and levels of human capital determine whether the competition to attract mobile capital constrains governments. Li (2006) and Genschel, Lierse and Seelkopf (2016) show that whether countries compete over mobile capital via tax rates depends on their level of fiscal decentralization and regime type. Jensen (2013) finds that while capital mobility may lower firms' taxes in OECD countries, paradoxically, mobility raises tax rates

among non-OECD countries with US firms' investments. [Pond and Zafeiridou \(2019\)](#) show that when governments care about firm performance in financial markets, they prefer lower taxation for less mobile firms to prop up their financial performance. The effect is most prominent under democratic governance and broad participation in the stock market.

How does one reconcile these different findings regarding the relationship between capital mobility and taxation? A growing body of work suggests that strategic interactions between governments and businesses can offer a potential explanation. Starting with firms with a high proportion of fixed assets: these firms are more vulnerable to government extraction as they cannot easily move to another location ([Cao et al., 2021](#)). Additionally, with higher start-up and thus sunk costs, these firms face more extensive losses when government intervention disrupts production ([Johns and Wellhausen, 2020](#); [Zhu and Deng, 2021](#)). Understanding their disadvantages, these firms are more likely to actively engage in bribing and corruption to protect themselves from the extractive state. Recent studies found that fixed assets are associated with higher levels of bribery and corruption, based on evidence in China, Vietnam, and Uganda ([Zhu and Deng, 2021](#); [Bai et al., 2019](#)). Once firms establish good relationships with the state, they benefit in the long run and economic areas beyond taxation. At the same time, government officials are much more likely to seek bribes and build relations with firms with low mobility. Since fixed asset firms are more dependent on local government officials for survival in the long run, these relationships are also more beneficial to government officials. Consequently, under certain political and economic conditions, fixed asset firms can turn their apparent disadvantages into advantages when competing over local fiscal policies.

Firms with higher capital mobility, in contrast, have fewer barriers to move and have more bargaining power, according to conventional wisdom. However, when collusion is allowed, mobility also comes with disadvantages. For these firms, it is less worthwhile to invest resources into building relations as they are more likely to move in the future. Due to lower relocation costs and shorter time horizons, mobile firms are less active than fixed asset firms in terms of paying bribes to public officials ([Gauthier and Goyette, 2014](#)). Anticipating that mobile firms are less dependent on the government and less vulnerable, officials would

also have fewer incentives to seek bribes or establish new networks. Knowing that they may move, government officials would resort to taxation, an already set-up institution of state extraction, while firms are still in their jurisdiction.

Viewed in this light, the conventional theoretical expectation that capital mobility increases a firm's bargaining power over taxation is not necessarily wrong but requires essential qualifications. One has to take firm-government interaction and the political economic environment into full consideration, which determines the advantages and disadvantages associated with mobile/fixed firms:

1) In a context when state-business collusion is prevalent, as described above, the strategic interactions between firms and governments can reach an equilibrium that favors fixed asset firms rather than mobile firms. While mobile firms can still threaten to exit, such threat has less impact, as officials focus on colluding with fixed asset firms, who offer kickbacks and side payments. This scenario is especially applicable in countries where corruption and political connections are found to help reduce tax rates to the state's detriment, such as Brazil, Malaysia, India, and Russia (Timmons and Garfias, 2015; Tanzi and Davoodi, 2000; Adhikari, Derashid and Zhang, 2006; Hollenbach and Silva, 2019; Marjit, Mukherjee and Mukherjee, 2000; Safavian, Graham and Gonzalez-Vega, 2001).

2) By contrast, where fiscal transparency is high or government-business collusion and corruption are significantly constrained, the conventional assumption of state-business bargaining is more appropriate. In this context, bribery, corruption, and government business relationships matter less, and fixed-asset firms have few advantages. In the ideal scenario where corruption is impossible, mobile firms' exit threats become salient in obtaining tax breaks. The mobile firms' exit would cause losses to the local economy, pushing local officials to offer tax breaks to mobile firms.

Placed in such a theoretical context, much of recent Chinese history falls into the former scenario, where government-business collusion and the *guanxi* network have played crucial roles in shaping economic activities. Given the limited channels for formal policy lobbying and weak protection of property rights, businesses tend to bribe public officials and resort to

political connections (Pearson, 1997). The increased state-business connections play an essential role as an alternative way to obtain property rights protection (Tsai, 2007; Dickson, 2008; Wang, 2014; Truex, 2016; Zhu and Shi, 2019; Hou, 2019). At the same time, taxation is one of the most important areas for state-business collusion. Businesses often prepare their bribes well before the tax season or attend various banquets with local officials. In exchange, officials offer tax breaks or turn a blind eye towards tax evasion. As discussed above, such an environment made fixed asset firms more active in rent-seeking than mobile firms. Therefore, we expect firms with a higher proportion of fixed assets to be more likely to invest in government-business collusion in China. Meanwhile, officials are more likely to offer tax cuts to those firms than to more mobile firms.

That said, we also observe variations in government-business interactions across different periods and localities in China. We use this variation to investigate our argument within the same country. We expect fixed-asset firms' advantages to be most salient in localities with cozy government-business relations and less salient in areas of higher fiscal transparency. Likewise, when the state cracks down on corruption and state-business collusion, firms and officials are deprived of the full range of options for strategic interaction. In this case, mobile firms' advantages increase. In the following sections, we use fine-grained firm-level data combined with city-level variables and qualitative evidence to examine the empirical relationship between capital mobility and taxation and uncover the mechanisms underlying such a relationship.

### **3 Research Design & Case Selection**

China is now one of the world's largest economies, where state involvement and state business relations play an important role. In the early 1980s, China decentralized its revenue system and increased fiscal autonomy at the local level. The fiscal decentralization significantly incentivized local governments to promote economic growth and generate revenue sources (Oi, 1999; Shirk, 1993; Whiting, 2001; Ong, 2012). Although a 1994 reform re-claimed part of the revenue to the central government, most expenditures and the responsibilities of tax collections remain at the local level (National Bureau of Statistics,



2015). Until the start of the Xi regime, local governments had considerable discretion over the offering of tax breaks before collecting taxes. At the same time, the cadre evaluation systems of party and government officials create an essential institution of accountability from above, comparable to that of Vietnam (Jensen and Malesky, 2018). Higher-level officials evaluate the performance of lower-level officials based on local economic indicators. These evaluations increase pressure on local government officials to compete to attract investment and to promote economic growth (Lü and Landry, 2014; Jiang, 2018; Chen and Zhang, 2021). Since the 1990s, offering tax breaks has become an essential tool for local governments to draw investment and retain firms in their jurisdiction (Gao, 2015; Naughton, 2018; Zuo, 2015; Chen, 2018). While the central government did not openly endorse this practice, it allowed local governments to provide tax breaks based on local conditions (*yin di zhi yi*). Several studies have noted the impact of regional competition on offering tax breaks in China (Cheng, Lin and Simmons, 2017; Xing, Cui and Qu, 2018).<sup>4</sup>

In contrast, we still know little about how local government officials and businesses in China have used tax-break policies to build mutually beneficial relationships and consolidate connections (Zheng, 2006; Chen, 2018; Choi, 2009). Local officials, generally underpaid, often sacrifice state revenue for personal benefits (Zhang, 2021). The hundreds of tax break policies issued by the central government, which generated even more policies at the local level, were hard to monitor. The criteria for evaluating firms' eligibility for tax breaks were particularly flexible. A China National Audit Office investigation found that 98% of the investigated counties had issued tax break policies without central government approval, reducing tax revenues by more than 7 billion yuan<sup>5</sup> According to interviews, tax bureaus and other government departments would often directly reach out to firms (or tax companies with connections to firms) to seek bribes and kickbacks and advertise such opportunities.<sup>6</sup> At

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<sup>4</sup> These policies, from 1990 to present, were later summarized in the catalog of tax break policies (see The State Tax Bureau of China (2015)).

<sup>5</sup> See China National Audit Office, <http://www.audit.gov.cn/n5/n25/c63597/content.html>.

<sup>6</sup> Interview with a tax bureau official, Sichuan, October 2009; interview with an accountant in an equipment manufacturing firm, Jiangsu, March 2010. In addition, see Choi (2009).

the same time, firms actively seek help from local governments. While official application processes exist, it is nearly impossible to stay on top of hundreds of policies or navigate approval through different government departments without building networks with local tax bureaus. Nurturing and maintaining good relationships with local officials—through cash, gifts, or banquets—are essential for firms to “get things done” and receive approval within a realistic time frame. As discussed above, both the officials and firms have strong incentives to engage in this type of government-business collusion, particularly when firms have a higher proportion of fixed assets. In many of these firms, to facilitate the eventual implementation of tax breaks or exemption policies, specific personnel are employed to establish and maintain good relations with the tax bureau and other departments. For example, the representative for a company selling electric power equipment recalled being responsible for establishing connections with the government department that issued tax break policies (in this case, the Development and Reform Commission). She would go to the government office about twice a week to promise bribes for a few months. After receiving initial approval, she had to receive final support from the tax bureau and, therefore, repeated the procedure for another couple of months. When the official notified her that the tax breaks were finally “done,” the representative would go in person to deliver the cash bribes to both the department official and the tax official.<sup>7</sup>

As we show with additional examples below, long-term government collusion is often established through repeated interactions, making it more rational to invest in future bribing. By contrast, although mobile firms can also bribe officials, they tend to invest fewer resources and personnel into doing so and do so less regularly. Moreover, while these firms have in-house accountants or outsource tax issues to external accountants, in contrast to fixed asset firms, they often do not bother to set up special departments or allocate particular personnel in charge of government-business relations.<sup>8</sup> In a comparative context, the Chinese case is

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<sup>7</sup> Interview with a financial manager in an electric power equipment company, Sichuan, November 2009. Earlier forms of bribing are often in cash; later ones can often take the forms of reimbursement for business travel and entertainment expenses (Cai, Fang and Xu, 2011).

<sup>8</sup> Interview with a manager of a start-up information technology Company, Zhejiang, March 2010.

representative of a broader set of countries with a lack of fiscal transparency, e.g., Brazil and India. In many of these cases, government-business collusion is vital for tax breaks at the local level with fiscal decentralization (Hollenbach and Silva, 2019; Marjit, Mukherjee and Mukherjee, 2000). Furthermore, even in centralized tax systems, such as Russia and Malaysia, tax collectors often seek bribes, and the “relational based” ties between firms and politicians have reduced effective tax rates (Safavian, Graham and Gonzalez-Vega, 2001; Adhikari, Derashid and Zhang, 2006).

We have assembled two large firm-level panel data sets to systematically investigate the relationship between capital mobility and taxation, including firm characteristics and actual tax payments. The first set of data come from the *China National Survey of Industrial Firms (CNSIF)* and cover the years 1995 to 2007. The survey was taken by the State Economic Census Center of the National Bureau of Statistics (NBS) and includes micro-level data of all above-scale industrial firms (with sales above 5 million RMB) across the entire jurisdictions of mainland China, covering about 2 million observations.<sup>9</sup> As a second data set, we use firm-level data from the *China Stock Market and Accounting Research Database (CSMAR)*, which includes all publicly listed firms from 2009 to 2017 (about 24, 000 observations).

The two data sets allow us to investigate the relationship between capital mobility and taxation with fine-grained firm-level data in China. The within-country research design accounts for potential confounding factors at the country level, such as differences due to institutional or legal environments. Additionally, both data sets allow us to calculate the effective tax rates based on taxes paid and profits earned, taking into account any tax rebates, tax breaks, or special rates.

We study two different periods in the two data sets to ensure policy consistency over the analyzed period. China implemented a fiscal reform in 1994 and a corporate income tax rate change in 2008. Based on data availability and to avoid major policy disruption, we analyze the national survey data from 1995 to 2007, after fiscal reform, and before the corporate tax

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<sup>9</sup> Although economic data in China are often subject to manipulation by local officials (Wallace, 2016), the CIES data used here are collected directly at the firm level.

changes. In contrast, we analyze the stock market data in the period after the corporate tax reform, i.e., from 2009 to 2017.<sup>10</sup> The two data sets complement each other in terms of time period covered and the sample of firms included. In addition, as we further explain below, we also use city-level variables as moderators in the capital mobility-taxation relationship: 1) firms' rating of relationships with tax bureau officials, and 2) cities' fiscal transparency scores.

## 4 Empirical Analysis

Before proceeding to our primary analysis, we first present descriptive statistics of our dependent variable of interest: effective income tax rates. Following the standard calculation for effective income tax rates in China (Liu and Martinez-Vazquez, 2014), we calculate each firm's yearly effective income tax rate by dividing the firm's paid corporate income taxes by its profits.<sup>11</sup> The corporate income tax is one of the primary revenue sources the Chinese government collects from firms. As noted above, crucial for our research design, local officials have the authority to grant tax breaks on corporate income taxes for a wide range of reasons (Xing, Cui and Qu, 2018; Cheng, Lin and Simmons, 2017).<sup>12</sup>

After calculating the effective income tax rate, we end up with 2, 024, 432 observations from 1995 to 2007 for 784, 267 unique firms in 477 cities across 40 industries (at two-digit coding) in the national survey data. The left plot in Figure 1 displays the density of effective income tax rates for values between zero and one.<sup>13</sup> We use the same method to plot

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<sup>10</sup> Before 2008, China's standard corporate income tax rate was 33%. Rates for domestic firms were 27% for those with profits between 30,000 and 100,000 and 18% for those below 30,000. Foreign-invested firms' rates were set to 15%. In 2008, the standard corporate income tax rate was changed to 25% for domestic and foreign firms. Given the time of its implementation, we do not include the year 2008 in either analysis. In both our data sets, we control firms' total profits and their ownership types.

<sup>11</sup> We drop observations for firm years with zero or negative profits. We do so for two reasons: 1) firms with zero or negative profits are pre-determined to pay zero taxes even without tax breaks according to Chinese Corporate Income Tax Law (see [http://www.gov.cn/flfg/2007-03/19/content\\_554243.htm](http://www.gov.cn/flfg/2007-03/19/content_554243.htm)); 2) zeros or negative values in the denominator create infinite or unreasonable effective tax rates.

<sup>12</sup> What we study here is different from tax evasion. A firm's corporate income tax is calculated by multiplying total profits with the given tax rate. Tax evasion means firms under report profits, but in this case the effective tax rate remains legitimate.

<sup>13</sup> There are 6, 260 observations fall out of this range and are not plotted here.

effective tax rates of firms in the stock market data in the right plot of Figure 1, which includes 22, 012 total observations from 3, 628 unique firms in 282 cities between 2009 and 2017.<sup>14</sup> The two densities have peaks at different values, which is unsurprising, given the different statutory corporate tax rates in the two time periods. Even though the National Tax Bureau set the standard statutory rates, Figure 1 shows a wide range in actual income tax rates paid by firms.

Since both data sets include extremely uncommon values on the effective income tax rate and a high number of zeros, we estimate statistical models on several transformations of the dependent variable, including the original scale. Our main results are based on our preferred measure: the winsorized effective income tax rate (*Winsorized*). Winsorizing the dependent variables ensures that our inference is not the result of extreme values in the dependent variable.<sup>15</sup> In addition, we create a binary variable that is coded zero for firms paying no income tax and one for those firms that pay positive income tax rates (*Binary*). Lastly, we estimate models on the original measure of effective tax rate (*Untransformed*).<sup>16</sup> Tables A.1 and A.2 in the Appendix show the summary statistics for all variables for the national firm survey and stock market data, respectively.

Figure 1: Density of the Effective Income Tax Rates  
Figure 1a & Figure 1b here

Note: The left plot shows the density of the effective income tax rate for the sample derived from the *China National Survey of Industrial Firms (CNSIF)* for 1995–2007. The right plot shows the density for the same variable calculated on data from the *China Stock Market and Accounting Research Database (CSMAR)* for 2009–2017. Both data sets contain a large number of firms who pay zero income tax, i.e., both densities spike at zero. At the same time, they display a large variation in effective income taxes paid by firms.

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<sup>14</sup> Again, 815 observations fall out of this range and are not plotted.

<sup>15</sup> Specifically, we set values below the 2.5th percentile and above the 97.5th percentile to the 2.5th or 97.5th percentile value.

<sup>16</sup> As a further robustness check we create a measure of logged total tax payments (*Tax Payment (ln)*). Our general results remain the same with this alternative measure, but we have omitted those tables from the Appendix for space reasons.

We measure our independent variable, capital mobility, as the ratio of mobile assets to the sum of mobile and fixed assets owned by each firm in a given year, i.e., capital mobility =  $\frac{\text{mobile assets}}{\text{fixed assets} + \text{mobile assets}}$ . We largely follow Jensen (2013) on this measurement, which defines capital mobility as the opposite of fixed assets. According to the definition of the dataset, mobile capital or mobile assets are “assets which can be cashed in or spent or consumed in an operating cycle of one year or over one year, including cash, all kinds of deposits, short-term investment, receivables, advance payment, stock, etc.” In contrast, fixed assets are defined as “the net value of fixed assets, clearance of fixed assets, project under construction, fixed assets losses in suspense.” The net value of fixed assets typically includes property, plants, and any equipment and tools associated with production and operation of the business.<sup>17</sup>

Given the observational nature of the data, we are concerned about potential omitted variables that might affect the relationship between capital mobility and effective tax rates. At the same time, for many of the potential confounders, the causal ordering is unclear, and their inclusion could potentially induce post-treatment bias (Montgomery, Nyhan and Torres, 2018). We, therefore, present a number of models with different sets of covariates and fixed effects included in the analysis.

We estimate a set of standard OLS models with different sets of fixed effects for both data sets. First, we estimate a pair of bivariate models with only our main variable of interest included: capital mobility. In the second set of models, we add several covariates which may influence the relationship between capital mobility and effective tax rates. We include logged firm profits and total assets, as companies with more mobile capital may also be more profitable, subjecting them to different statutory tax rates. Similarly, larger firms may be more mobile, profitable, and may potentially have more bargaining power with city bureaucracies. In the third set of models, we add covariates for the share of exports in firms’ sales, logged total employment, and indicators for state-owned or foreign-invested

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<sup>17</sup> See the definition of these concepts by National Statistics Bureau at <http://www.stats.gov.cn/tjsj/ndsj/2011/html/zbl4.htm>.

enterprises. More export-oriented firms could profit from Chinese export promotion, and exports may be related to capital mobility. Foreign firms have a lower statutory tax rate than domestic firms (state-owned or private), influencing their effective tax rates. Given that firms are nested within cities, we cluster standard errors at the city level.

We estimate a similar set of models with the same sets of fixed effects for the models based on the stock market data. First, we estimate bivariate models. Next, we control only for profits (logged) and assets (logged). Lastly, we estimate models with covariates for profits (logged), total assets (logged), research and development expenditure as the share of total operating costs (R&D intensity), logged expenditure on employees, as well as ownership type. Research and development expenditure may be related to capital mobility and has been promoted by the Chinese government through various industrial policies (Chen, 2018).

We estimate the three models with different covariates conditional on two sets of fixed effects. First, we only include fixed effects for years and the city in which the firm is located. We include year fixed effects in case of domestic or international events that influence firms' behavior or local economies. City fixed effects allow us to account for China's vast regional variation in implementing and adapting economic policies (Rithmire, 2014). Second, we add additional fixed effects for industry types (at the two-digit level industrial coding), as different industries are often subject to different tax policies. In total, we thus estimate six different models for each dependent variable and its transformations.

Given that we are interested in the influence of capital mobility, and most firms' level of capital mobility does not significantly change over time, our main models focus on the differences between firms within each city (and industry).<sup>18</sup> The exception is our later model leveraging changes before and after the anti-corruption campaign, where we include firm fixed effects similar to a difference-in-difference design.

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<sup>18</sup> Our main results are effectively unchanged if we include firm fixed effects. For space reasons, we have not included these results.

## 4.1 The Influence of Firm Mobility on Tax Rate

Table 1 shows the relationship between capital mobility and the winsorized effective income tax rate based on data from the national survey of industrial firms. Columns one and two present the estimates for the bivariate models with city/year and city/year/industry fixed effects, respectively. The coefficient remains effectively unchanged if we add controls for profits and total assets to these models (columns 3 & 4). Similarly, adding covariates for exports, employment, and ownership type does not change the coefficient estimate for capital mobility (columns 5 & 6). In all six models, the estimated coefficient on capital mobility is positive and statistically significant at the 1% level. Higher shares of mobile capital are associated with higher effective tax rates.

Table 1: Effective Income Tax Rate (National Survey)

	Winsorized					
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Capital Mobility</b>	<b>0.039**</b> (0.003)	<b>0.046**</b> (0.003)	<b>0.042**</b> (0.003)	<b>0.048**</b> (0.003)	<b>0.046**</b> (0.003)	<b>0.051**</b> (0.003)
Profits (ln)			-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Assets (ln)			0.007** (0.001)	0.006** (0.001)	0.008** (0.001)	0.007** (0.001)
Export Share					-0.000	0.000



					(0.000)	(0.000)
Employees (ln)					0.005**	0.006**
					(0.000)	(0.000)
Foreign Ownership					-0.098**	-
					(0.006)	0.095**
					(0.006)	(0.006)
State Ownership					-0.007*	-
					(0.003)	0.013**
					(0.003)	(0.003)
<hr/>						
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	No	Yes
N	2023967	2023967	2023961	2023961	1973136	1973136
Adj. R2	0.08	0.09	0.08	0.09	0.12	0.13

\* p < 0.05, \*\* p < 0.01

*Note:* Models estimated with standard errors clustered by city.

To interpret the results substantively, consider the model presented in column 5 in Table 1. Here we include fixed effects for city and year, as well as the full set of controls. Holding all other variables constant, an increase in capital mobility from the median value for firms in Shanghai in 2000 to the third quartile in that group (i.e., from 0.73 to 0.85) is associated with half percentage point rise in the effective income tax rate (or a 16% increase in the tax rate).

The results in Table 1 are based on the winsorized dependent variable. In the Appendix, we show the same models for the effective tax rates on the original scale (Table A.3) and the dichotomized dependent variable (Table A.4). Throughout all models and specifications of the dependent variable, we find a positive and statistically significant association between effective income taxes and capital mobility. With the untransformed dependent variable, the estimated coefficient on capital mobility is slightly larger. For the binary dependent variable, we consistently find evidence that more mobile firms are more likely to pay a positive effective income tax rate.

In addition to the city and year fixed effects, we estimate models with the full set of controls for each of the three dependent variables but with fixed effects for the interactions between city-year or city-year-industry. Table A.6 shows the results when we add fixed effects for the city-year interaction, in the models presented in Table A.7 we include fixed effects for the city-year-industry interaction. Again, the coefficient of capital mobility is effectively unchanged: Capital mobility has a positive association with effective income tax rates.<sup>19</sup> Table A.5 shows the results when we estimate our main models (as in Table 1) as random instead of fixed effects models, results are virtually unchanged.

Next, we estimate a similar set of models using the stock market data. Table 2 shows the estimated coefficients for capital mobility with the winsorized effective income tax rate from the stock market data as our dependent variable. As with the data from the national survey, the coefficient for capital mobility is generally positive in all six models.<sup>20</sup> However, the estimated coefficient is quite small and rounds to zero in the bivariate model with only city and year fixed effects (column 1).

Again, we also estimate these models on the untransformed and dichotomized effective income tax rate. In models with the untransformed dependent variable, the coefficient on capital mobility is larger but estimated with substantially more uncertainty and not statistically significant (Table A.8). This difference in results can be traced to only about 170 of the almost 23, 000 observations, with very extreme and unrealistic effective income tax rates. With the dichotomized dependent variable, our main finding remains: firms with more mobile capital are more likely to pay positive income tax rates (Table A.9). Our main finding of a positive relationship remains in models with fixed effects for the interaction between city and year (Table A.11), when we include fixed effects for the city-year-industry interaction (Table A.12), or if we estimate models with random intercepts instead of fixed effects (Table

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<sup>19</sup> Our results remain if we estimate models with the winsorized dependent variable on yearly cross-sections and include city fixed effects. Capital mobility is positively related to effective income tax rates for all years in the sample. Due to space constraints, we have omitted these results.

<sup>20</sup> Note that the stock market data is based on 2009-2017, when China erased the different corporate tax rates between foreign and domestic firms.

A.10). In general, results are quite consistent, with positive coefficient estimates on capital mobility throughout.

Table 2: Effective Income Tax Rate (Stock Market Data)

	Winsorized					
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Capital Mobility</b>	<b>0.001</b> <b>(0.009)</b>	<b>0.017</b> <b>(0.009)</b>	<b>0.031**</b> <b>(0.008)</b>	<b>0.045**</b> <b>(0.008)</b>	<b>0.036**</b> <b>(0.009)</b>	<b>0.049**</b> <b>(0.009)</b>
Profits (ln)			-0.021** (0.002)	-0.022** (0.002)	-0.019** (0.002)	- 0.022** (0.002)
Assets (ln)			0.035** (0.002)	0.029** (0.002)	0.034** (0.003)	0.028** (0.003)
R&D Intensity					-0.136** (0.033)	-0.048 (0.030)
Employee Benefits (ln)					-0.005** (0.001)	-0.000 (0.001)
Foreign Ownership					0.012 (0.013)	0.003 (0.011)
State Ownership					0.018* (0.008)	0.013* (0.006)
Private Ownership					-0.003 (0.006)	0.002 (0.005)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	No	Yes
N	20945	20945	20945	20945	15570	15570
Adj. R2	0.04	0.15	0.09	0.18	0.10	0.18

\* p < 0.05, \*\* p < 0.01

*Note:* Models estimated with standard errors clustered by city.

## 4.2 State-Business Collusion as a Moderator

In the previous section, we examined the relationship between capital mobility and effective income tax rates using two different samples of firm-level data from China. Contrary to conventional wisdom, we find a positive association between capital mobility and effective tax rates, which challenges the standard assumption that mobile firms generally have advantages over fixed asset firms. Instead, our results suggest a more complicated reality about the relationship between mobility and taxation. As discussed above, a reason for this finding is the strategic interactions between firms and governments. Firms with more fixed capital tend to have advantages under the conditions of constant government-business collusion. In this section, we further untangle the mechanisms using qualitative and quantitative evidence.

Qualitative evidence suggests that firms with a lower degree of mobility, i.e., a higher proportion of fixed assets, are significantly more likely to invest in political connections to acquire tax breaks. Moreover, these firms are more likely to be the targets of public officials seeking gifts. Many of these businesses rely on natural resource extraction, such as coal, petroleum, power generation, and mining, where the location of these resources is geographically constraining and where firms have to interact with government officials intensively to gain access to these resources and land. For example, a coal mining company in the Tongliang county of Chongqing city with a fixed asset share of 85%, was caught bribing a local official with 147 thousand rmb. Before the arrest of the official and the firm's closure, the company enjoyed an average income tax rate of 10% since its establishment in 2005.<sup>21</sup> Similarly, a steel company in the Liaocheng City of Shandong Province, with a fixed asset share of 83%, had been paying an effective income tax rate of about three percent. Nevertheless, the company was on the list of "the top 100 taxpaying companies" in

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<sup>21</sup> Authors' calculation based on China National Survey of Industrial Firms. Also see the report by *China Legal Daily* at [http://www.legaldaily.com.cn/index/content/2012-05/25/content\\_3598724.htm?node=20908](http://www.legaldaily.com.cn/index/content/2012-05/25/content_3598724.htm?node=20908).

Liaocheng.<sup>22</sup> Liaocheng has recently gained unwanted attention due to an investigation into corruption, money embezzlement, and suicide by public officials.<sup>23</sup>

Other avenues for firms to gain influence exist as well. Since its establishment in 1997, a real estate and software company in Chengdu, Sichuan had successfully received tax breaks. In the mid-2000s, however, a newly appointed official denied the firm's qualification for the tax breaks based on the policy's restrictions concerning industry type. After denial of the tax benefit, a previous colleague of the official was given a well-paid position in the company. The former official soon informed his old colleague in government that the firm's CEO was a member of the budget committee in the local People's Congress, who could influence the budget allocated to the government official's office. In the end, the firm was once again approved for the tax break policy.<sup>24</sup>

Firms with higher capital mobility are not constrained to particular industries. They range from garments, shoes, metal processing to auto parts and consumer electronics. These firms have a higher ability to relocate. In their development, mobile firms are less tied down to local resources such as mining and land and hence less vulnerable and dependent on local governments. They, therefore, tend to have weaker incentives to invest resources in bribing, corruption, and networking with local governments. Anticipating that they may move, such investment may not be worth it in the long run. Similarly, given that government officials suspect that businesses may not remain in the locality in the long run, they put less value in relationships with more mobile firms. Similarly, they tend to take fewer risks engaging in collusion where bribes are exchanged for tax breaks. Not surprisingly, officials had not heard of or were much less familiar with more mobile firms in their jurisdiction but knew most fixed asset firms quite well.<sup>25</sup>

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<sup>22</sup> Authors' calculation, also see records at the Tax Bureau of Liaocheng [http://liaocheng.sd-n-tax.gov.cn/art/2007/11/6/art\\_22992\\_49102.html](http://liaocheng.sd-n-tax.gov.cn/art/2007/11/6/art_22992_49102.html).

<sup>23</sup> See for example the announcement by Shandong Central Commission for Discipline Inspection [http://www.sdjj.gov.cn/tbbg/201607/t20160728\\_11244711.htm](http://www.sdjj.gov.cn/tbbg/201607/t20160728_11244711.htm).

<sup>24</sup> Interviews with the manager and financial staff of a real estate and software company, Sichuan, January 2009 and May 2019.

<sup>25</sup> Interview with officials in the Bureau of Finance and Bureau of Commerce, Jiangsu, April 2010.

The qualitative evidence brought to bear here suggests a mechanism that links the capital mobility/taxation relationship to the dynamics of firm-government strategic interactions. Although each set of the firm-level data does not allow us to test the proposition directly, we can leverage the differences across Chinese cities and between different periods to further investigate the potential mechanism.

First, to examine the potential role of political connections given the estimated relationship in the China industrial firm survey (*CNSIF*), we use data from the 2005 World Bank Investment Climate Survey ([Enterprise Analysis Unit - World Bank Group, 2005](#)). The survey investigated various aspects of business-government relations and was conducted across a sample of firms in 123 cities in China. The survey included questions about firms' interaction with government agencies. We use the firms' survey responses about their perceived relationship with tax bureaus as an indicator for political connections at the city level, i.e., better relationships are indicative of better political connections.

We use the survey responses to create city-level measures of government-business relationships for the 123 cities, which we merge to the firm survey data for 2004 based on firm locations. While imperfect, we would prefer a firm-level measure of corruption; this allows us to investigate differences in firm behavior based on city averages. Specifically, we aim to proxy the city-level environment for corruption or government-business collusion with the measure of firm-tax bureau relationships. If our conjecture about the link between capital mobility, corruption, and tax rates is correct, then we should observe this relationship play out differently depending on the city context. We expect the positive relationship between mobility and tax rates to be particularly pronounced in cities with more prevalent government-business collusion.

As a first indication that this is indeed the case, we plot the bivariate association between firm-level capital mobility and effective tax rates for two types of cities in Figure 2. In cities where the average relationship between firms and tax bureaus is below (i.e., worse than) the median of the tax bureau relationship variable, the bivariate association is plotted in grey. In contrast, for firms in cities where the average relationship is above the median, the bivariate relationship is plotted in black. As the figure suggests, the relationship between tax rates and

mobility is stronger in cities where government-business relations are better (more collusion) than the median. In cities with worse government business relationships, the linear relationship between mobility and tax rates is close to zero.

To estimate this potential mechanism using regression analysis, we regress firms' effective income tax rates on our independent variable of interest (capital mobility) interacted with the city level measure of the relationship between firms and tax bureaus. We again include the three sets of covariates. In addition, models presented in columns 2, 4, and 6 include city fixed effects, which results in the constituent term for the tax bureau relationship to drop out. As Table 3 shows, we find evidence in line with the proposed explanation. First, the constituent terms are in the expected direction. Capital mobility has a negative association with tax rates in cities where relations with the tax bureau are worst, i.e., when government-business collusion is low, more mobile firms pay lower taxes. At the same time, the constituent term of our proxy for corruption environment is negative. Most importantly, in line with the proposed explanation, we find that the interaction between firm-level capital mobility and city-level firm-tax bureau relationship is positive and statistically significant. Figure 3 shows the marginal effect of



Table 3: Effective Income Tax Rate – Relationship w. Tax Bureaus (National Survey)

	Winsorized					
	(1)	(2)	(3)	(4)	(5)	(6)
Capital Mobility	-0.126 (0.067)	-0.098** (0.036)	-0.127* (0.064)	-0.100** (0.037)	-0.110 (0.058)	-0.046 (0.042)
Relationship w. Tax Bureau	-0.093** (0.015)		-0.089** (0.016)		-0.091** (0.015)	
<b>Cap. Mobility × Tax Bureau</b>	<b>0.045*</b> <b>(0.019)</b>	<b>0.036**</b> <b>(0.010)</b>	<b>0.044*</b> <b>(0.018)</b>	<b>0.036**</b> <b>(0.010)</b>	<b>0.044**</b> <b>(0.016)</b>	<b>0.023*</b> <b>(0.012)</b>
Profits (ln)			-0.009** (0.002)	-0.009** (0.001)	-0.007** (0.001)	- 0.007** (0.001)
Assets (ln)			-0.001 (0.002)	0.003 (0.002)	0.004** (0.001)	0.004** (0.001)
Exports (ln)					0.012* (0.005)	-0.003 (0.004)
Employees (ln)					0.005* (0.002)	0.009** (0.001)
Foreign Ownership					-0.122** (0.008)	- 0.114** (0.009)
State Ownership					-0.039**	- 0.023**

					(0.007)	(0.004)
City FE	No	Yes	No	Yes	No	Yes
N	165423	165423	165423	165423	165168	165168
Adj. R2	0.01	0.09	0.02	0.10	0.11	0.17

\* p < 0.05, \*\* p < 0.01

*Note:* Models estimated with standard errors clustered by city.

Figure 2: Relationship between Mobility and Income Tax Rates Across Cities

**Figure 2 here**

Note: This figure shows the relationship between city average capital mobility and effective tax rates for cities with below and above median firm-tax bureau relationships. The positive association between mobility and tax rates is only present in cities with above median government-business relationships (higher collusion).

capital mobility at different levels of city-level firm-tax bureau relationships (based on column 3 in Table 3). More mobile firms pay higher effective tax rates than firms with more fixed assets in cities with better firm-tax bureau relationships (more collusion). In other words, firms with more fixed assets pay lower taxes but only in cities with the potential for political connections. This finding holds true across the full set of controls and if we include city fixed effect, i.e., when analyzing only within city variation. In the Appendix, we present results for models with city and industry fixed effects (Table A.14), fixed effects for the city-industry interaction (Table A.15), and with random intercepts (Table A.13). Overall, the results are quite similar; the interaction is always estimated to be positive.<sup>26</sup>

Figure 3: Marginal Effect of Capital Mobility

**Figure 3 here**

Note: This figure shows the marginal effect of capital mobility conditional on the city average score of firm-tax bureau relationships. As the relationship between firms and the tax bureau becomes cozier (higher scores), the estimated effect of capital mobility is increasingly positive.

### 4.3 Anti-Corruption Campaign as a Tipping Point

In November 2012, President Xi Jinping took power in China and subsequently launched a major anti-corruption campaign in 2013, which continues to this day. The campaign aims to curb rampant corruption and government-business collusion in China (Manion, 2016). Along with the campaign, in 2014, the State Council of the central government issued a “Notice on Clearing and Regulating Taxation and Other Preferential Policies,” which started a crackdown

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<sup>26</sup> We have run the same regression models but using time spent with tax bureaus as the proxy for corruption potential. While we find a positive interaction effect, the estimate is not significant when standard errors are clustered at the city level. For space reasons, we have omitted those results.

on local governments offering tax breaks based on government-business collusion. Any such tax break would now have to be inspected and approved by the State Council of the central state ([The State Council of China, 2014](#)). However, the central government later provided a grace period to fend off potential lawsuits by businesses ([The State Council of China, 2015](#)). The crackdown reduced the issuance of illegitimate tax breaks based on government-business connections or bribery ([Ye, 2017](#)). As a result, many bureaucrats started avoiding direct contact with business owners. The frequency with which public officials would attend banquets with business leaders, another avenue for gifts or money to be presented to public officials, sharply declined. Overall, the campaign significantly changed how governments and businesses interact ([Ang, 2020](#)).

We use this anti-corruption campaign as a potential shock to the system of corruption. Suppose the prevalence of state-business collusion and bribery is crucial in the relationship between capital mobility and firm taxation. In that case, the relationship should change with the anti-corruption campaign. To test this proposition, we use the stock market data and estimate the same models as above but interact our independent variables with an indicator variable that is zero for the period from 2009 to 2013 (including) and one for years starting 2014 and afterward.

Table 4 presents the results regarding the interaction of capital mobility with the post-2013 dummy when estimated on the winsorized dependent variable. For these models estimating the effect of mobility in the pre- and post-anti-corruption campaign periods, we alternatively include city and year (columns 1, 3, 5) or firm and year fixed effects (columns 2, 4, 6). In models with firm and year fixed effects, constant firm-level differences are absorbed, and we can estimate how firms are affected differently before and after the start of the anti-corruption campaign (similar to a difference-in-differences design).

The positive and significant estimate for the constituent term of capital mobility indicates the positive association in the period until 2013. After the anti-corruption campaign went into full effect in 2014, the relationship between capital mobility and effective income taxation is substantially weaker. Depending on the specific model, the estimated relationship is halved for the period after 2013. In general, these results hold across all three of our

dependent variables.<sup>27</sup> The positive relationship between capital mobility and tax rates disappears after the Chinese government cracked down on local corruption and government-business collusion. The advantage for firms with higher shares of fixed assets is much smaller after 2013. These results, especially where we include firm fixed effects, are quite strong evidence for the idea that the anti-corruption campaign significantly weakened the mechanism by which fixed-asset firms gained an advantage over mobile firms.<sup>28</sup> In Table A.18 in the Appendix, we present the results when we interact our main independent variable with the year fixed effects, i.e., estimating year-specific effects for capital mobility. Alternatively, we interact capital mobility and all covariates with the year fixed effects. To better visualize the results, Figure 4 presents the coefficient estimates for capital mobility from model 4 in Table A.18. As one can see, the relationship between capital mobility and effective tax rates becomes weaker over time. In line with the initial grace period mentioned above, the relationship first weakens and turns negative in 2016. We do find a significant positive effect in 2014, likely due to the fact that a grace period was offered. Thus, firms and local officials rushed to get tax cuts done before the end of the grace period.

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<sup>27</sup> The estimates of the post 2013 interaction effect are generally robust to using the untransformed effective rate (Table A.16) or the binary coding (Table A.17) as the dependent variable. In some of the models without any control variables, we do find insignificant interaction effects.

<sup>28</sup> These results generally remain the same if we interact all covariates with the pre-/post-2013 interaction. Due to space constraints, we have not included those results.

Table 4: Effective Income Tax Rate (Stock Market Data) – Pre-/Post-2013

	Winsorized					
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Capital Mobility</b>	<b>0.010</b> <b>(0.010)</b>	<b>0.033**</b> <b>(0.013)</b>	<b>0.043**</b> <b>(0.009)</b>	<b>0.062**</b> <b>(0.012)</b>	<b>0.046**</b> <b>(0.009)</b>	<b>0.047**</b> <b>(0.013)</b>
<b>Capital Mobility × post 2013</b>	<b>-0.019*</b> <b>(0.009)</b>	<b>-0.016</b> <b>(0.009)</b>	<b>-0.024**</b> <b>(0.009)</b>	<b>-0.026**</b> <b>(0.009)</b>	<b>-0.028*</b> <b>(0.012)</b>	<b>-0.025*</b> <b>(0.010)</b>
Profits (ln)			-0.023** (0.002)	-0.022** (0.003)	-0.022** (0.002)	- 0.022** (0.003)
Profits (ln) × post 2013			0.002 (0.003)	-0.000 (0.003)	0.006 (0.004)	0.004 (0.004)
Assets (ln)			0.037** (0.003)	0.031** (0.004)	0.037** (0.003)	0.034** (0.005)
Assets (ln) × post 2013			-0.003 (0.003)	0.001 (0.003)	-0.005 (0.004)	-0.001 (0.004)
R&D Intensity					-0.190** (0.030)	-0.132* (0.061)
R&D Intensity × post 2013					0.098** (0.036)	0.035 (0.055)
Employee Benefits (ln)					-0.004** (0.001)	-0.003 (0.002)
Employee Benefits (ln) × post 2013					-0.003 (0.001)	-0.003* (0.002)
Foreign Ownership					0.007 (0.012)	0.011 (0.021)
Foreign Ownership × post 2013					0.011 (0.016)	0.008 (0.016)
State Ownership					0.015 (0.009)	-0.001 (0.013)
State Ownership × post 2013					0.007 (0.009)	0.006 (0.010)

Private Ownership					-0.002	0.008
					(0.007)	(0.012)
Private Ownership × post 2013					-0.003	-0.005
					(0.009)	(0.009)
City FE	Yes	No	Yes	No	Yes	No
Firm FE	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	20945	20945	20945	20945	15570	15570
Adj. R2	0.04	0.34	0.09	0.36	0.10	0.38

\* p < 0.05, \*\* p < 0.01

*Note:* Models estimated with standard errors clustered by city.

Figure 4: Coefficient Estimates for Capital Mobility by Year  
**Figure 4 here**

Note: This figure shows the relationship between capital mobility and effective tax rates over time. The relationship weakens after the beginning of the anti-corruption campaign and is estimated to be negative in 2016, though statistically insignificant.

As the last test of the potential mechanism outlined above, we use a city-level measure of fiscal transparency as a moderator of the capital mobility-taxation relationship. As part of Xi's effort to establish a more efficient market and cleaning up the bureaucracy, the Third Plenum of the 18th Party Congress implemented the decision to increase fiscal transparency in cities nationwide ([China CCP Central Committee, 2013](#)). Tax rates should be based strictly on rules and laws rather than personal relations in more transparent cities. If our argument is correct, we should see less of a positive relationship between mobility and effective tax rates in more fiscally transparent cities. Additionally, and in accordance with the findings above, we should expect the interactive relationship between fiscal capacity and mobility to matter less in later years as the anti-corruption crackdown takes effect. We test this

argument by merging the city fiscal transparency index from the reports published by Tsinghua University (Yu, 2018) to the stock market data from 2014 to 2018.<sup>29</sup>

As Table 5 shows, in line with our expectations, we find a positive and significant effect of capital mobility for 2014, while the interaction with fiscal transparency is negative and significant. Figure 5 shows the marginal effect of capital mobility for 2014. As one can see, the positive relationship of capital mobility with effective tax rates decreases with higher levels of fiscal transparency. Similar results are true for 2015, but the relationship disappears in 2016 and 2017. At this point, the anti-corruption campaign had taken full effect, and firms and officials nationwide were increasingly less likely to collude. Tables A.19 and A.20 in the Appendix show the relationship when modeled as panel models with fixed or random effects. The results are similar to those for 2014 but slightly weaker. Overall, these results are additional evidence in favor of our argument. Before the anti-corruption campaign took full effect, the positive relationship between capital mobility and effective tax rates was especially present in cities with low fiscal transparency. In other words, the increase of transparency alleviated the mobility-tax relationship we observe in China. These results are particularly notable in combination with the results from the post-anti-corruption campaign period.

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<sup>29</sup> We used the final scores of fiscal transparency for each city and re-scaled each years' full score to 100. For more information, see <http://www.sppm.tsinghua.edu.cn/xycbw/yjbg/>.



Table 5: Interaction with Fiscal Transparency (Stock Market Data)

	Winsorized							
	2014	2014	2015	2015	2016	2016	2017	2017
Capital Mobility	0.310** (0.097)	0.362** (0.095)	0.196 (0.101)	0.251* (0.106)	-0.198 (0.247)	-0.322 (0.287)	0.263 (0.248)	0.679 (0.395)
Fiscal Transparency (ln)	0.034* (0.016)		0.019 (0.016)		-0.025 (0.033)		0.042 (0.036)	
<b>Capital Mobility × Transparency</b>	<b>-0.071** (0.025)</b>	<b>-0.083** (0.025)</b>	<b>-0.043 (0.024)</b>	<b>-0.056* (0.025)</b>	<b>0.040 (0.059)</b>	<b>0.069 (0.068)</b>	<b>-0.076 (0.060)</b>	<b>-0.170 (0.093)</b>
Profits (ln)	-0.035** (0.003)	-0.036** (0.003)	-0.043** (0.003)	-0.043** (0.004)	-0.035** (0.008)	-0.033** (0.009)	-0.045** (0.008)	- 0.043** (0.007)
Assets (ln)	0.051** (0.004)	0.053** (0.004)	0.051** (0.004)	0.051** (0.004)	0.044** (0.008)	0.040** (0.010)	0.045** (0.008)	0.042** (0.008)
R&D Intensity	-0.088 (0.076)	-0.058 (0.078)	-0.186* (0.075)	-0.175* (0.069)	-0.029 (0.082)	-0.020 (0.103)	-0.118 (0.051)	-0.122 (0.063)
Employee Benefits (ln)	-0.005* (0.002)	-0.005* (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.005 (0.003)	-0.002 (0.004)	0.001 (0.003)	0.003 (0.004)
Ownership Other	-0.349** (0.073)		-0.190* (0.070)	-0.026 (0.023)	0.091 (0.153)		-0.137 (0.163)	
Foreign Ownership	-0.309** (0.071)	0.041* (0.017)	-0.154* (0.070)		0.071 (0.153)	-0.029 (0.034)	-0.129 (0.159)	0.020 (0.039)
State Ownership	-0.325** (0.073)	0.031* (0.011)	-0.163* (0.068)	0.002 (0.020)	0.070 (0.155)	-0.019 (0.019)	-0.143 (0.164)	0.003 (0.016)
Private Ownership	-0.342** (0.071)	0.011 (0.012)	-0.190* (0.068)	-0.025 (0.019)	0.061 (0.151)	-0.029 (0.021)	-0.143 (0.161)	0.002 (0.012)
City FE	No	Yes	No	Yes	No	Yes	No	Yes
Year Analyzed	2014	2014	2015	2015	2016	2016	2017	2017
N	2142	2142	2237	2237	774	774	610	610
Adj. R2	0.78	0.79	0.79	0.80	0.76	0.78	0.79	0.79

\* p &lt; 0.05, \*\* p &lt; 0.01

Note: Models estimate d with standard errors clustered by city.

Figure 5: Marginal Effect of Capital Mobility by Fiscal Transparency in 2014

**Figure 5 here**

Note: This figure shows the marginal effect of capital mobility conditional on the city's fiscal transparency score for 2014. As fiscal transparency increases (higher score), the positive relationship between capital mobility and effective tax rates disappears.

## 5 Conclusion

In this paper, we investigate the relationship between capital mobility and taxation in China. The case of China allows us to examine the capital mobility-taxation relationship in an important country with local tax competition, holding many other covariates constant. Additionally, China is representative of a larger set of cases where effective tax rates at the local level typically vary widely from the standard rates, as firms and government officials collude to reduce tax rates.

Using two sets of firm-level panel data over two time periods, we show that firms with a higher level of mobility pay higher effective tax rates than firms with larger proportions of fixed assets. Our findings suggest that the relationship between asset mobility and effective tax rates depends highly on the context of strategic interactions between governments and firms. The conventional wisdom that capital mobility lowers taxes generally assumes state-business bargaining under low levels of bribery and collusion. In an environment that lacks fiscal transparency and where tax breaks can be offered in exchange for other economic benefits, government-business collusion can be an essential path for firms to reduce taxes. Even within the same country, a more corrupt environment with a cozier relationship between government and business can change the capital mobility-taxation nexus.

Our findings reveal the limitations of the current literature on tax policies and shed light on potential directions for future research. On the demand side of tax breaks, while firms prefer paying lower taxes, one has to take the cost of such choices in less transparent environments into consideration. High capital mobility may weaken a firm's incentives and

ability to build a stronger relationship with government officials. In contrast, firms with higher proportions of fixed assets may have stronger incentives to invest in building connections due to their vulnerability to bribe seeking, the sunk cost of fixed assets, and the long-term benefits of such investment. On the supply side, our finding suggests that bureaucrats may be more likely to offer lower tax rates and seek bribes when interacting with less mobile firms because of the vulnerability and commitment of these firms in the long term.

Finally, one could see investments in political connections as another type of taxation. We might consider the sum of investments in government relationships plus income taxes as the total tax bill. Given the scope of this paper, we are unable to know how high the costs of such investments are and how such a “total tax bill” differs between fixed asset firms and more mobile firms. However, it seems unlikely that in the long-run investment in political connections for individual firms is higher than paying the full tax bill. Examining this trade-off and cost differentials more closely will be an important avenue for future research.

We believe our results underline the importance of using firm-level data to investigate these questions. Analyzing firm-level effective tax rates within a single country allows for a more fine-grained investigation of the relationship between mobility and taxation, as well as the varying conditions that moderate such a relationship. Therefore, it is worth replicating our efforts in other countries, especially developing countries where state-business collusion is prevalent.

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