Capital Mobility & Taxation in Non-OECD Countries – Evidence from China*

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Abstract

Do more mobile firms pay lower taxes? A large literature contends that higher capital mobility increases firms' bargaining power against the state, thereby lowering their taxes. Much of this work, however, is based on country average statutory tax rates in OECD countries. We explore this relationship at the firm level in China. Using two comprehensive panel data sets with over 600,000 Chinese firms, we find that firms with higher shares of mobile capital, in fact, pay higher tax rates. We then explore potential explanations for this counter-intuitive finding. We present both qualitative and quantitative evidence that collusion between local governments and businesses can partially explain the positive relationship between capital mobility and tax rates. Firms with more fixed assets are more likely to invest in connections with local officials and thereby obtain more tax breaks compared to their mobile counterparts.

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1 Introduction

Over the last half-century, political economists have grappled with the idea that capitalist countries have limited power to tax corporations, with capital mobility being a crucial limiting factor. Capitalist societies depend on private investment decisions to achieve future growth, and thus will always have incentives to pursue policies that keep capital from divesting. Even in closed economies, the state, therefore, is *structurally dependent on capital* (Przeworski and Wallerstein, 1988). With increasing capital mobility, firms can threaten to move across jurisdictions, increasing their bargaining power over governments, leading to downward pressures on tax rates. Based on standard theoretical arguments, the expectation is that capital mobility lowers corporate tax rates, especially for more mobile firms.

Much of the work investigating the relationship between capital mobility and tax rates, however, has focused on highly developed economies and states, e.g., OECD countries. Moreover, many of the findings are based on country averages and statutory tax rates. Departing from this earlier work, we investigate whether the proposed relationship may be different in less developed countries. More specifically, we use geographically disaggregated panel data from China, the largest developing country in the world, where local bureaucrats have high levels of autonomy when it comes to providing tax breaks. Contrary to conventional expectation, we find that firms that have higher shares of mobile capital, in fact, pay higher effective tax rates compared to firms that are more fixed-asset intensive. We contend that this positive relationship between mobility and tax rates may be partly explained by government-business collusion and bribery. These factors are likely driving forces behind tax breaks in emerging economies like China, where property rights are not completely secure. Firms instead rely

on connections with local government officials to receive preferential treatment. Moreover, firms with more fixed assets, we argue, are more likely to invest resources into building such connections compared to more mobile firms. This difference in firm behavior partly explains the surprising relationship between mobility and effective tax rates.

We investigate the general relationship between capital mobility and effective income tax rates using two different data sources from China. First, we analyze data from the *China National Survey of Industrial Firms* containing effective tax rates for over $600,000$ firms in 385 Chinese cities between 1996 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 mobility and tax rates on two different samples of firms, as well as two unique time periods. Moreover, both data sets contain firm level data on assets types as well as actual yearly tax payments, giving us the opportunity to estimate relationships based on firm level observations instead of country averages.

After establishing that the overall relationship between capital mobility and effective tax rates is in fact positive in China, we empirically explore a potential explanation for our findings. We show that part of the positive relationship may be explained by less mobile firms investing more in building connections with the government. First, using the national firm survey data, we demonstrate that more mobile firms are less likely to reside in cities with more positive government-business relations. Second, firms in cities with more cozy government-business relations pay lower taxes on average. We show that city level government-business relations is a mediator in the relationship between mobility and tax rates. Additionally, using the panel data from 2009 to 2017, we present evidence that the

positive relationship between mobility and tax rates is only present prior to a crack down on corruption and bribery in China under President Xi Jinping. After the anti-corruption campaign was launched in 2012, the estimated relationship is significantly weaker. We also provide qualitative evidence in line with the proposed mechanism.

In this paper, we make several important empirical contributions. First, we take a relatively established theory outside its traditional testing grounds, as previous work on corporate taxation and capital mobility has largely focused on OECD countries and democracies. Second, much of this work has relied on cross-national data (i.e., country averages) and statutory tax rates, which can mask key relationships among variables and are often weak predictors of actual taxes paid. Instead, we are able to provide evidence from firm level data, where capital mobility and tax rates vary by firm across different Chinese cities and years. Focusing on within-country data also allows us to hold constant other potential confounding factors, such as the political system. Lastly, the fine grained data on each firm's actual tax payments allows us to calculate a yearly effective tax rate for each firm instead of relying on data on statutory tax rates. Our findings suggest that the relationship between capital mobility and taxation can be quite different in less developed countries where institutions for the protection of property rights are weaker. Our research suggests that this area of research, and the motivations driving tax incentives in particular, warrants further investigation, especially in non-OECD countries such as China.

2 Capital Mobility and Taxation

Much theoretical work suggests that capital mobility ought to lower taxes on capital. While rulers or states may be revenue maximizers (e.g., Levi, 1989; Olson, 1993), capital mobility should constrain the state's extractive ability. To put simply, firms with mobile capital can choose to *exit* in the face of higher tax rates, thus exerting pressure to lower effective tax rates (Hirschman, 1970). Not surprisingly, standard economic theory implies that capital mobility changes 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). Moreover, competition for capital may not only lead to inefficiently low tax rates but can also increase business-friendly spending (Keen and Marchand, 1997).[1]

Even though this theoretical expectation is well known and straightforward, empirical results are somewhat mixed. On the one hand, some research suggests that capital mobility has indeed shifted taxation from capital to labor, generating distributional consequences by lowering the effective tax rates on capital and raising taxes on labor (Garrett, 1995; Rodrik, 1997; Bretschger and Hettich, 2002). In fact, statutory corporate tax rates have continuously fallen in OECD countries since the mid 1980s (Devereux, Griffith and Klemm, 2002). On the other hand, Quinn (1997) suggests that capital account liberalization is actually associated with higher corporate income taxation. Jensen (2012) and many other studies likewise question the supposed effect of globalization on tax competition. Their works find little support for a race to the bottom with respect to tax rates (Hays, 2003; Basinger

[1]Research shows that the use of tax incentives to lure businesses are often not effective, especially in raising overall long run economic growth (Prillaman and Meier, 2014). Nevertheless, governments continue to use them.

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 endowments, regime types, and level of economic development. Cai and Treisman (2005) argue that competition to attract mobile capital must not always constrain governments and instead results in a divergence of government policies between countries with better resource endowments and higher human capital and those worse off. Li (2006, 2016); 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. Lastly, while capital mobility may lower firms' taxes in OECD countries, in non-OECD countries, the reverse seems to be true: here Jensen (2013) finds a positive association.

What can explain these differences in the relationship between capital mobility and business taxation across countries and various regimes? One way to increase our knowledge in this area, is to better utilize fine grained, micro-level data at the firm level and calculate actual effective tax rates, instead of relying on statutory tax rates that are often unrelated to actual taxes paid. Jensen and Malesky (2018), for example, have used micro-level data from firms located in Vietnamese provinces to better understand when and why politicians use tax incentives to attract businesses in a one-party autocracy.

In taking a more fine-grained approach, a growing body of work draws attention to government-business collusion and corruption as a possible explanation for differences between OECD and developing countries. First, evidence based on China, Vietnam, and Uganda suggests that fixed assets are associated with higher levels of bribing and corruption. With higher sunk costs in a particular locality, firms with fixed assets are less likely

to move or shut down. They are far more willing to engage in corruption, and favor the establishment of long term, stable channel of corruption and bribing in order to offset their sunk cost (Zhu and Deng, 2018; Bai et al., 2019; Zhu and Shi, 2019). Higher capital mobility, in contrast, is associated with firms paying fewer bribes to public officials (Gauthier and Goyette, 2014). Second, a number of studies have shown that political connections and government-business collusion can influence economic outcomes (Truex, 2014; Wang, 2015; Chen and Kung, 2019; Fan, Wong and Zhang, 2007; Zhang, Marquis and Qiao, 2016). In particular, higher corruption and political connections often decrease taxation, as tax collectors and tax payers collude to the government's detriment (Timmons and Garfias, 2015; Tanzi and Davoodi, 2000; Adhikari, Derashid and Zhang, 2006; Hollenbach and Silva, 2019).

Taking this insight to economies like China, where a weak rule of law often does not ensure the protection of property rights, government-business relations at the local level are especially important (Hou, 2019). Businesses often resort to bribing public officials in order to seek protection (or as an alternative way to obtain *de facto* property rights) (Tsai, 2007; Dickson, 2008; Zhu and Shi, 2019). Local officials, on the other hand, can use tax incentives as resources to build and maintain connections with firms. Within such a context, firms that possess a higher proportion of fixed assets are by definition more bound to their current locality. They have, therefore, stronger motivations to invest resources into growing and maintaining political connections, for example, via bribing local officials (e.g., in tax bureaus). When tax collection is decentralized to local bureaucrats, as in many developing countries, political connections can also increase firms' awareness of and chances to receive favorable tax breaks. More mobile firms, on the other hand, may forgo investments in building political connections, as they are less constrained by their current location. If

fixed assets indeed raise the level of corruption and bribery, and corruption and political connections are a channel for firms to lower their taxes, then we might expect that firms with higher proportion of fixed assets are more likely to receive tax breaks, whereas firms with more mobile assets are likely to pay higher taxes.

Building on these insights, we aim to further contribute to this growing literature on the relationship between capital mobility and taxation in developing countries. To do so, we utilize comprehensive firm level data in China, a country with high fiscal decentralization and subnational tax competition. In the following section, we empirically investigate the relationship between firms' capital mobility and their effective income tax rates using two separate data sets, showing a consistent positive relationship between the two. We then seek to unravel the mechanisms and examine to what extent political connections and corruption can explain the counterintuitive finding. Here we combine quantitative data with qualitative evidence from interviews and cases on government-business interactions in China.

3 Research Design & Case Selection

Over the last two decades, China has been one of the fastest growing developing countries in the world, with a political regime highly involved in the economy and active in economic policy making. Moreover, China's fiscal system in the post-reform era is marked by decentralization and local control. In the early 1980s, China changed its centralized revenue system to a more delegated system with increased fiscal autonomy at the local level. Fiscal decentralization was seen as one of the significant factors incentivizing local governments to promote economic growth and generate revenue sources in contemporary China (Oi, 1999;

Shirk, 1993; Ong, 2012). Although the 1994 reform re-claimed part of the revenue to the central government, 70-85% of expenditures remained local responsibilities (National Bureau of Statistics, 2015). Furthermore, before revenue is divided between central and local governments, taxes are initially collected by local tax bureaus. Given shrinking budgets and increasing expenditure needs (including infrastructure and welfare), local officials were pushed to attract new revenue sources for their jurisdiction (Jin, Qian and Weingast, 2005; Liu and Tao, 2007).

At the same time, the cadre evaluation systems of party and government officials created a strong institution of "accountability from above," comparable to that of Vietnam (Jensen and Malesky, 2018). Higher level officials evaluate the performance of lower-level bureaucrats/politicians against economic performance and revenue collection targets. These evaluations are important for possible bonus and promotion decisions. The evaluation system generates further pressures for local government officials to compete with each other and to seek GDP, revenue, and investment growth in order to boost their political achievements (Huang, 1996; Edin, 2003; Lü and Landry, 2014; Guo, 2009).[2] Overall, the State Council, Ministry of Finance, and the State Tax Bureau have issued more than 600 tax cut and exemption policies. Although the central government did not openly endorse the practice, it allowed local governments to "make tax break policies that are suitable to local conditions *(shiyong yu bendi)*," as long as they are approved by local tax bureaus.[3]

[2]There are considerable debates on whether economic growth or patronage and factions drive the promotion of officials at higher echelon sof the party (Shih, Adolph and Liu, 2012), but recent findings suggest that these two mechanisms can be reconciled (Landry, Lü and Duan, 2019; Jiang, 2018). We do not aim to explain promotion in this paper, and furthermore, we focus on local city level, where economic performance likely matters more and local officials consistently believe that these economic targets are important.

[3]These detailed policies, from 1990 to present, were later summarized in the catalogue of tax break policies (see The State Tax Bureau of China (2015)). Our argument does not imply that the central government has completely abandoned political control over regions (Sheng, 2010). Rather, until the start of the recent

The decentralization of the fiscal state and its active local economic policy make China an excellent case to investigate the capital mobility/taxation nexus in a context outside of the OECD setting. Municipalities actively compete with each others and local tax offices have the necessary leeway to do so. Under pressure to raise revenues and boost economic achievements, many local governments adopted aggressive policies with the goal of attracting investment, e.g., grant tax breaks for potential investors (Ang, 2016). While offering tax incentives sacrifices revenue temporarily, the hope is that firms would contribute positively to regional growth, investment, and therefore, long run tax revenue. Montinola, Qian and Weingast (1995) have used market-preserving federalism to describe such local competition. Throughout the 1990s and the 2000s, local governments in China established thousands of development zones to attract investment by offering tax breaks, land discounts, and other preferential policies (Gao, 2015; Zuo, 2015; Chen, 2018).[4] Within this context, scholars have started to examine the effects of regional competition on tax rates in China (Liu and Martinez-Vazquez, 2014; Suwina Cheng, Kenny Lin and Richard Simmons, 2017). Few have further investigated, however, the relationship between capital mobility and tax rates.

The high level of competition between localities and the fact that local officials use tax breaks to attract investment would lead one to expect that firms with high capital mobility are able to use a potential "exit" to negotiate better tax rates. In this standard framework, more mobile firms ought to hold more bargaining power over local governments. Moreover, in individual cases, well known multinational corporations have been offered with generous

Xi regime, the center provides significant leeway for the approval of tax breaks at the local level as long as justified by policies.

[4]One does not need to assume goodwill on the part of the local governments for promoting these activities. While offering tax breaks to firms, they often extract revenues from peasants and impose other burdens on them (Bernstein and Lu, 2003).

tax rates when local officials scrambled to attract businesses. As we show in the empirical analysis, however, at a more general level this expectation is not borne out in the data.

To investigate the questions outlined above we have assembled two major sets of firm level panel data, both including tax payments, firm characteristics, and their location. The first set of data come from the *China National Survey of Industrial Firms (CNSIF)* and cover the years 1996 to 2007. The survey was initiated by the State Economic Census Center of the National Bureau of Statistics (NBS) and implemented using more than three million local enumerators from survey teams organized by the local bureau of statistics. The survey includes micro-level data of all above-scale industrial firms (with sales above 5 million RMB) across the entire jurisdictions in mainland China, leading to about 1.8 million observations.

As a second data set, we use firm level data from the *China Stock Market and Accounting Research Database (CSMAR)*. This data set includes attributes for all publicly listed firms from 2009 to 2017, leaving us with about $24,000$ total observations over that time period. Both data sets allow us to investigate the relationship between capital mobility and taxation with fine grained firm level data within a single country. 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 that firms actually paid, i.e., taking into account any tax rebates or special rates, instead of relying on statutory rates.

We select the time period we study for each data set to ensure policy consistency over the analyzed time 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 *CNSIF* data from 1996 to 2007, that is, after fiscal reform and prior to the

corporate tax changes. In contrast, we analyze the *CSMAR* data on the time period after the corporate tax reform, i.e., from 2009 to 2017.[5] We primarily draw on the *CNSIF* data given that its coverage is substantially more comprehensive of Chinese firms and jurisdictions. On the other hand, the *CSMAR* provides us with a different sample of firms and a more recent time period.

4 Empirical Analysis

Before proceeding to our main analysis, we first discuss and present descriptive statistics of our dependent variable of interest: effective income tax rates. For both data sets we calculate each firm's yearly effective income tax rate by dividing the firm's paid corporate income taxes by its profits, the standard calculation for effective income tax rates in China (Liu and Martinez-Vazquez, 2014).[6] The corporate income tax is one of the primary revenue sources collected from firms by the Chinese government. Important for our research design, local officials have the authority to grant tax breaks on corporate income taxes for a wide range of reasons and are, therefore, important determinants of tax policies for industrial firms (Wu et al., 2007; Suwina Cheng, Kenny Lin and Richard Simmons, 2017).

In the *CNSIF* data, after calculating the effective income tax rate, we end up with $1,817124$ observations from 1995 to 2007 for $635,537$ unique firms in 385 cities across 40

[5]Before 2008, the standard corporate income tax rate was 33%, with foreign-invested firms' rates set to 15%. Starting in 2008, the standard corporate income tax rate was changed to 25% for both domestic and foreign firms. We do not expect that this change would systematically influence the relationship between mobility and tax rates, but given the time of its implementation, we did not include the year 2008 in either analysis. Additionally, in analyzing the *CNSIF* data from 1996 to 2007, we do control for ownership type.

[6]We drop observations for firm years with zero or negative profits. We do so for two reasons: 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`); and zeros or negative values in the denominator create infinite or unreasonable effective tax rates.

industries (at two-digit coding). The left plot in Figure 1 displays the density of effective income tax rates for values between zero and one.[7] As is easily visible, even when excluding firm-years with zero or negative profits, a substantial number of firms pay zero taxes in a given year. We use the same method to calculate effective tax rates of firms in the *CSMAR* data, which leaves us with 24,132 total observations from 3,628 unique firms in 283 cities. The density for the effective income tax rate based on the *CSMAR* data is shown in the right plot of Figure 1.[8] The two densities peak at different values, which is not surprising, given that the statutory corporate tax rate was different across the two time periods. Yet, even though the standard statutory rates were set by the National Tax Bureau, Figure 1 show the wide range in actual income tax rates paid by firms.

Since the effective income tax measures in both data sets include extremely uncommon values on the effective income tax rate and a high number of zeros, we estimate the general statistical models on the original scale and on two transformations of the dependent variable. Our main results are based on the winsorized effective income tax rate to ensure that our inference is not the results of extreme values in the dependent variable.[9] In addition, we create a binary variable that is coded zero for firms paying no income tax and is coded one for those firms that pay income tax rates greater than zero, i.e, an indicator for firms paying a positive effective income tax rate. We also estimate all models on the original scale.

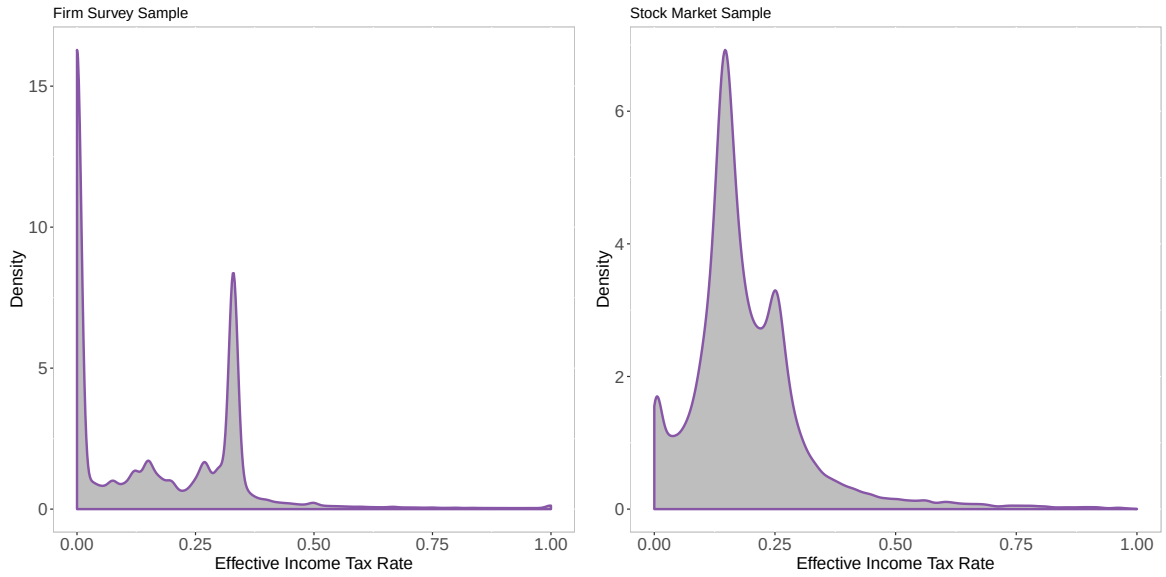
Figure 2 further breaks down firms by ownership and shows the density of effective income tax rates and our main independent variable, capital mobility based on the *CNSIF* data. The left plots shows the densities of the effective income tax rates for state-owned enterprises

[7] 5856 observations fall out of this range and are not plotted here.

[8] Again, 2,092 observations fall out of this range and are not plotted.

[9] Specifically, we set values below the 2.5th percentile and above the 97.5th percentile to the 2.5th or 97.5th percentile value.

Figure 1: Density of the Effective Income Tax Rates



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)*. The right plot shows the density for the same variable calculated on data from the *China Stock Market and Accounting Research Database (CSMAR)*. 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.

(purple), foreign enterprises (green), and domestic private firms (blue). The average effective income tax paid by foreign firms is lower than that of domestic firms. Foreign firms have the highest spike at zero, while private domestic firms have a large spike around 30%, which is close to the 33% standard tax rates before 2008.

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. Thus the mobility variable ranges from zero to one. 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.[10] The right plot in Figure 2 shows how our measure of capital mobility varies by firm type. Not surprisingly, foreign owned firms have the highest level of capital mobility, though only sightly higher than privately owned Chinese firms. State owned enterprises, on the other hand, exhibit substantially lower rates of capital mobility.[11]

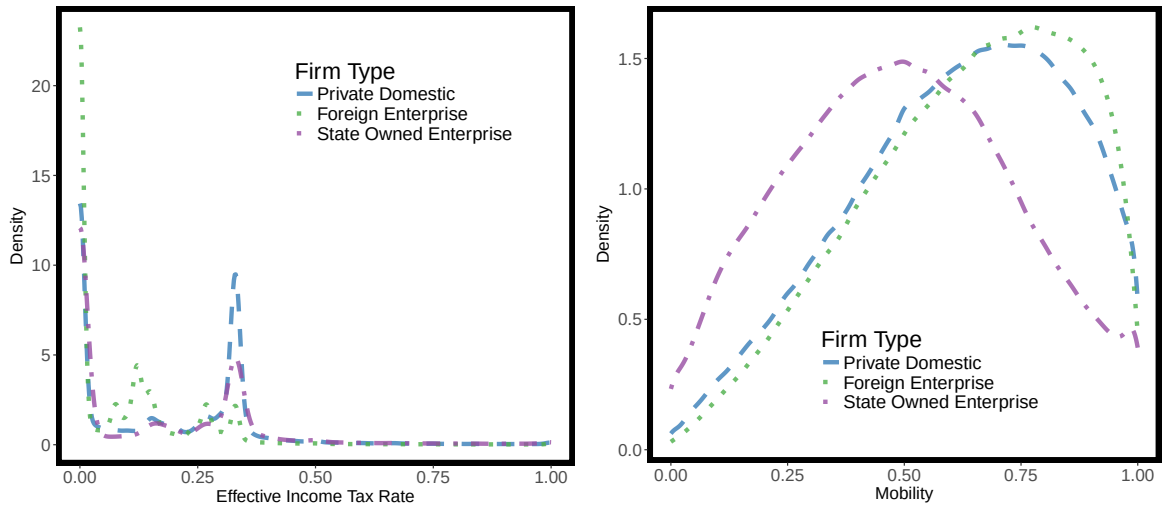


Figure 2: Densities of Effective Income Tax Rate and Capital Mobility by Firm Type (*CNSIF* Data)

Given the observational nature of the data, we are, of course, 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 (Acharya, Blackwell and Sen, 2016; Montgomery, Nyhan and Torres, 2018). We therefore present a number of models with different sets of covariates and fixed effects included in the analysis.

[10]For more information, see the definition of the National Statistics Bureau (`/http://www.stats.gov.cn/english/classificationsmethods/Definitions.html`).

[11]The stock market data set (*CSMAR*) unfortunately does not include information on ownership type.

For both data sets, we estimate a set of standard OLS models with fixed effects for city and year, as well as industry type in some models. We cluster standard errors at the city level. First, we estimate a pair of bivariate models with the only covariate included being the our main variable of interest: capital mobility. In the next set of models, we add a number of control variables which may influence the relationship between capital mobility and effective tax rates. First, we include logged firm profits, as companies with more mobile capital may be more profitable and profits ought to influence tax rates. For the models based on the *CNSIF* data, we also add ownership indicators of state-owned or foreign-invested enterprises. As Figure 2 shows, Chinese local governments have preferential tax policies towards foreign-invested firms (Huang, 2008). We also add covariates for the share of exports in firm's sales, logged total employment, and logged value of total assets. More export-oriented firms could profit from Chinese export promotion and exports may be related to capital mobility. Similarly, larger firms may be more mobile, profitable, and may, therefore, have more bargaining power with city bureaucracies.

For the models based on the *CSMAR* data, we estimate the same bivariate models, a model only controlling for logged profits, as well as a model with controls for logged profits, total assets, research and development expenditure as share of total operating costs (R&D intensity), and logged expenditure on employees. Research and development expenditure may be related to capital mobility and has been promoted by the Chinese government through various industrial policies (Chen, 2018; Chen et al., 2019). We control for employee expenditure as a proxy for total employment, since the exact variable is not available in the stock market data.[12]

[12]In general, we add 1 to variables before any log transformation, as to not lose observations that were

We estimate each of the three models with the different sets of 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. Although, as mentioned above, there are no major shifts in the fiscal policies during each of the time periods studied, we include year fixed effects in case of domestic or international events that influence firm behavior or local economies. The city fixed effects allow us to control 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, both nationally and locally. In total, we thus estimate six different models for each dependent variable and its transformations. Given that we are primarily interested in the effect of capital mobility on firms' effective tax rates, we do not think that firm level fixed effects are appropriate, as a firm's level of capital mobility does not significantly change over time. In the models presented below, coefficient estimates are, therefore, based on the differences between firms within each city (and industry) in a given year. We cluster standard errors at the city level.

4.1 China National Survey of Industrial Firms (*CNSIF*)

Table 1 shows the coefficient estimate and standard errors for capital mobility for the six models when the winsorized effective income tax rate from the *CNSIF* data is the dependent variable. Columns one and two present the estimates for the bivariate models with the two sets of fixed effects. The coefficient remains effectively unchanged if we add controls for profits and ownership type (columns 3 & 4). Similarly, adding covariates for exports, employment,

originally zero.

and total assets does not change the coefficient estimate for capital mobility (columns 5 & 6). Throughout the 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. The full results including all covariates are presented in Table A.1 in the Appendix. Additionally, when included, the estimate for foreign owned firms is consistently estimated to be negative, indicating that foreign firms pay lower taxes than Chinese firms.

To interpret the results substantively, consider the results presented in column 5 in Table 1. Here we include fixed effects for city and year, as well as all controls discussed above. In this instance, holding all other variables constant, an increase in capital mobility from the median value for Shanghai firms in 2007 to the third quartile in that group (i.e., from 0.77 to 0.89) is associated with slightly more than a half percentage point rise in the effective income tax rate (or a 16% increase in the tax rate).

Table 1: Effective Income Tax Rate – Winsorized

Capital Mobility	0.04***	0.04***	0.04***	0.05***	0.04***	0.05***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	No	Yes
Observations	1,816,757	1,816,757	1,816,757	1,816,757	1,776,312	1,776,312
R^2	0.07	0.08	0.11	0.12	0.12	0.12

Models in column 3 and 4 include a control for total profits (ln), state and foreign enterprise indicators.
Models in column 5 and 6 include controls for total profits (ln), state and foreign enterprise indicators, share of exports, total employment (ln), and total assets (ln).
Models estimated with standard errors clustered by city. $^{***}p < .01$; $^{**}p < .05$; $^{*}p < .1$

As mentioned above, given the somewhat unusual distribution of the dependent variable, the results in Table 1 are based on the winsorized dependent variable. We estimate the same

set of models on the original scale (Table A.2 in the Appendix) and the binary dependent variable (Table A.3 in the Appendix). The results, with respect to capital mobility, are essentially unchanged. For 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 also estimate a model where we include fixed effects for the interaction between city and year. Here the interpretation of the coefficient changes again, as we are now controlling for possibly omitted city level variables that change over time. We estimate these models with the full set of controls and include the interaction of year and city as fixed effects. In Table A.4 in the Appendix, we present the results for all three dependent variables: the untransformed, winsorized, and dichotomized effective income tax rate. Again, the coefficient of capital mobility is effectively unchanged compared to the models presented above. Capital mobility has a positive association with effective income tax rates throughout.

4.2 China Stock Market and Accounting Research Database (*CSMAR*)

Next, we estimate a similar set of models using the data from the *CSMAR* data. Table 2 shows the estimated coefficients for capital mobility when we use the winsorized effective income tax rate from the stock market data as our dependent variable. Overall, the results are quite similar to those presented above. The estimate for capital mobility is positive in the bivariate models (columns 1 & 2) and when controlling for profits with indudstry fixed

effects (column 4). When controlling for profit and only including city and year fixed effects, however, the estimated coefficient is quite small and rounds to zero (column 3). When we include the full set of controls (profits, total assets, research and development intensity, and employee benefits), the estimate is once again positive and statistically significant at the 1% level. The full results are shown in Table A.5.

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

Capital Mobility	0.03***	0.05***	0.00	0.02*	0.03***	0.05***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	No	Yes
Observations	22,976	22,976	20,945	20,945	15,959	15,959
R^2	0.04	0.12	0.05	0.17	0.11	0.20

Models in column 3 and 4 include a control for total profits (ln).
Models in column 5 and 6 include controls for total profits (ln),
R&D Intensity, total assets (ln), and employee benefits (ln).
Models estimated with standard errors clustered by city. ***p < .01; **p < .05; *p < .1

As above, we also estimate these models both on the original data and using the binary indicator of a positive effective income tax rate. In the models with the untransformed effective income tax rate, the coefficient on capital mobility is larger but estimated with substantially more uncertainty and not statistically significant at conventional levels (Table A.6 in the Appendix). The large difference in results compared to the models with the winsorized dependent variable is due to about 170 of the almost 23,000 observations. These observations have highly extreme and unrealistic effective income tax rates. When we regress the dichotomized dependent variable on the different sets of covariates, we again find that firms with more mobile capital are more likely to pay positive income tax rates (Table A.7 in the Appendix). In the binary dependent variable models, the coefficient on capital mobility

is positive and statistically significant at the 1% level throughout.[13] Lastly, when estimating the models with all controls and fixed effects of the interaction between city and year, we again recover positive coefficients for capital mobility with all three dependent variables. The coefficient for capital mobility is significant at the 1% level for the models with the winsorized and binary dependent variable (Table A.8 in the Appendix).

4.3 State-Business Collusion and Bribery

In the previous two sections, we examined the relationship between capital mobility and effective income tax rates using two different samples of firm level data from China. Contrary to work on OECD countries, we consistently find a positive association between capital mobility and effective tax rates. The positive association is present in both the firm survey data (*CNSIF*) and the stock market sample (*CSMAR*), and robust to a number of specifications. We find consistent evidence that firms with higher capital mobility pay higher effective tax rates. This finding raises questions about the standard theoretical account that mobility increases a firms' bargaining power vis-a-vis the state. Indeed, it suggests a more complicated reality about the relationship between mobility and taxation in developing countries. One possibility is that this positive relationship is partly due to China's unique economic system and the support of certain industries and firms by the state. On the other hand, it is unclear why city governments picking *winners* and *losers* would lead to lower taxes for firms with higher shares of fixed assets. Moreover, the positive association remains when we include industry fixed effects.

[13] Although the CSMAR data does not include a potential control for ownership type, the period we select to study is 2009-2017, which is after the 2008 corporate tax change that abolished the differences between foreign and domestic firms.

As we discuss above, a different potential explanation for the positive relationship between capital mobility and effective tax rates is that firms with more fixed capital are more likely and better able to use political connections and bribes to secure lower tax rates. In this section, we provide some qualitative and quantitative evidence for this potential mechanism.

Many local government officials and businesses in China have used tax-break policies to build mutually beneficial relationships and consolidate connections. Given the authority of local governments to grant their own tax breaks, officials have thoroughly explored and made use of these policies to grant tax breaks to firms (Zheng, 2006; Chen, 2018; Choi, 2009). In an investigation by the China National Audit Office, 53 of the 54 investigated counties across 18 provinces were found to have issued tax break policies without central government approval. In total, these 221 policies reduced tax revenues by more than 7 billion yuan.[14] To further their own political and bureaucratic careers, local officials were highly motivated to provide tax breaks/benefits in an effort to attract investment and achieve economic development targets. Over time, these practices seem to have become almost institutionalized. Tax bureaus and other government departments, such as the Economic Commission and the Development and Reform Commission, would often advertise tax cutting opportunities directly or through associated tax companies in order to seek bribes and kickbacks. Business managers or financial officers would receive phone calls from tax companies who would advertise their services.[15]

Firms also actively seek help from local governments. While standard tax rates are set at the national level, as seen in Figure 1, firms pay very different rates. Firm specific

[14]For the result of the investigation, see China National Audit Office, `http://www.audit.gov.cn/n5/n25/c63597/content.html`.

[15]Authors interviews, 2016. Further, see Choi (2009).

corporate income tax rates are based on the firm's particular tax breaks. While tax breaks require formal applications, without building networks with local tax bureaus it is nearly impossible to stay on top of and navigate through the hundreds of policies issued by state and local governments. Part of the difficulty stems from the fact that these policies are often created in an *ad hoc* manner. Furthermore, firms often have to acquire approval from several different departments before formally receiving tax breaks. In this case, nurturing and maintaining good relationships with local government officials are viewed essential for firms to "get things done" and to receive approval within a realistic time frame. Each firm, therefore, generally employs specific personnel in charge of regularly visiting the tax bureau and other departments to facilitate the eventual implementation of tax breaks or exemption policies.

Qualitative evidence suggests that in the process of government-business collusion, firms with a lower degree of mobility, i.e., higher proportion of fixed assets, are significantly more likely to use political connections to acquire tax breaks. Moreover, they are also more likely to be the targets of public officials seeking gifts. These businesses are often in industries such as power generation and natural resource extraction, e.g., coal, petroleum, power generation and mining more generally. With more fixed assets and reliant on natural resources, these firms are more bound to their localities. They remain in the same place for a long time, leading to entrenched connections with public officials. For example, a coal mining company in the Tongliang county of Chongqing city held 85 percent fixed assets. The company was caught contributing a bribe of 147 thousand rmb to a local official, which led to the firm's closure. Before the arrest of the official, the company enjoyed an average income tax rate of

10% since its establishment in 2005.[16] Similarly, a steel company in the Liaocheng City of Shandong Province, with a share of fixed assets at about 83% had been paying an effective income tax rate of about three percent. Nevertheless, the company was awarded to be on the list of "the top 100 tax paying companies" in Liaocheng.[17] The city has recently gained attention due to an investigation into corruption, money embezzlement, and suicide by public officials [18]

While bribery may not always work, there are often multiple avenues for firms to gain influence. A company in Chengdu, Sichuan investing in real estate and software had been successful in receiving tax breaks since its establishment in 1997, in part due to its good relationship with the government. In the mid 2000s, however, a newly appointed official in charge of approving the firm's tax break policy did not agree that it qualified, given the policy's restrictions regarding industry type. Following the official's denial of the tax benefit, a former colleague was given a well-paid position in the company. The former colleague soon informed the government official of the firm CEO's membership on the budget committee in the local People's Congress. As such the CEO could potentially influence the budget allocated to the government official's office. In the end, the firm was once again approved for the tax break policy.[19].

Firms with lower capital mobility are often in manufacturing industries, ranging from garments, shoes, metal processing to auto parts and consumer electronics. Owners of these

[16]Author's 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`.

[17]Authors' calculation based on China National Survey of Industrial Firms. Also see records at the Tax Bureau of Liaocheng `http://liaocheng.sd-n-tax.gov.cn/art/2007/11/6/art_22992_49102.html`.

[18]Among many of the reports, see the announcement by Shandong Central Commission for Discipline Inspection `http://www.sdjj.gov.cn/tbbg/201607/t20160728_11244711.htm`.

[19]Author's interviews, January 2009 and May 2019.

firms often have alternative relocation plans, should they face problems in the current location. Their higher level of mobility, however, does not seem to lead to higher bargaining power over local governments. As other studies suggest, instead these firms tend to have weaker incentives to invest resources in bribing, corruption, and networks with local officials. Well-known large firms, such as Lenovo, Samsung, HP, Great Wall, National Petroleum, Olympus, which are typically wooed by mayors or party secretaries afraid of losing these firms, are well-known exceptions to the rule. In many instances the qualitative evidence suggests that using local connections and bribery has become the predominant way of obtaining tax breaks and has trumped competition over mobile capital.

In November 2012, President Xi Jinping, who took power that same year, launched a major anti-corruption campaign in China, which continues today. One goal of the campaign is to curb rampant corruption and government-business collusion in local China (Manion, 2016). Along with the anti-corruption campaign, the State Council of the central government also began to crack down on local governments offering tax breaks based on government-business collusion (The State Council of China, 2014).[20] The crackdown clearly reduced the issuance of illegitimate tax breaks based on government-business connections or bribery (Ye, 2017). As a result, many government bureaucrats started avoiding direct contact with business owners, and the frequency with which public officials would attend banquets with any 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.

[20]Note that the central government later provided a grace period to fend off potential lawsuits by businesses (The State Council of China, 2015).

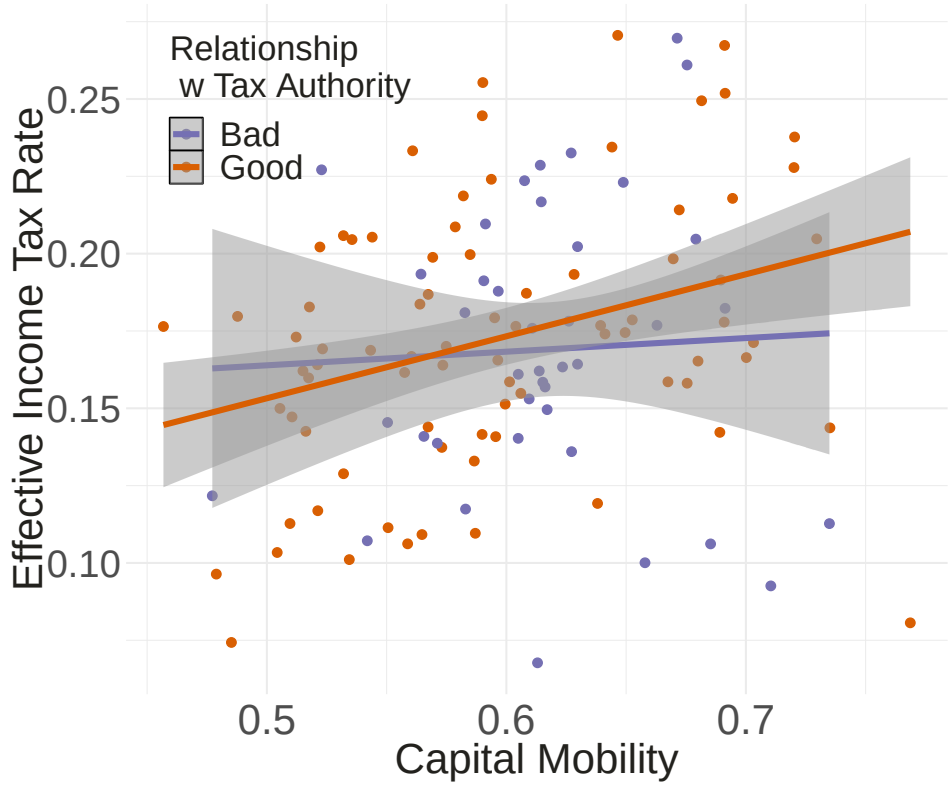
While the qualitative evidence, brought to bear here, is suggestive of a mechanism that potentially links the capital mobility/taxation relationship to political connection and corruption, there is no direct test allowing us to examine this proposition. Given the two different time periods we study in this paper, however, each data set provides a unique opportunity to investigate this potential mechanism.

First, to examine the potential role of political connections given the estimated relationship in the Chinese firm survey (*CNSIF*), we rely on data from the 2005 World Bank Investment Climate Survey (Enterprise Analysis Unit - World Bank Group, 2005). The survey investigates 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 primarily use the firms' survey responses on their perceived relationship with tax authorities as an indicator for political connections at the city level, i.e., better relationships are indicative of better political connections. As a second possible measure we use the time firms spent with government officials from any departments, where again we assume that more time indicates 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, given that we would prefer a firm level measure of political connections or corruption, this allows us to investigate differences in firm behavior based on city averages. Specifically, we evaluate whether government-business relationships could be a potential mediator for the observed relationship between mobility and tax rates. As a first indication that government-business relations might matter for the association between mobility and tax rates, take Figure 3.

In Figure 3 we plot the bivariate association between firm level capital mobility and effective tax rates for two types of cities. The association for firms in cities where the average relationship between firms and tax authorities is below (i.e., worse than) the median city are plotted in purple, while the association for firms in cities with the average relationship above the median are plotted in orange. As one can see, only in cities where government-business relations are better than the median, do firms with more fixed assets pay lower tax rates. In cities with worse government-business relationships, there is effectively no relationship between mobility and tax rates.

Figure 3: Relationship between Mobility and Income Tax Rates Across Cities



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

Turning to regression analysis, we again find suggestive evidence of said mechanism. When we regress the potential mediator (government-business relationships) on our independent variable of interest (capital mobility), we find that firms' capital mobility is negatively associated with city level averages of the relationship between firms and tax authorities, i.e., more mobile firms are located in cities with worse relationships. Second, when regressing effective income tax rates on capital mobility and the city level score of the relationship with tax authority, a better relationship predicts lower tax rates while the association of mobility and tax rates is weaker. This is in line with a potential mediation effect of government-business relationships. Moreover, if we treat the city level average of firm relationships with tax authorities as a mediator variable (Imai, Keele and Yamamoto, 2010; Tingley et al., 2014) in the relationship between effective tax rates and capital mobility, we find evidence that is in line with the relationship being mediated by government-business relations.

Table 3: Income Tax Winsorized - Mediation Analysis Models

	Relationship w. Tax Auth			Income Tax Rate (winsorized)		
Relationship w. Tax Auth				-0.06^{***}	-0.06^{***}	-0.06^{***}
				(0.02)	(0.01)	(0.01)
Capital Mobility	-0.06^{**}	-0.05^{**}	-0.04^{*}	0.03^{***}	0.05^{***}	0.04^{***}
	(0.03)	(0.03)	(0.02)	(0.01)	(0.01)	(0.01)
Mediation Analysis						
Prop Mediated				0.1	0.07	0.06
Conf. Int.				(0.09, 0.12)	(0.06, 0.07)	(0.05, 0.07)
Observations	161,133	160,879	160,395	161,133	160,879	160,395
R^2	0.00	0.01	0.05	0.01	0.11	0.11

Models in column two and five include the same firm level covariates as models presented in Table A.2. Models in columns three and six additionally include covariates for city level population (ln), FDI (ln), and GDP (ln). Standard Errors clustered at city level. Robust standard errors estimated for mediation analysis. $^{***}p < .01$; $^{**}p < .05$; $^{*}p < .1$

We want to emphasize that we do not interpret the results of the mediation analysis as a

well identified test of a causal mechanisms. Given the nature of the observational data, it is hard to justify the assumptions necessary for such interpretation (Imai, Keele and Yamamoto, 2010; Tingley et al., 2014). Our goal is merely to show that the associations observed in the data are in line with a potential mechanism, such that the relationship between capital mobility and income tax rates can be partly explained by differences in political connections.

As with the empirical models estimated in previous sections, the threat of introducing post-treatment bias is a problem for most of the potential control variables. On the other hand, leaving out relevant controls may induce omitted variable bias. This concern is amplified by the sequential ignorability assumption necessary for the mediation analysis (Imai, Keele and Yamamoto, 2010; Tingley et al., 2014; Montgomery, Nyhan and Torres, 2018). We, therefore, again estimate three sets of models with each dependent variable. We first estimate both models without any control variables, next we add the full set of firm level controls from above, and last we add three city level covariates: population size (logged), city GDP (logged), and total foreign direct investment in the city (logged). Table 3 presents the main results for the variables of interest.[21] Across the three models with different sets of controls, more mobile firms are located in cities where firms have worse relationships with tax authorities (columns 1-3 in Table 3). On the other hand, being in a city with better relationships with the tax authorities is associated with lower tax rates, while capital mobility is still predictive of higher taxes (columns 4-6 in Table 3). Independent of the covariates included, we find significant evidence of mediation in all models.[22]

Unfortunately, we are unable to undertake the same analysis for the *CSMAR* data. The

[21]The full results are presented in Table A.12 in the Appendix.

[22]Alternatively using time spent with government officials as the mediator, leads to very similar results. The main difference is that the relationship flips once we add city level controls. The results are presented in Table A.13 in the Appendix.

particular time period studied in this data, however, allows us to undertake a different test of the corruption mechanism. As explained above, President Xi Jinping launched a major anti-corruption campaign in 2012. We use this anti-corruption campaign as a potential shock to the system of corruption. If corruption and bribery are important factors that influence the relationship between capital mobility and effective income tax rates, then that relationship should change with the anti-corruption campaign. To investigate this idea, we estimate the same models on the stock market data as above but interact our independent variables with an indicator variable that is coded zero for the period from 2009 to 2012 and coded one for the years after 2012.

Table 4 presents the results regarding the interaction of capital mobility with the post 2012 dummy when estimated on the winsorized dependent variable. Again, we estimate the same set of models as above, with combinations of control variables and fixed effects. For space reasons, we only present the constituent terms for capital mobility and its interaction here. The full results are presented in Table A.9 in the Appendix.

Table 4: Income Tax Payments Pre-/Post-2012 (Stock Market Data) – Winsorized

Capital Mobility	0.04***	0.07***	0.02	0.04***	0.05***	0.07***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Capital Mobility × post 2012	−0.02***	−0.03***	−0.02**	−0.03***	−0.03***	−0.03***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	No	Yes
Observations	22,976	22,976	20,945	20,945	15,959	15,959
R^2	0.04	0.12	0.05	0.17	0.11	0.20

Models in column 3 and 4 include a control for total profits (ln). Models in column 5 and 6 include controls for total profits (ln), R&D Intensity, total assets (ln), and employee benefits (ln).
Models estimated with standard errors clustered by city. ***p < .01; **p < .05; *p < .1

The positive and significant estimate for the constituent term on capital mobility indicates that up to the year 2012, the association between capital mobility and effective income tax rates is positive. After the beginning of the anti-corruption campaign, i.e., post-2012, however, the relationship between capital mobility and effective income taxation is substantially weaker. Depending on the controls or the fixed effects included, the relationship between capital mobility and income tax rates is halved for the period after 2012. It is important to note again that all our models are relatively conservative, as we always include fixed effects for year and city, as well as fixed effects for industry in models 2, 4, and 6. The results for the binary dependent variable models are quite similar.[23] These results are generally in line with the idea that the anti-corruption campaign significantly weakened the mechanism for fixed-asset firms to gain advantage over mobile firms.

5 Conclusion

In this paper, we investigate domestic factors that directly contribute to tax incentives in developing countries, drawing on the case of China. Using two sets of firm-level panel data over two time periods, we show that tax incentives are widely provided in the local implementation of taxation, such that effective corporate income tax rates diverge substantially from standard rates set by the central state. We find that more mobile firms, in fact, pay higher effective tax rates compared to firms with larger proportion of fixed assets. This finding suggests that in developing countries or emerging economies, the relationship between assets mobility and effective tax rates may not be the same as what is often found in OECD

[23]When we use the untransformed dependent variable, the results concerning the interaction are weaker and the interaction is not statistically significant (Table A.10 in the Appendix).

countries. In non-OECD contexts, government-business collusion can be an important mechanism for firms to receive tax breaks.

Even though our findings are based on the case of China, they do shed light on the limitation of current literature on tax policies in non-OECD countries, and potential directions for future research. On the demand side, firms of course prefer paying lower tax rates, but our findings suggest that capital mobility may not increase a firm's leverage to receive tax cuts. In less mature economic environments, the exit/voice options can be limited and the cost of relocating to other locations may be quite high. In addition to the usual business costs and the regional market barriers, we suggest that there is also political cost: nurturing new political networks with local officials and becoming familiar with the local contexts requires substantial investments and time. As such, a high proportion of mobile capital as opposed to fixed capital does not necessarily entail advantages in bargaining and may in fact mean weaker government-business connections. On the supply side, the incentives of tax officials for providing tax breaks to firms are worth further examination in future research, especially the different patterns of interaction and networking of bureaucrats with mobile and fixed-asset driven firms.

Furthermore, we believe that our results underlines the importance of using firm-level data to investigate these questions as they can give us additional leverage that country-level analyses often lack. Both analyzing firm level effective tax rates and within country data allows for a more fine grained investigation of these relationships. Precisely because of the variation across countries, the conditions mediating the relationship between mobility and taxation will also differ, which calls for more contextualized analysis in the future.

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Supplementary Online Appendix: Capital Mobility & Taxation in Non-OECD Countries – Evidence from China

A Appendix

Table A.1: Effective Income Tax Rate – Winsorized

Capital Mobility	0.04***	0.04***	0.04***	0.05***	0.04***	0.05***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Profits (ln)			0.00***	0.00***	−0.00	−0.00
			(0.00)	(0.00)	(0.00)	(0.00)
State Owned Enterprise			0.00	−0.01*	−0.01***	−0.02***
			(0.00)	(0.00)	(0.00)	(0.00)
Foreign Firm			−0.09***	−0.09***	−0.10***	−0.10***
			(0.01)	(0.01)	(0.01)	(0.01)
Exports (ln)					−0.00	0.00
					(0.00)	(0.00)
Employment (ln)					0.01***	0.01***
					(0.00)	(0.00)
Assets (ln)					0.01***	0.01***
					(0.00)	(0.00)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	No	Yes
Observations	1,816,757	1,816,757	1,816,757	1,816,757	1,776,312	1,776,312
R^2	0.07	0.08	0.11	0.12	0.12	0.12

Models estimated with standard errors clustered by city.

***p < .01; **p < .05; *p < .1

Table A.2: Effective Income Tax Rate – Untransformed

Capital Mobility	0.06*	0.07**	0.06**	0.06*	0.09***	0.09***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Profits (ln)			−0.02***	−0.03***	−0.06***	−0.06***
			(0.01)	(0.01)	(0.02)	(0.02)
State Owned Enterprise			0.08	0.07	−0.01	−0.01
			(0.05)	(0.06)	(0.03)	(0.04)
Foreign Firm			−0.04	−0.03	−0.08**	−0.07**
			(0.04)	(0.04)	(0.03)	(0.03)
Exports (ln)					−0.00	−0.00
					(0.00)	(0.00)
Employment (ln)					0.03	0.03*
					(0.02)	(0.02)
Assets (ln)					0.07**	0.06**
					(0.03)	(0.02)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	No	Yes
Observations	1,816,757	1,816,757	1,816,757	1,816,757	1,776,312	1,776,312
R^2	0.00	0.00	0.00	0.00	0.00	0.00

Models estimated with standard errors clustered by city.

***p < .01; **p < .05; *p < .1

Table A.3: Effective Income Tax Rate – Binary

Capital Mobility	0.13***	0.14***	0.15***	0.16***	0.15***	0.16***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Profits (ln)			0.04***	0.04***	0.03***	0.03***
			(0.00)	(0.00)	(0.00)	(0.00)
State Owned Enterprise			−0.05***	−0.06***	−0.06***	−0.08***
			(0.01)	(0.01)	(0.01)	(0.01)
Foreign Firm			−0.22***	−0.21***	−0.22***	−0.22***
			(0.01)	(0.01)	(0.01)	(0.01)
Exports (ln)					0.00	0.00
					(0.00)	(0.00)
Employment (ln)					0.01***	0.01***
					(0.00)	(0.00)
Assets (ln)					0.01***	0.00
					(0.00)	(0.00)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	No	Yes
Observations	1,816,757	1,816,757	1,816,757	1,816,757	1,776,312	1,776,312
R^2	0.08	0.08	0.12	0.12	0.12	0.13

Models estimated with standard errors clustered by city.

***p < .01; **p < .05; *p < .1

Table A.4: Models with City × Year FE

Capital Mobility	0.087^{***}	0.041^{***}	0.146^{***}
	(0.032)	(0.003)	(0.008)
Profits (ln)	-0.063^{**}	-0.000	0.034^{***}
	(0.025)	(0.001)	(0.001)
State Owned Enterprise	-0.018	-0.012^{***}	-0.069^{***}
	(0.041)	(0.003)	(0.011)
Foreign Firm	-0.083^{**}	-0.100^{***}	-0.227^{***}
	(0.033)	(0.006)	(0.012)
Exports (ln)	-0.002	-0.000	0.000
	(0.001)	(0.000)	(0.000)
Employment (ln)	0.033	0.005^{***}	0.011^{***}
	(0.022)	(0.000)	(0.001)
Assets (ln)	0.069^{**}	0.006^{***}	0.006^{***}
	(0.029)	(0.001)	(0.002)
City *imes* Year FE	Yes	Yes	Yes
Observations	1,776,312	1,776,312	1,776,312
R^2	0.004	0.135	0.144

Models estimated with standard errors clustered by city.

$^{***}p < .01$; $^{**}p < .05$; $^{*}p < .1$

Table A.5: Effective Income Tax Rate (Stock Market Data) – Winsorized

Capital Mobility	0.03***	0.05***	0.00	0.02*	0.03***	0.05***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Profits (ln)			0.00	−0.00***	−0.02***	−0.02***
			(0.00)	(0.00)	(0.00)	(0.00)
Assets (ln)					0.04***	0.03***
					(0.00)	(0.00)
R&D Intensity					−0.15***	−0.05*
					(0.03)	(0.03)
Employee Benefits (ln)					−0.00***	0.00
					(0.00)	(0.00)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	No	Yes
Observations	22,976	22,976	20,945	20,945	15,959	15,959
R^2	0.04	0.12	0.05	0.17	0.11	0.20

Models estimated with standard errors clustered by city.

***p < .01; **p < .05; *p < .1

Table A.6: Effective Income Tax Rate (Stock Market Data) – Untransformed

Capital Mobility	0.17*	0.29*	0.00	0.05	0.06	0.14
	(0.09)	(0.16)	(0.04)	(0.07)	(0.10)	(0.22)
Profits (ln)			−0.02	−0.03	−0.08	−0.09
			(0.05)	(0.05)	(0.15)	(0.16)
Assets (ln)					0.09	0.08
					(0.14)	(0.16)
R&D Intensity					−0.16**	−0.05
					(0.08)	(0.10)
Employee Benefits (ln)					−0.00	0.01
					(0.02)	(0.02)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	No	Yes
Observations	22,976	22,976	20,945	20,945	15,959	15,959
R^2	0.05	0.05	0.01	0.01	0.01	0.01

Models estimated with standard errors clustered by city.

***p < .01; **p < .05; *p < .1

Table A.7: Effective Income Tax Rate (Stock Market Data) – Binary

Capital Mobility	0.15***	0.20***	0.07***	0.09***	0.05***	0.06***
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Profits (ln)			0.03***	0.03***	0.05***	0.05***
			(0.00)	(0.00)	(0.00)	(0.00)
Assets (ln)					−0.02***	−0.02***
					(0.00)	(0.01)
R&D Intensity					−0.05	−0.05
					(0.08)	(0.08)
Employee Benefits (ln)					−0.01***	−0.01***
					(0.00)	(0.00)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	No	Yes
Observations	22,976	22,976	20,945	20,945	15,959	15,959
R^2	0.06	0.08	0.09	0.10	0.12	0.13

Models estimated with standard errors clustered by city.

***p < .01; **p < .05; *p < .1

Table A.8: Models with City × Year FE (Stock Market Data)

Capital Mobility	0.043	0.031^{***}	0.047^{***}
	(0.105)	(0.009)	(0.008)
Profits (ln)	−0.072	-0.019^{***}	0.055^{***}
	(0.164)	(0.002)	(0.003)
Assets (ln)	0.079	0.036^{***}	-0.026^{***}
	(0.151)	(0.003)	(0.004)
R&D Intensity	-0.192^{*}	-0.139^{***}	−0.047
	(0.115)	(0.038)	(0.080)
Employee Benefits (ln)	−0.005	-0.004^{***}	-0.008^{***}
	(0.018)	(0.001)	(0.002)
City *imes* Year FE	Yes	Yes	Yes
Observations	15,959	15,959	15,959
R^2	0.049	0.201	0.221

Models estimated with standard errors clustered by city.

$^{***}p < .01$; $^{**}p < .05$; $^{*}p < .1$

Table A.9: Income Tax Payments Pre-/Post-2012 (Stock Market Data) – Winsorized

Capital Mobility	0.04***	0.07***	0.02	0.04***	0.05***	0.07***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
post 2012						
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Profits (ln)			0.00	−0.00***	−0.02***	−0.02***
			(0.00)	(0.00)	(0.00)	(0.00)
Assets (ln)					0.04***	0.03***
					(0.00)	(0.00)
R&D Intensity					−0.20***	−0.08*
					(0.03)	(0.05)
Employee Benefits (ln)					−0.00**	0.00
					(0.00)	(0.00)
Capital Mobility × post 2012	−0.02***	−0.03***	−0.02**	−0.03***	−0.03***	−0.03***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Profits (ln) × post 2012			0.00	0.00	0.00	0.00
			(0.00)	(0.00)	(0.00)	(0.00)
Assets (ln) × post 2012					−0.00	−0.00
					(0.00)	(0.00)
R&D Intensity × post 2012					0.08	0.05
					(0.06)	(0.06)
Employee Benefits (ln) × post 2012					−0.00	−0.00
					(0.00)	(0.00)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	No	Yes
Observations	22,976	22,976	20,945	20,945	15,959	15,959
R^2	0.04	0.12	0.05	0.17	0.11	0.20

Models estimated with standard errors clustered by city.

***p < .01; **p < .05; *p < .1

Table A.10: Income Tax Payments Pre-/Post-2012 (Stock Market Data) – Untransformed

Capital Mobility	0.07	0.15	0.06	0.12	0.36	0.44
	(0.09)	(0.10)	(0.05)	(0.08)	(0.24)	(0.35)
post 2012						
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Profits (ln)			−0.11	−0.11	−0.33	−0.33
			(0.10)	(0.10)	(0.28)	(0.29)
Assets (ln)					0.32	0.31
					(0.26)	(0.29)
R&D Intensity					−0.26	−0.17
					(0.19)	(0.23)
Employee Benefits (ln)					0.01	0.02*
					(0.01)	(0.01)
Capital Mobility × post 2012	0.17	0.23	−0.09	−0.11*	−0.49*	−0.51*
	(0.26)	(0.32)	(0.06)	(0.06)	(0.27)	(0.26)
Profits (ln) × post 2012			0.14	0.14	0.43	0.44
			(0.10)	(0.10)	(0.28)	(0.29)
Assets (ln) × post 2012					−0.40	−0.41
					(0.27)	(0.27)
R&D Intensity × post 2012					0.28	0.29
					(0.25)	(0.28)
Employee Benefits (ln) × post 2012					−0.02	−0.02
					(0.03)	(0.03)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	No	Yes
Observations	22,976	22,976	20,945	20,945	15,959	15,959
R^2	0.05	0.05	0.01	0.01	0.02	0.02

Models estimated with standard errors clustered by city.

***p < .01; **p < .05; *p < .1

Table A.11: Income Tax Payments Pre-/Post-2012 (Stock Market Data) – Binary

Capital Mobility	0.18***	0.24***	0.09***	0.10***	0.07***	0.08***
	(0.02)	(0.03)	(0.01)	(0.01)	(0.01)	(0.01)
post 2012						
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Profits (ln)			0.03***	0.03***	0.05***	0.05***
			(0.00)	(0.00)	(0.00)	(0.00)
Assets (ln)					−0.01**	−0.01*
					(0.00)	(0.01)
R&D Intensity					−0.16	−0.16
					(0.14)	(0.15)
Employee Benefits (ln)					−0.01***	−0.01***
					(0.00)	(0.00)
Capital Mobility × post 2012	−0.05**	−0.06***	−0.02	−0.03*	−0.03**	−0.04**
	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)
Profits (ln) × post 2012			−0.00	−0.00	0.01**	0.01**
			(0.00)	(0.00)	(0.01)	(0.01)
Assets (ln) × post 2012					−0.02***	−0.02***
					(0.01)	(0.01)
R&D Intensity × post 2012					0.18	0.17
					(0.17)	(0.17)
Employee Benefits (ln) × post 2012					−0.00	0.00
					(0.00)	(0.00)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	No	Yes
Observations	22,976	22,976	20,945	20,945	15,959	15,959
R^2	0.06	0.08	0.09	0.11	0.12	0.13

Models estimated with standard errors clustered by city.

***p < .01; **p < .05; *p < .1

Table A.12: Income Tax Winsorized - Mediation Analysis Models

	Relationship w. Tax Auth			Income Tax Rate (winsorized)		
Relationship w. Tax Auth				−0.06***	−0.06***	−0.06***
				(0.00)	(0.00)	(0.00)
Capital Mobility	−0.06***	−0.05***	−0.04***	0.03***	0.05***	0.04***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Profits (ln)		0.01***	0.01***		−0.01***	−0.01***
		(0.00)	(0.00)		(0.00)	(0.00)
State Owned Enterprise		0.00	0.01***		−0.04***	−0.03***
		(0.00)	(0.00)		(0.00)	(0.00)
Foreign Firm		0.02***	0.01***		−0.12***	−0.13***
		(0.00)	(0.00)		(0.00)	(0.00)
Exports (ln)		−0.07***	−0.08***		0.01***	0.01***
		(0.00)	(0.00)		(0.00)	(0.00)
Employment (ln)		0.01***	0.01***		0.01***	0.01***
		(0.00)	(0.00)		(0.00)	(0.00)
Assets (ln)		−0.01***	−0.01***		0.00***	0.00***
		(0.00)	(0.00)		(0.00)	(0.00)
City Pop (ln)			0.08***			−0.01***
			(0.00)			(0.00)
City FDI (ln)			0.07***			0.01***
			(0.00)			(0.00)
City GDP (ln)			−0.15***			−0.00
			(0.00)			(0.00)
Constant	3.65***	3.63***	4.68***	0.39***	0.39***	0.41***
	(0.00)	(0.00)	(0.02)	(0.01)	(0.01)	(0.01)
Mediation Analysis						
Prop Mediated				0.1	0.07	0.06
Conf. Int.				(0.09, 0.12)	(0.06, 0.07)	(0.05, 0.07)
Observations	161,133	160,879	160,395	161,133	160,879	160,395
R^2	0.00	0.01	0.05	0.01	0.11	0.11

Standard Errors clustered at city level. Robust standard errors estimated for mediation analysis.

***p < .01; **p < .05; *p < .1

Table A.13: Income Tax Winsorized - Mediation Analysis Models - Time w. Government

	Time w. Government			Income Tax Rate (winsorized)		
Time w. Government				−0.03*** (0.00)	−0.03*** (0.00)	−0.02*** (0.00)
Capital Mobility	−0.07*** (0.00)	−0.04*** (0.00)	0.03*** (0.00)	0.04*** (0.00)	0.05*** (0.00)	0.04*** (0.00)
Profits (ln)		0.00*** (0.00)	0.00*** (0.00)		−0.01*** (0.00)	−0.01*** (0.00)
State Owned Enterprise		0.11*** (0.00)	0.08*** (0.00)		−0.04*** (0.00)	−0.03*** (0.00)
Foreign Firm		−0.00 (0.00)	0.04*** (0.00)		−0.12*** (0.00)	−0.13*** (0.00)
Exports (ln)		−0.04*** (0.00)	−0.02*** (0.00)		0.01*** (0.00)	0.01*** (0.00)
Employment (ln)		0.04*** (0.00)	0.03*** (0.00)		0.01*** (0.00)	0.01*** (0.00)
Assets (ln)		−0.02*** (0.00)	−0.02*** (0.00)		0.00*** (0.00)	0.00*** (0.00)
City Pop (ln)			0.07*** (0.00)			−0.01*** (0.00)
City FDI (ln)			−0.03*** (0.00)			0.00 (0.00)
City GDP (ln)			−0.06*** (0.00)			0.01*** (0.00)
Constant	2.51*** (0.00)	2.50*** (0.01)	3.44*** (0.03)	0.23*** (0.00)	0.24*** (0.00)	0.20*** (0.01)
Mediation Analysis						
Prop Mediated				0.05	0.03	-0.02
Conf. Int.				(0.04, 0.05)	(0.02, 0.03)	(-0.02, -0.01)
Observations	161,133	160,879	160,395	161,133	160,879	160,395
R^2	0.00	0.02	0.07	0.01	0.10	0.10

Standard Errors clustered at city level. Robust standard errors estimated for mediation analysis.

***p < .01; **p < .05; *p < .1