Does Local Fiscal Pressure Affect Corporate Tax Avoidance?

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ABSTRACT

This paper investigates the impact of local governments' fiscal pressure on tax avoidance of Chinese industrial firms. We find that the local government's fiscal squeeze stemming from the loss of land transfer revenues is associated with lower tax avoidance of firms under its jurisdiction. Moreover, the tax avoidance-reduction effect is stronger in cities with larger fiscal deficits, lower economic growth, and where the local politicians have greater promotion concerns. Also, the effect is more pronounced among firms that do not receive government subsidies and among domestic firms, which were subject to higher tax burdens than foreign firms. Further analysis reveals that higher fiscal pressure is associated with higher growth rate of tax officers and tax audits, which serve as mechanisms for the decreased tax avoidance. Overall, our findings shed light on the role of local politicians in shaping corporate tax behavior.

Keywords: Fiscal pressure; Tax avoidance; Land transfer revenue; Political incentives

JEL Classification: H26, H71, M48

1. Introduction

There is a growing interest in corporate tax behavior among academics and practitioners in the past decades. Special attention has been devoted to understanding the determinants of corporate tax avoidance (see Hanlon and Heitzman (2010) for a review). This stream of research has uncovered a broad spectrum of parties that may affect a firm's tax behavior, such as shareholders (Chen et al. 2010), debtholders (Hasan et al. 2014), executives (Dyreng et al. 2010; Armstrong et al. 2012), labor union (Chyz et al. 2013), customers and suppliers (Naritomi 2013; Cen et al. 2014), auditors (McGuire et al. 2012), and the public (Mills et al. 2013). Yet, little is known about the role of *local* governments in taxation, despite the fact that the state is *de facto* the largest minority shareholder of firms due to its tax claim on cash flows (Desai et al. 2007). Our study seeks to fill this void by investigating how fiscal pressure of local governments affects tax enforcement and corporate tax avoidance.

We examine this question in the Chinese context primarily because of China's authoritarian state-capitalist model, of which government intervention is far more profound than that in liberal capitalist economies. In China, the role of local governments in corporate taxation is not well understood due to the parallel existence of rampant horizontal tax competition between jurisdictions and a conflict of interest between national and sub-national governments as a result of the vertical tax-sharing system. On one hand, China has a highly centralized political system with strong top-down mandates and a homogeneous governance structure. In this system, personnel control is concentrated in the hands of the central government, with economic performance being a crucial indicator for sub-national government officials to move up the career ladder (Li and Zhou 2005). As such, the promotion concerns of local officials may mutate into fierce inter-jurisdictional tax competition in order to attract capital inflows, especially foreign investment. On the other hand, the tax-sharing system in favor of central government has created a substantial fiscal

gap at the local levels. For instance, in 2008, local governments accounted for more than 78.7 percent of total public expenditure, while receiving 46.7 percent of total government revenue (China Statistical Yearbook 2009). The fiscal deficit seriously compromises local governments' ability to carry out infrastructure investment and weakens social service provision, which may lead to political repercussion for the local officials.

The traditional taxation theory depicts that the optimal condition requires that the marginal cost of taxation should be equal to the marginal benefit of public funds (Slemrod and Gillitzer 2014). Consider the local politicians' payoff function. The local leaders are mainly concerned about their political career path, which is critically conditioned on the economic growth record during the leaders' tenure (Liu et al. 2006). Intuitively, local governments with budgetary slack are in an advantageous position to engage in tax competition and boost economic growth. The marginal benefit from lax tax enforcement may overweigh the marginal cost. Consequently, the local leaders are less motivated to strengthen tax enforcement, leaving considerable room for firms to avoid tax. For example, Esteller-Moré (2005) finds that regional governments have less incentive and thereby devote less effort in tax collection when they receive unconditional grants from the central government. In contrast, for local governments suffering a fiscal squeeze, it is reasonable to assume that the marginal cost from a lenient tax policy is more than the marginal benefit. This is because, to meet their commitments to finance public services, the local governments may be forced to raise public revenues through stricter tax enforcement. Taken together, the cost and benefit from stern tax enforcement vary according to the fiscal condition of the local governments. We therefore hypothesize that firms operating in regions with higher fiscal pressure are associated with lower tax avoidance.

Our empirical analysis is conducted based on three distinct databases: the firm-level data are obtained from the Annual Survey of Industrial Production maintained by the National

Bureau of Statistics of China (NBS), the city-level data are compiled from the China City Statistics Yearbook and the land revenue data are collected from the China Land and Resources Statistics Yearbook. The prior research often uses book income as a proxy for true profits and use the book-tax gap as a measure of tax avoidance (e.g., Desai, 2003; Desai and Dharmapala, 2006). However, since our sample consists of unlisted firms only, the book income information that is widely used to calculate tax avoidance measures for public firms is largely unavailable. To overcome this difficulty, we follow Cai and Liu (2009) and calculate an imputed corporate profit based on the national income account, that is, by deducting intermediate inputs from gross output. We then use the sensitivity of the reported accounting profit to the imputed profit to measure the level of tax avoidance (see Section 3 for more details). The intuition is straightforward. To the extent that both profit figures reflect a firm's economic fundamentals, a positive relationship between them is indicative of a low level of tax avoidance. Therefore, our empirical strategy is to test how fiscal pressure of local governments affects the sensitivity of the reported profits to the imputed profits.

Our prediction is confirmed by the empirical results. We find strong evidence suggesting that fiscal pressure due to the land revenue tax decline tend to be offset by tougher tax enforcement, which results in less tax avoidance activities. The estimated effects of fiscal pressure have the predicted signs with statistical and economic significance. For instance, on average, the responsiveness of the reported profit to the imputed profit for firms in high pressure cities increases by 0.018, representing a 21.2 percent increase from the mean level of the reported profit. This result is robust to alternative proxies for fiscal pressure, and to controlling for year, industry, city, industry-year and city-year fixed effects.

Moreover, we examine several factors that may moderate the effect of fiscal pressure on tax avoidance. The results show that the effect is augmented by financial constraints on local governments, measured by fiscal deficit and gross domestic product (GDP) growth rate.

These findings suggest that, when local governments are financially constrained, the reduction in land tax revenue will further worsen the financial condition and force local governments to raise more revenue by implementing stricter tax regulations. In addition, as discussed earlier, the tax capacity, to a large extent, is affected by the incentives of local officials. Our results confirm this argument by showing that the impact of fiscal pressure on corporate tax avoidance is more noticeable when the local political leaders have strong incentives to get promoted. Following prior research, the promotion incentives are measured based on political leaders' age, tenure, as well as national political cycle (Li and Zhou 2005; Piotroski et al. 2015).

Furthermore, Cai and Liu (2009) suggest that firms in relatively disadvantageous positions tend to demonstrate stronger incentives to engage in tax avoidance. Thus, we expect that the influence of local fiscal pressure on curbing tax avoidance is stronger for financially disadvantageous firms. Drawing on previous studies (Faccio et al. 2006; Hung et al. 2015), firms receiving government subsidies are considered as being financially and politically advantageous relative to the unsubsidized peers. Once again, our prediction is affirmed by the empirical results. That is, the impact of fiscal pressure is more pronounced among unsubsidized firms than subsidized ones. In addition, domestic firms were levied at a higher income tax rate (33 percent) compared to the foreign counterparts (25 percent) before the tax reform in 2008, which renders the former financially unfavorable. Consistent with our conjecture, the association between fiscal pressure and tax avoidance is stronger for domestic firms than for foreign firms using the subsample from 1999-2008.

One may reasonably concern that our independent variable, i.e., loss of land tax revenue, can be endogenous due to possible reverse causality and omitted variable bias. However, this does not seem to be a major concern in our study because the land taxes are primarily levied on real estate companies, which are excluded from our sample. To the extent that the decline

in land tax revenue should be considered an exogenous shock to industrial firms, what we have observed is actually a spillover effect from the real estate sector to other industries. Despite this argument, to empirically address the potential endogeneity concern, we conduct two-stage least squares (2SLS) regressions. We utilize three novel instrumental variables following Wang et al (2012) and Brueckner et al (2017), including the price elasticity of housing supply of cities, the developable land ratio and the elasticity of land price with respect to the floor area ratio. The IV results reveal a similar pattern of the relationship between fiscal pressure and tax avoidance compared with the OLS results. We do not consider the IV tests to be perfect ways to tackle the endogeneity concerns. Nevertheless, these tests can be viewed as another piece of evidence suggesting that endogeneity is unlikely to be the driving force of our main results.

We argue that fiscal pressure leads to greater local tax enforcement, which in turn results in lower corporate tax avoidance. To provide direct evidence of this argument, we measure the changes in enforcement actions using two proxies: the growth rate of local tax officers and the growth rate of local tax audits. In line with our conjecture, we find evidence suggesting that local fiscal pressure resulting from decreased land revenue tax is associated with higher growth rate of tax officers and tax audits.

Our study contributes to the literature in several ways. First, we contribute to an emerging literature on corporate tax avoidance. Prior studies focus largely on firm characteristics inhibiting corporate tax behavior, such as agency conflicts between manager and shareholder (Desai and Dharmapala 2006), ownership structure (Desai and Dharmapala 2008), corporate governance (Minnick and Noga 2010; Armstrong et al. 2015), and financial constrains (Edwards et al. 2016; Dyreng and Markle 2016). While there is a growing awareness on the role of politics in corporate tax behavior (Kim and Zhang 2015; Tang et al. 2017), the incentives of local governments on corporate taxation remain under-examined. Our

study is complementary to this literature by presenting new evidence that the fiscal squeeze of local governments decreases tax avoidance.

Second, our paper adds to understanding how local political leaders use tax instrument to achieve their personal political objectives. Our study is related to Esteller-Moré (2005), which focuses on the Spanish context and provides region-level evidence that unconditional grants from the central government undermine the efforts of regional tax administration in tax enforcement. Our study differs from Esteller-Moré (2005) in two important respects. Firstly, we focus on the firm-level tax avoidance behavior in response to the local governments' fiscal pressure. Secondly, we look at the Chinese setting that has unique institutional features. The Chinese style federalism renders the incentives of local government officials very complex. As a result of the inter-regional tax competition together with the vertical tax sharing, the local officials have to cautiously trade-off between the benefits and costs associated with rigid tax enforcement.

The rest of the paper proceeds as follows. Section 2 introduces institutional background pertaining to the tax system in China. Section 3 describes the data and variables. Section 4 presents the main findings and the results of subsample analyses. Section 5 discusses the results of further robustness checks. Section 6 concludes.

2. Institutional Background

2.1. Corporate income tax system in China

Acemoglu and Robinson (2006) suggest that leaders in an authoritarian regime such as China often prioritize tax collection capacity, because taxes are convenient and effective tools for local government officials to obtain resources to develop local economy and compete with others under the relative performance evaluation system. A report published by the World Bank and PwC in 2016 indicates that the total tax rate for Chinese enterprises has

averaged 68 percent, placing China 1st in the Asia-Pacific and 12th in the world.[1] In addition, a government-led survey on tax burden of Chinese enterprises reveals that more than 70 percent of the survey participants have complained about the high corporate income tax rates.[2] Accordingly, tax evasion is also a pervasive phenomenon in China. A survey conducted by the National Audit Office in 2004 shows that 788 large firms avoided a tax payment totaling more than 25 billion yuan over two years.[3] This is corroborated by the existing studies (Fisman and Wei 2004; Cai and Liu 2009; Tang et al. 2017). A further investigation uncovers that the tax evasion could be attributed to the weak tax enforcement by local governments, as well as possible collusion of government bureaucrats with firms for the purpose of rent seeking.

China's current tax system was established in 1994 with the promulgation of Tax System Reform Act. Under this system, tax revenue was classified into central and local tax revenue, separately collected by the National Taxation Bureau and provincial bureaus. While the legislation power of tax rests on the central government, the local governments can issue policies to facilitate the implementation of tax rules. In addition, the local governments are found to engage in tax competition by offering various tax incentives to local firms even without proper authorization from the central government. Wu and Yue (2009) document evidence that local governments provided firms in their jurisdictions with favorable tax policies, under which the firms paid income tax at the nominal rate of 33 percent and then were refunded 18 percent to attract businesses.

The national and local tax bureaus share responsibility to collect corporate income tax. During 1994-2001, the national tax bureau was responsible for collecting income taxes on state-owned enterprises (SOEs) owned by the central government and on the foreign

[1] See https://www.pwc.com/gx/en/paying-taxes-2016/paying-taxes-2016.pdf
[2] See http://money.163.com/15/1020/15/B6COERFG00253B0H.html
[3] See the report 'Tax treatment used as a tool for tax evasion' in ZhongguoJingyingBao (in Chinese), 26 September 2004.

enterprises. The local tax bureau collected income taxes from local SOEs, collective firms and private firms. The sharing ratio between the central and local governments was 40/60 percent. Since January 2002, the taxation scope and sharing ratio between the state and local tax bureaus were adjusted. All companies established after 2002 paid income taxes to the local branches of the state tax bureau, whereas the local firms registered prior to 2002 still paid income taxes to the local tax bureau. In 2002, the sharing ratio was 50/50 percent, but it was settled at 60/40 percent in favor of the central government beginning 2003.

Another major tax reform took place in 2008. Before the reform China provided various tax incentives to foreign-funded businesses, rendering their applicable income tax rates less than 25 percent, compared to the tax rate of 33 percent for domestic firms. Since 2008, China uniformed its corporate tax rate at 25 percent for foreign and domestic enterprises. The new tax reform marks a fundamental change in China's tax policy, from the preferential taxation of foreign firms to the neutral taxation of all businesses regardless of ownership.

2.2. Land transfer revenue in China

In China, the urban land belongs to the state, while the rural land is property of the collective. The state maintains monopoly of the primary land market in the urban areas. The land use rights are transferred via allocation (reserved for state-owned enterprises or non-profit organizations) and conveyance (reserved for commercial enterprises). The state allocation is transacted at an "allocation price", consisting of the expropriation cost of the land, stipulated land fees and a government-set allocation fee. The land use rights obtained through the conveyance can be further transferred in the "secondary land market". Since the conveyance fees are partly determined by the market, these fees are substantially higher than the allocation prices.

Since the 1994 tax reform, the revenue assignment has been gradually recentralized,

leaving expenditure assignment largely unchanged. This has created a substantial fiscal gap at the local levels (Nitikin et al. 2012). In 2008, for example, the local governments contributed more than 78 percent of total public expenditure, while receiving less than 47 percent of total government revenue. The lack of revenue has seriously comprised local governments' capability to carry out infrastructure and prevented them from offering social services, which may have adverse impacts on political leaders' promotion prospects and even lead to political repercussion. As a result, the local governments have strong incentives to raise revenue through various means. The monopolistic power of local governments on land decision-making makes it an especially attractive revenue source to enable the local governments to meet their extensive expenditure assignment (Nitikin et al. 2012). Specifically, the local governments generate revenue from land transfers through: (1) land auctions (which account for 20-30 percent of all land transfers); (2) administrative transfer of land for urban use; and (3) land banks and mortgage loans.

According to China Land and Resources Statistics Yearbook 2018, land transfer revenue accounts for 15 percent of the total central and local government revenue, serving as the second largest revenue source only behind the tax revenue. By the estimates of the World Bank, land transfer fees amount to at least 20 to 30 percent of total sub-national government revenue (World Bank 2006). Moreover, land related revenue takes an increasing proportion of local governments' revenue. For example, the ratio of land related revenue to total revenue of local government was less than 10 percent prior to 2000, and dramatically increased to more than 20 percent in 2007. However, since a large proportion of the land related revenue is collected in the form of extra-budgetary revenue for which the collection process is opaque, such revenue source is unstable and risky. When there is a significant decrease in land transfer revenue, the local government will inevitably suffer from serious fiscal pressure and be forced to tighten their tax enforcement to generate revenue from other sources.

3. Data, Sample and Variables

3.1. Sample and data

The primary data source used in our study is the National Bureau of Statistics of China (NBS), which contains annual survey data for all industrial firms with annual sales of more than 5 million RMB Yuan (approximately $780, 000 USD). Those firms account for more than 85 percent of China's industrial value added. The firm-level information includes industry code, ownership, region code, value added, sales revenue, various tax payments among others. So far, the NBS database provides the most comprehensive coverage for Chinese unlisted firms, with around 200,000 firms included each year.[4] The information reported to the NBS should be highly reliable, because the NBS has implemented standard procedure in calculating the national income account and double checked the information in a strict manner. Also, firms do not have any incentives to misreport their information to the NBS, since such information cannot be used against them by other government agencies like the tax authorities (Cai and Liu 2009).

The city-level information is manually collected from the China City Statistical Yearbook, which covers information on government revenue and expenditure for cities at and above the prefecture level. In addition, information on the land transfer revenue is derived from the China Land and Resources Statistics Yearbook. Finally, personal information on government officials is obtained from the China Stock Market & Accounting Research (CSMAR) database.

We use data from 1999 to 2012, spanning 34 provinces or province-equivalent municipal cities and 289 prefecture-level cities. We combine the above databases and drop four types of observations following Cai and Liu (2009): (1) the observations with missing value on key

[4] The NBS does not cover Chinese listed firms specifically, which are grouped together with other firms under the mixed-ownership category. By end of 2013, there were about 2,490 firms listed in China's two stock exchanges.

variables, such as total assets, number of employees, industrial output, profit, and depreciation expense; (2) the observations with negative value for total assets, intermediate input and total fixed assets; (3) the observations with total assets less than the net fixed assets, or with accumulated depreciation less than the current depreciation; and (4) the observations for which one of the following is true: the value of fixed assets is below RMB 10 million, the value of total assets is below RMB 10 million, and the number of employees is less than 30. This procedure yields a final sample of 649,611 observations, representing 209,806 unique firms.

3.2. Measurement of tax avoidance

A conventional measure of tax avoidance is the book-tax difference (Mills 1998; Hanlon 2005; Blaylock et al. 2012). However, since book incomes are usually unavailable for unlisted firms, we cannot use this approach in our study. We follow Cai and Liu (2009) and use the association between the imputed profit and the true accounting profit to measure the degree of tax avoidance. Using the difference between the imputed profit and the accounting profit to proxy for tax avoidance is not appropriate because the two figures can legitimately differ from each other due to accounting standards. However, for our purpose, we only need to assume that the two profit numbers are positively correlated, because both of them reflect a firm's economic fundamentals. In other words, a strongly positive correlation between the imputed profit and the reported accounting profit indicates a low level of tax avoidance. The NBS database contains information on input and output for every sample firm, which allows us to compute the imputed profit (*PRO*) defined according to the national income accounting system as follows:

$$PRO=Y-MED-FC-WAGE-CURRD-VAT \quad (1)$$

where *Y* is firm's gross output, *MED* is intermediate inputs, *FC* is financial charges (mainly

interest payments), *WAGE* is total wage bill, *CURRD* stands for the amount of current depreciation, and *VAT* is value-added tax. The reported accounting profit is measured as the pre-tax accounting profit (*RPRO*). Both imputed and reported profits are normalized by firms' total assets.

3.3. Measurement of fiscal pressure

As discussed in Section 2, land transfer revenue comprises a significant proportion of a local government's income. The revenue loss from land transfer substantially increases local governments' fiscal pressure. Thus, in our study, we measure fiscal pressure of a local government as the changes in land transfer revenues in its jurisdiction. *LAND* is defined as state-owned land transfer revenues divided by local fiscal revenue. *⊿LAND* is the change of the state-owned land transfer revenues, which equals *LAND* in year *t-1* minus *LAND* in year *t*, and then divided by *LAND* in year *t-1*. A higher value of *⊿LAND* stands for a decrease in revenue, suggesting an increase in fiscal pressure for the local government.

3.4. Control variables

Following Cai and Liu (2009), the control variables used in the main analysis include: *TAX*, defined as actual corporate income tax divided by its reported pre-tax profit, which is set to zero for loss-making firms.[5] *FINANCE*, defined as a firm's financial charges divided by its total assets, which is a proxy for the firm's access to credit markets; *RSALE*, defined as a firm's sales divided by its total output; *SIZE*, defined as the natural logarithm of the number of employees; and *SOE*, which equals 1 if the firm is a state-owned enterprise and 0 otherwise. We also include city-, industry-, and year- fixed effects, as well as city-year and

[5] While prior studies use effective tax rates (*ETR*) to measure corporate tax avoidance, *ETR* is likely to be noisy in our context. This is because the Chinese government has given various preferential tax treatments to various kinds of firms. In addition, local governments also grant tax holidays and rebates to various types of firms to promote local economic growth. Thus, *ETR* captures not only tax avoidance behavior, but also preferential tax policies.

industry-year fixed effects. The standard errors are clustered at the city level to correct for within-city correlation. All continuous variables are winsorized at the 0.5 percent and 99.5 percent levels. The variable definitions are provided in the Appendix A.

4. Empirical Results

4.1. Summary statistics

Summary statistics of the variables used in regressions are reported in Table 1. The mean of the reported profit is 0.0854 with a standard deviation of 0.1613, while the mean of the imputed profit is 0.1432 with a standard deviation of 0.3705. These figures are highly consistent with those reported in Cai and Liu (2009).[6] The difference between the two profit measures may reflect the differences between the accounting system and the national income account system. Moreover, as can be seen from Panel B, the mean of $\Delta LAND$ is -0.1828, suggesting that on average the local governments profit from transferring state-owned lands during our sample period. However, the medium of $\Delta LAND$ turns positive, suggesting the presence of revenue loss from land transfers. In addition, the summary statistics of the control variables are also consistent with those reported in Cai and Liu (2009). For example, the mean of *TAX* and *FINANCE* is 0.227 and 0.018 in our sample, compared to 0.25 and 0.016 in Table 2 of Cai and Liu (2009).

[Insert Table 1 about here]

4.2. Baseline regression results

To assess the impact of local fiscal pressure on corporate tax avoidance, we estimate the following regression model:

$$RPRO_{i,t}=(\beta_0+\beta_1*\Delta LAND+\beta_2*TAX+\beta_3*FINANCE+\beta_4*SIZE+\beta_5*RSALE+\beta_6*SOE+\lambda_{i,t})*P$$

[6] As reported in their Table 2, the mean of the reported profit is 0.0515 and that of the imputed profit is 0.1431 during 2000-2005.

$$RO_{i,t}+\alpha_1*\Delta LAND+\alpha_2*TAX+\alpha_3*FINANCE+\alpha_4*SIZE+\alpha_5*RSALE$$
$$+\alpha_6*SOE+\lambda_{i,t}+\mu_i+\varepsilon_{i,t} \quad (2)$$

where for firm i in year t, λ includes industry and city fixed effects. μ refers to year fixed effects. β_1 captures the effect of land transfer revenue on tax avoidance. If fiscal squeeze due to the revenue loss from land transfers forces local governments to tighten tax enforcement, we would expect β_1 to be significantly positive.

Table 2 presents the OLS regression results. In columns (1)-(5) the land transfer revenue loss is measured as $\Delta LAND$, whereas in columns (6)-(7) we use an alternative proxy, which is a dummy variable that equals 1 if $\Delta LAND$ is above the sample median and 0 otherwise. In column (1), we only include the imputed profit and city dummy variables in the regression. The coefficient on *PRO* is positive and statistically significant at the 1 percent level. In column (2), we add all variables in Equation (2) except the fiscal pressure variable and its interaction with the imputed profit. The significantly positive coefficient on *PRO* remains. Furthermore, in column (3), we only consider the impact of fiscal pressure on tax avoidance without controlling for other variables except the city-, year- and industry-fixed effects. The coefficient on the interaction term *PRO* $*\Delta LAND$ is positive and statistically significant. This result is not sensitive to adding control variables in column (4) and replacing the city-, year- and industry fixed effects with industry-year and city-year fixed effects in column (5). These results confirm our conjecture that fiscal pressure due to land transfer revenue loss provides local governments with greater incentives to strengthen their tax regulation and thereby reduces the incidence of tax avoidance in their jurisdictions.

In columns (6) and (7), we replace $\Delta LAND$ with $D\_\Delta LAND$. The coefficients on the interaction terms are still significantly positive. The economic significance is also sizable. Take for example the results in column (6). On average, the responsiveness of the reported profit to the imputed profit for firms in high pressure cities increases by 0.018, representing a

21.2 percent increase from the mean level of the reported profit.

The results on control variables are mostly consistent with our expectations. The coefficients on the interaction of effective tax rate with the imputed profit are statistically negative, consistent with the finding of Fisman and Wei (2004). Additionally, a firm's incentive to avoid tax should be negatively associated with its financial performance. This is supported by the significantly positive coefficient on the interaction of sales with the imputed profit. We also find some evidence that state-owned firms tend to underreport their profits compared to other firms. This is broadly consistent with the finding of Cai and Liu (2009). Inconsistent with our prediction, the coefficients on the interaction of firm size with the imputed profit are significantly negative, suggesting that larger firms are more likely to avoid corporate tax.

[Insert Table 2 about here]

4.3. Cross-sectional analyses

Our baseline result is consistent with firms hiding less profits when the local government becomes financially pressurized. In this subsection, we provide several cross-sectional variation analyses to substantiate the above relation. To the extent that we find evidence consistent with theoretical predictions in which land transfer revenue loss is expected to have a larger impact on tax avoidance, the potential endogeneity concern is lessened (Rajan and Zingales 1998). We consider three types of measures on strength of fiscal pressure as moderating factors in the following analyses.

4.3.1. Financial condition of local governments

Thus far, our findings have suggested that local governments tend to tighten tax enforcement when they suffer a severe revenue loss. If this argument holds, it would be

reasonable to expect that this effect is more pronounced for firms located in regions where the fiscal condition is undesirable. We employ two measures of local fiscal circumstance: fiscal deficit and GDP growth rate. Specifically, we define fiscal deficit (*DEFICIT*) as the fiscal expenditure minus fiscal revenue and then divided by local GDP, averaged over the past five years. A city is considered as having higher deficit if the value of *DEFICIT* is above the sample median. In the similar vein, we use annual GDP growth rate to proxy for local fiscal condition (Jin et al. 2005). A city is assigned into the high (low) growth group if its GDP growth rate is above (below) the sample median.

Table 3 presents the regression results conditional on fiscal deficit. In columns (1)-(2), we control for city-, year- and industry-fixed effects. In columns (3)-(4), city-year and industry-year fixed effects are included instead. In line with our prediction, the coefficients on *PRO*⊿LAND* are significantly positive only for firms domiciled in regions suffering more fiscal deficits. The equality of the coefficients is investigated with a Wald test. The results show that the differences in the coefficients on *PRO*⊿LAND* are significant at the 1 percent level.

[Insert Table 3 about here]

In Table 4, we use GDP growth rate as a factor in moderating the relation between fiscal pressure and tax avoidance. Similarly, we control for city-, year- and industry- fixed effects in columns (1) and (2), while city-year and industry-year fixed effects in columns (3)-(4). The results constantly show that the coefficients on *PRO*⊿LAND* are statistically significant only for firms located in regions with lower economic growth, which represents a higher level of fiscal constraint. The equality test of the coefficients also suggests that the differences in the coefficients are significant at the 1 percent level. In addition, there is a sizable difference in terms of the economic magnitudes of the coefficients on *PRO*⊿LAND*. Take for instance

columns (1) and (2), the coefficient is 0.0063 for the low growth group, in contrast to that of 0.0007 for the high growth group. Overall, the results reported in Tables 3 and 4 provide supportive evidence that local officials' incentives to strengthen tax regulation and raise revenue from alternative sources when facing fiscal squeeze tend to be amplified by poor fiscal condition of the local governments.

[Insert Table 4 about here]

4.3.2. Promotion incentives of political leaders

Since the economic reforms starting 1979, the evaluation criterion for government officials has shifted from political conformity to economic performance as well as competence-related indicators (Li and Zhou 2005). Officials who are younger, better educated and having better record of administrative management are prioritized in terms of promotion. As discussed earlier, the fiscal pressure due to land transfer revenue loss will compromise the ability of local governments to finance local services and promote economic growth, which will subsequently have adverse impacts on local officials' promotion prospects. This is especially the case for officials who have strong incentives to get promoted. To empirically test this prediction, we use three measures for political leaders' promotion incentives. Empowered with decision-making rights on key political and economic matters, Communist Party Committee Secretary (Party Secretary) is the *de facto* "first-in-command" officials in a province. Therefore, we define political leaders as party secretaries (Persson and Zhuravskaya 2011; Chen and Kung 2016). Our first proxy is age of the party secretaries. According to the retirement rule in the communist party, provincial leaders are required to retire at the age of 65 if they are not promoted to a higher position in the central government. In this study, we focus on incentives of government officials at the city level, who take longer time than provincial officials to be promoted to the central government. To identify the

promotion incentives for such officials, we define a dummy variable *D_SWAGE*, which equals 1 if the municipal party committee secretary's age is below 55, and 0 otherwise. Officials whose ages are under 55 are deemed as having stronger promotion incentives than the older ones. Accordingly, we expect the main effect to be more noticeable for firms under the administration of officials who are younger than 55. This conjecture is confirmed by the results reported in panel A of Table 5.

In a further analysis, we define promotion incentives based on the interplay of age and tenure of government officials. Specifically, we first define an official's tenure as current year minus the appointment year and plus one. If the secretary takes office prior to June in year t, we assume year *t* to be the beginning year; and if he takes office after June in year *t*, we assume year *t+1* to be the beginning year. We then measure promotion incentives (*SWAGE_AD*) by multiplying *D_SWAGE* with *TENURE. SWAGE_AD* measures the relative age advantage of the secretary of the municipal party committee, with higher values indicating stronger promotion incentives. We conduct a subsample analysis based on the median value of *SWAGE_AD*. It is reasonable to expect that the relation between fiscal pressure and tax avoidance is stronger among the high incentive group than for the low incentive group. As reported in panel B of Table 5, we find evidence consistent with our expectation, regardless of what fixed effects are included.

[Insert Tables 5 about here]

In China, the promotion events are often visible and anticipated by government officials, and the promotions usually take place just prior to or during the National Congress of the Communist Party of China (NCCPC), which is a party congress held every five years. Piotroski et al. (2015) find that politicians and their affiliated firms tend to suppress negative information prior to the NCCPC, leading to higher stock price crash risk afterwards. This

suggests that to contest for personal advancement within the political structure, government officials have strong incentives to window-dress economic performance especially before the political events. Likewise, to better fund local services and boost economic growth, the officials are expected to strengthen tax enforcement prior to the NCCPC. Table 6 presents the regression results. We define a dummy variable *D_NCCPC*, which equals 1 if it is the current year of or one year before the NCCPC (namely, year 2001, 2002, 2006, 2007, 2011 and 2012, in our sample period), and 0 otherwise. Our results show that the coefficient on *PRO**⊿LAND* is significantly positive one year before or during the NCCPC year. When it comes to other periods, the above coefficient becomes insignificant. The difference in the coefficient is statistically significant at the 1 percent level. Collectively, the results reported in Tables 5 and 6 suggest that the incentives of strengthening tax enforcement by local officials are augmented by their career concerns and promotion incentives.

[Insert Table 6 about here]

4.3.3. Firm-level financial constraint

Prior research documents evidence that an increase in financial constraints leads firms to engage in more tax avoidance (Edwards et al. 2016). Following this logic, we predict that the positive relation between local fiscal pressure and corporate tax avoidance is more prominent for firms facing greater financial constraints. We first separate our sample into high and low constrained firms based on their receipt of government subsidies. Allen et al. (2005) suggest that government subsidy is one of the most important external financing sources for Chinese firms. Since China's industrial development is directed by the state through its five-year plans, government subsidies received by firms are pervasive and persistent. The previous research also finds that Chinese government subsidies have significant valuation implications (Lee et al. 2004) and reduces firms' cost of borrowing (Lim et al. 2018). As such, we predict that the

increased responsiveness of reported profit to imputed profit following the fiscal pressure is stronger for unsubsidized firms than for subsidized counterparts. This is exactly what we find in Table 7.

[Insert Table 7 about here]

High tax burden is a driving force of firms' incentives for tax avoidance (see, e.g., Fisman and Wei 2004; Cai and Liu 2009). Thus, we expect the impact of fiscal pressure on curbing tax avoidance to be more noticeable for firms suffering greater tax burden. To test this conjecture, we divide our sample into domestic firms and foreign firms, and use a subsample during 1999-2008. Before 2008, China provided various tax incentives to foreign businesses, rendering their applicable income tax rates less than 25 percent, compared to the tax rate of 33 percent for domestic firms. In other words, domestic firms suffered more severe tax burden than their foreign peers prior to 2008. Table 8 reports the results of this subsample analysis. Once again, consistent with our prediction, we find that the mitigating effect of fiscal pressure on tax avoidance is stronger for domestic firms that used to be taxed at a higher rate than foreign firms.

[Insert Table 8 about here]

5. Robustness Checks

5.1. Instrumental variable estimation

While we argue that the land transfer revenue loss is relatively exogenous to the industrial firms that are examined in our study, the current OLS results should be interpreted with caution. There might be omitted variables such as macroeconomic fluctuations that may simultaneously affect land transfer revenue and tax avoidance. Failing to address endogeneity concerns leads to biased results and even misleading interpretations. Thus, in this subsection,

we tackle the potential endogeneity issue by employing a two-stage least squares (2SLS) estimation procedure. Specifically, we separately use three variables as our instrumental variables (IVs). First, following Wang et al.'s (2012) approach, we construct two IVs using data from 35 cities: *ELASTICITY*, which captures the estimates of the price elasticity of housing supply of cities, and *DEV*, which indicates the developable land ratio (the proportion of land suitable for housing construction). Wang et al. (2012) find that the supply elasticity and developable land ratio are positively associated with housing prices. Therefore, these two variables are expected to be negatively associated with $\triangle LAND$. Additionally, drawing on Brueckner et al. (2017), we construct a floor-area-ratio (*FAR*) for residential land, which limits the ratio of the floor area within the proposed building. A stringent *FAR* limit will constrain the building height to be much lower than without the limit. A consequence of this regulation is that housing price rises due to the restricted supply. As such, we predict that *FAR* is negatively associated with $\triangle LAND$. However, these IVs are unlikely to affect firms' profit numbers directly. Thus, we have confidence that both exclusion and relevance criteria of IVs are fulfilled in our study. Following the literature (Himmelberg et al. 2005; Chaney et al. 2012), we instrument $\triangle LAND$ using the above three IVs multiplied by annual mortgage rate (*RATE*).[7]

Columns (1), (3) and (5) of Table 9 present the results of the first-stage regression. All the coefficient estimates for the IVs have expected signs and are statistically significant. In addition, F-tests of excluded IVs support the relevance of the instruments (F-statistic ranges from 719.27 to 875.07). Columns (2), (4) and (6) of Table 9 report the results of the second-stage regression. The instrumented interaction term $PRO*\triangle LAND$ continues to have a positive and significant coefficient as in the previous OLS regressions.

[Insert Table 9 about here]

[7] See Appendix B1-3 for city-level values of the above instrumental variables.

5.2. Alternative sample selection

We also carry out a robust test using other restricted samples. In Table 10, we remove firms located in four municipalities (Beijing, Shanghai, Tianjin and Chongqing), because of their vastly different features from other cities. Our findings remain unchanged under this sample restriction.

[Insert Table 10 about here]

5.3. Other robustness checks

We also conduct a battery of robust tests using alternative specifications, and the results are presented in Table 11. In column (1), we add some other firm characteristics that may influence the difference between imputed profit and real profit, which include inventory scaled by total assets (*INVEN*), current depreciation scaled by total assets (*DEP*), current liabilities scaled by total assets (*LIA*), and administrative expenses scaled by total assets (*ADMIN*). We add them and their interactions with imputed profits into the model. In column (2), we add local GDP growth (*GDPGW*) and its interaction with imputed profits into the model, which reflects the potentially regional influencing factor. In column (3), we control for the real profits in the previous year (*lag.RPRO*) and its interaction with *PRO*, given that the higher reported profits indicate higher tax payment, which implies more difficulties in sheltering tax fees in the following year. As predicted, the coefficients on *lag.RPRO* and *PRO*lag.RPRO* are significantly positive at the 1 percent level. In column (4), we control for the real corporate tax rate at the city level, measured as the mean of *TAX* in each city (*MEANTAX*). Higher values of *MEANTAX* indicate higher local tax rates and more stringent tax regulation. After controlling for these factors, the coefficient on our key variables remain qualitatively unaffected, suggesting that our findings survive these robust checks.

[Insert Table 11 about here]

5.4. Alternative measures of land transfer revenue loss

We also employ two alternative measures of land transfer revenue loss and repeat our main regressions. The first alternative is *⊿LAND1* (*LAND1* in year *t-1* minus *LAND1* in year *t*, divided by *LAND1* in year *t-1*), where *LAND1* is defined as state-owned land transfer revenues divided by local GDP. The second alternative is *LAND2* (*LAND2* in year *t-1* minus *LAND2* in year *t*, divided by *LAND2* in year *t-1*), where *⊿LAND2* is defined as state-owned land transfer revenues divided by fiscal expenditure of the whole city. The results are reported in Table 12 and remain qualitatively unchanged.

[Insert Table 12 about here]

5.5. Testing the Mechanism of Tax Enforcement

We argue that local fiscal pressure decreases corporate tax avoidance through enhanced tax enforcement/collection. In this subsection, we seek to provide direct evidence of this argument. First, we use the growth rate of local tax officers as a surrogate for tightness of tax enforcement. Since one of the major roles played by tax officers is to identify and combat tax evasion, a growing number of tax officers is expected to be associated with a higher level of tax enforcement. We collect the number of provincial tax officers and calculate the annual growth rate of tax officers (*OFFICE_g*). Besides, we also capture regional tax authority enforcement using the probability of a tax authority audit, which is measured as the *ex post* realizations of actual face-to-face audits. Specifically, we measure the audit probability by the annual number of audited firms by the provincial tax authority in a particular province. To capture the tax authority enforcement intensity for a region with different fiscal pressure, we take the annual change rate in tax audit (*Tax audit_g*) as our second measure of tax

enforcement. We regress the tax enforcement measure (i.e., *OFFICE_g* and *Tax audit_g*) on one-year-lagged land transfer revenues divided by fiscal revenue at the province level. The results are presented in Panel A of Table 13. We find that fiscal pressure due to loss in land transfer revenues is positively associated with local tax enforcement. This effect is economically sizable. For instance, 1% decrease in land transfer revenues increases the growth rate of local tax officers by 8.9% and the growth rate of tax audit by 5.5%.

Second, we separate the full sample into high- and low-growth subsamples based on the median of *OFFICE_g*. *D_OFF_g* (i.e., the high growth group) is a dummy variable that equals one if *OFFICE_g* is above the median, and zero otherwise. We then repeat the main regression separately for the two subsamples and present the results in Panel B of Table 13. The results show that, regardless of what fixed effects are included, the role of fiscal pressure in reducing corporate tax avoidance is more pronounced in the areas with high growth rate of tax officers. This suggests a complementary effect of fiscal pressure and tax avoidance on curbing tax misconduct. Overall, these findings are in line with our argument that local government increase tax enforcement in response to decreases in other sources of tax revenues.

[Insert Table 13 about here]

6. Conclusion

Motivated by a burgeoning of literature on corporate tax avoidance, we investigate an important yet under-examined factor in shaping firms' tax behavior, namely fiscal pressure. Our results show that fiscal pressure as a result of land transfer revenue loss prevents Chinese industrial firms from engaging in more tax avoidance activities. In the cross-sectional variation analyses, we find that the mitigating effect of fiscal pressure on tax avoidance is more noticeable among firms located in regions with higher fiscal constraints, firms under the

jurisdictions where the local political leaders have greater promotion incentives, and financially disadvantaged firms. Our results are robust to a battery of alternative specifications.

Our study contributes in particular to understanding the impact of local government incentives on corporate tax behavior. Moreover, our research has wide implications for academics, investors and policy makers. For academics, a key message conveyed by this study is that the real estate market fluctuations may have unintended consequences for industrial firms. For investors who are interested in Chinese markets, they should be aware of the risk and benefit of government intervention when making investment decisions. For policy makers, especially those at the national level, it is imperative for them to be aware that while the relative performance evaluation system may fuel economic growth, it has also created room for local politicians to engage in horizontal tax competition by offering massive unfair tax benefits or imposing lenient tax regulation for firms within their jurisdictions.

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TABLE 1
Summary Statistics

Panel A: Firm-level Analyses

Variable	N	Mean	Std. Dev	Min	25%	Median	75%	Max
RPRO	649,611	0.0854	0.1613	-0.1732	0.0041	0.0362	0.1100	0.9902
PRO	649,611	0.1432	0.3705	-1.418	-0.0289	0.0720	0.2378	2.1377
TAX	649,611	0.2271	0.1422	0.000	0.1250	0.2484	0.3283	0.7880
FINANCE	649,611	0.0181	0.0181	0.000	0.0054	0.0134	0.0250	0.1272
SIZE	649,611	5.6039	1.0524	2.0794	4.8903	5.5607	6.2305	8.6656
RSALE	649,611	1.0148	0.3159	0.3452	0.9306	0.9948	1.0242	4.4250
SOE	649,611	0.1708	0.3764	0	0	0	0	1
FOREIGN	649,611	0.2754	0.4467	0	0	0	1	1
LAND	649,611	.61083	0.4598	0.0191	0.2750	0.5324	0.8138	7.2504
⊿LAND	649,611	-0.1828	1.1257	-6.7837	-0.3258	0.1109	0.3775	0.9828
DEFICIT	601,222	0.0283	0.0317	-0.0064	0.0094	0.0198	0.0369	0.1536
D_SUB	603,226	0.1178	0.3225	0	0	0	0	1
GDPGW	626,205	13.13	3.1848	-39.8	11.1	13.12	15.1	37.69
D_NCCPC	649,611	0.5734	0.4945	0	0	1	1	1
ELASTICITY	225,402	4.65	4.76	-7.70	1.52	3.42	5.40	37.05
DEV	225,402	87.23	9.16	57.39	83.1	86.41	96.66	99
FAR	410,133	0.71	0.28	-0.01	0.55	0.77	0.87	1.55
RATE	649,611	6.57	0.69	5.76	6.12	6.21	6.84	7.83
LAND1	649,006	0.0418	0.0333	0.0007	0.0167	0.0358	0.0586	0.2794
⊿LAND1	648,103	-0.2817	1.1816	-6.9314	-0.4241	0.0366	0.3413	0.9817
LAND2	649,514	0.4514	0.3986	-0.0007	0.1744	0.3517	0.6170	4.1583
⊿LAND2	649,434	-0.1862	1.1363	-7.050	-0.3058	0.1031	0.3845	0.9732
SWAGE	644,878	53.47	4.7308	43	50	53	56	76
TENURE	649,397	2.9386	1.9223	1	1	2	4	12
SWAGE_AD	644,878	1.5730	1.7447	0	0	1	3	11
Panel B: Region-level Analyses								
LAND_P	289	0.4389	0.2659	0.0289	0.2382	0.4389	0.5777	1.7047
L.⊿LAND_P	289	-0.6181	2.5658	-32.32	-0.6181	-0.2116	0.0765	0.6887
Tax audit_g	130	0.2578	1.4792	-0.9171	-0.3130	-0.0348	0.3355	11.7657
OFFICE_g	289	0.0169	0.2154	-0.6388	-0.0116	0.0032	0.0205	1.5687
Inflation	289	0.0029	0.0280	-0.0918	-0.0191	0.0079	0.0256	0.0520
GDP	289	8.6841	1.066	5.7969	7.9928	8.7881	9.4283	10.952
GDP_growth	289	0.1436	0.0439	0.0322	0.1142	0.0322	0.1718	0.3779
IND1	289	12.63	6.57	0.63	8.8	12.5	16.6	37.9
IND2	289	47.30	7.88	20.7	43.1	48.7	53	60.1
Unemployment_rate	289	3.72	0.71	1.3	3.4	3.8	4.18	6.5

This table reports the summary statistics of key variables used in the empirical analyses. Our sample comprises 649,611 firm-year observations from the National Bureau of Statistics of China (NBS) for the period 1999-2012. Variable definitions are provided in Appendix A.

TABLE 2
OLS Regressions

	RPRO						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PRO	0.1771***	0.1378***	0.1681***	0.1399***	0.1466***	0.1300***	0.1238***
	(20.72)	(7.26)	(21.10)	(7.45)	(7.68)	(6.23)	(5.86)
⊿LAND			-0.0012*	-0.0007	-0.0004		
			(-1.68)	(-1.07)	(-0.89)		
*PRO *⊿LAND*			0.0092***	0.0046**	0.0033**		
			(4.01)	(2.02)	(2.38)		
D_⊿LAND						-0.0016	0.0007
						(-0.68)	(0.28)
*PRO*D_⊿LAND*						0.0191**	0.0187**
						(2.06)	(1.99)
*PRO *TAX*		-0.0619***		-0.0617***	-0.0608***	-0.0622***	-0.0853**
		(-3.40)		(-3.39)	(-3.35)	(-3.41)	(-3.08)
*PRO*FINANCE*		0.2064		0.2039	0.2029	0.2092	0.1921
		(1.27)		(1.26)	(1.24)	(1.31)	(1.16)
*PRO*SIZE*		-0.0059**		-0.0061**	-0.0070**	-0.0071**	-0.0087***
		(-2.06)		(-2.16)	(-2.45)	(-2.57)	(-3.15)
*PRO*RSALE*		.0915***		0.0909***	0.0879***	0.0897***	0.0862***
		(10.74)		(10.71)	(10.45)	(10.61)	(10.36)
*PRO*SOE*		-0.0256***		-0.0244***	-0.0242***	0.0137	0.0121
		(-3.64)		(-3.47)	(-3.37)	(1.62)	(1.38)
TAX		0.0603***		0.0604***	0.0642***	0.0600***	0.0463***
		(11.72)		(11.72)	(11.88)	(11.64)	(7.98)
FINANCE		0.0198		0.0205	0.0525	0.0234	0.0506
		(0.15)		(0.16)	(0.39)	(0.18)	(0.38)
SIZE		-0.0007		-0.0007	0.0002	-0.0005	0.0004
		(-0.87)		(-0.83)	(0.35)	(-0.60)	(0.57)
RSALE		.0910***		0.0906***	0.0885***	0.0928***	0.0911***
		(15.05)		(15.02)	(14.86)	(15.17)	(15.04)
SOE		-0.0408***		-0.0409***	-0.0375***	-0.0437***	-0.0398***
		(-22.53)		(-22.42)	(-18.34)	(-23.41)	(-19.61)
Constant	0.0600***	-0.0510***	-0.0033	-0.0508***	-15.3532***	-0.0548***	-15.1753***
	(49.03)	(-5.62)	(-0.44)	(-5.58)	(-9.44)	(-5.82)	(-9.56)
Year FE	No	Yes	Yes	Yes	No	Yes	No
Industry FE	No	Yes	Yes	Yes	No	Yes	No
City FE	Yes	Yes	Yes	Yes	No	Yes	No
Ind-Year Effect	No	No	No	No	Yes	No	Yes
City-Year Effect	No	No	No	No	Yes	No	Yes
Cluster by City	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	649,611	649,611	649,611	649,611	649,611	649,611	649,611
Adj. R-squared	0.2677	0.3600	0.3285	0.3601	0.3473	0.3601	0.3475

This table presents the OLS regression results of estimating Model (2). Columns (1)-(5) present the results using the land transfer revenue loss measured as *⊿LAND*, whereas columns (6)-(7) include an alternative proxy *D_⊿LAND*, which is a dummy variable that equals 1 if *⊿LAND* is above the sample median and 0 otherwise. Column (1) only includes the constant and *PRO* in the regression. Column (2) presents all variables except the *⊿LAND* and its interaction with *PRO*. In column (3), we only consider the impact of land transfer revenues on the relationship between the reported profit (*RPRO*) and the imputed profit (*PRO*). In column (4), all the variables, city-, year- and industry- fixed effects are added into the model. In column (5), we add all the variables, industry-year and city-year fixed effects into the model. Column (6) presents the results using *D_⊿LAND*, other variables, city-, year- and industry- fixed effects. In column (7), we control for *D_⊿LAND*, other variables, city-year and industry-year fixed effects. T-statistics based on robust standard errors clustered at the city levels are reported in parentheses. Variable definitions are provided in Appendix A. ***, **, * represent significance at the 0.01, 0.05 and 0.10 levels, respectively.

TABLE 3
The Moderating Effect of Fiscal Deficit

	RPRO			
	D_DEFICIT=1	*D_DEFICIT*=0	*D_DEFICIT*=1	*D_DEFICIT*=0
	(1)	(2)	(3)	(4)
PRO	0.1236***	0.1745***	0.1285***	0.1785***
	(5.56)	(7.32)	(5.66)	(7.52)
*PRO**⊿LAND*	0.0027**	0.0035	0.0030**	0.0032
	(2.13)	(0.81)	(2.31)	(0.71)
[Test of equality of the above coefficients]	[30.15***]		[53.88***]	
⊿LAND	-0.0004	-0.0005	-0.0002	0.00001
	(-1.07)	(-0.58)	(-0.38)	(0.01)
Other Variables	CONTROLLED			
Year FE	Yes	Yes	No	No
Industry FE	Yes	Yes	No	No
City FE	Yes	Yes	No	No
Ind-Year Effect	No	No	Yes	Yes
City-Year Effect	No	No	Yes	Yes
Cluster by City	Yes	Yes	Yes	Yes
Observations	276,739	324,483	276,739	324,483
Adj. R-squared	0.3994	0.3350	0.3811	0.3258

This table presents the regression results at different levels of fiscal deficit. *DEFICIT* is the mean value of the fiscal deficit ratio, which is calculated as the fiscal expenditure minus fiscal revenue and then divided by local GDP, over the past five years. We separate our sample into two groups according to the median value of *DEFICIT*, with *D_DEFICIT* that equals 1 indicating higher fiscal pressure. In columns (1) and (2), we add all variables and city-, year- and industry- fixed effects into the model, whereas in columns (3) and (4), we replace city-, year- and industry- fixed effects with city-year and industry-year fixed effects. The Wald test provides the chi-square test statistics in the brackets for test of whether the coefficient on *PRO**⊿LAND* is significantly different between the two subsamples. T-statistics based on robust standard errors clustered at city levels are reported in parentheses. Variable definitions are provided in Appendix A. ***, **, * represent significance at the 0.01, 0.05 and 0.10 levels, respectively.

TABLE 4
The Moderating Effect of Local GDP Growth

	RPRO			
	D_GDPGW=1	*D_GDPGW*=0	*D_GDPGW*=1	*D_GDPGW*=0
	(1)	(2)	(3)	(4)
PRO	0.1850***	0.1160***	0.1923***	0.1225***
	(6.24)	(7.64)	(6.50)	(7.76)
*PRO**⊿LAND*	0.0063**	0.0007	0.0067**	0.0013
	(2.19)	(0.49)	(2.31)	(0.93)
[Test of equality of the above coefficients]	[460.39***]		[252.92***]	
⊿LAND	-0.0009	-0.0006	-0.0002	-0.0008
	(-1.45)	(-1.63)	(-0.31)	(-1.34)
Other Variables	CONTROLLED			
Year FE	Yes	Yes	No	No
Industry FE	Yes	Yes	No	No
City FE	Yes	Yes	No	No
Ind-Year Effect	No	No	Yes	Yes
City-Year Effect	No	No	Yes	Yes
Cluster by City	Yes	Yes	Yes	Yes
Observations	327,892	298,313	327,892	298,313
Adj. R-squared	0.3742	0.3787	0.3679	0.3523

This table presents the regression results at different levels of local GDP growth. *GDPGW* is local GDP growth per year, and *D_GDPGW* equals 1 if *GDPGW* is lower than the sample median, indicating higher fiscal pressure and 0 otherwise. In columns (1) and (2), we add all variables and city-, year- and industry-fixed effects into the model, whereas in columns (3) and (4), we replace city-, year- and industry-fixed effects with city-year and industry-year fixed effects. The Wald test provides the chi-square test statistics in the brackets for test of whether the coefficient on *PRO**⊿LAND* is significantly different between the two subsamples. T-statistics based on robust standard errors clustered at city levels are reported in parentheses. Variable definitions are provided in Appendix A. ***, **, * represent significance at the 0.01, 0.05 and 0.10 levels, respectively.

TABLE 5
The Moderating Effect of Promotion Incentives

Panel A: Promotion Incentives measured as age of government officials

	RPRO			
	D_SWAGE=1	*D_SWAGE*=0	*D_SWAGE*=1	*D_SWAGE*=0
	(1)	(2)	(3)	(4)
PRO	0.1143***	0.1715***	0.1204***	0.1775***
	(6.47)	(5.37)	(6.81)	(5.53)
PRO⊿LAND*	0.0046***	0.0002	0.0050***	-0.0002
	(3.34)	(0.07)	(3.53)	(-0.07)
[Test of equality of the above coefficients]	[6.34**]		[5.61**]	
⊿*LAND*	-0.0007	-0.0001	-0.0006	0.0006
	(-1.48)	(-0.27)	(-1.00)	(1.14)
Other Variables	CONTROLLED			
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes
Ind-Year Effect	No	No	No	No
City-Year Effect	No	No	No	No
Cluster by City	Yes	Yes	Yes	Yes
Observations	399,801	245,077	399,801	245,077
Adj. R-squared	0.3808	0.3654	0.3684	0.3529

This table presents the regression results conditional on official promotion incentives. Ages of government officials are used to capture the promotion opportunities. *D_SWAGE* is a binary variable that equals 1 if the municipal party committee secretary's age (*SWAGE*) is less than 55, and 0 otherwise. In columns (1) and (2), we add all variables and city-, year- and industry- fixed effects into the model, whereas in columns (3) and (4), we replace city-, year- and industry- fixed effects with city-year and industry-year fixed effects. The Wald test provides the chi-square test statistics in the brackets for test of whether the coefficient on *PRO*⊿LAND* is significantly different between the two subsamples. T-statistics based on robust standard errors clustered at city levels are reported in parentheses. Variable definitions are provided in Appendix A. ***, **, * represent significance at the 0.01, 0.05 and 0.10 levels, respectively.

Panel B: Promotion Incentives measured as officials' relative age advantage

	RPRO			
	DSWAGE_AD=1	*DSWAGE_AD*=0	*DSWAGE_AD*=1	*DSWAGE_AD*=0
	(1)	(2)	(3)	(4)
PRO	0.1072***	0.1545***	0.1126***	0.1610***
	(4.95)	(6.40)	(5.21)	(6.55)
*PRO**⊿LAND*	0.0049***	0.0005	0.0054***	0.0003
	(3.33)	(0.22)	(3.60)	(0.13)
[Test of equality of the above coefficients]	[12.72***]		[14.79***]	
⊿LAND	-0.0007*	-0.0004	-0.0008*	0.0004
	(-1.87)	(-0.78)	(-1.73)	(0.71)
Other Variables	CONTROLLED			
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes
Ind-Year Effect	No	No	No	No
City-Year Effect	No	No	No	No
Cluster by City	Yes	Yes	Yes	Yes
Observations	269,131	375,747	269,131	375,747
Adj. R-squared	0.3966	0.3565	0.3820	0.3442

This table presents the regression results conditional on official promotion incentives. officials' relative age advantage is used to measure the promotion likelihood. *SWAGE_AD* equals *D_SWAGE* multiplies *TENURE,* reflecting the relative advantage of official promotion. *DSWAGE_AD* is a binary variable that equals 1 if *SWAGE_AD* has above-the-median value and 0 otherwise. In columns (1) and (2), we add all variables and city-, year- and industry- fixed effects into the model, whereas in columns (3) and (4), we replace city-, year- and industry- fixed effects with city-year and industry-year fixed effects. The Wald test provides the chi-square test statistics in the brackets for test of whether the coefficient on *PRO**⊿LAND* is significantly different between the two subsamples. T-statistics based on robust standard errors clustered at city levels are reported in parentheses. Variable definitions are provided in Appendix A. ***, **, * represent significance at the 0.01, 0.05 and 0.10 levels, respectively.

TABLE 6
The Moderating Effect of Political Cycles

	RPRO			
	D_NCCPC=1	*D_NCCPC*=0	*D_NCCPC*=1	*D_NCCPC*=0
	(1)	(2)	(3)	(4)
PRO	0.1174***	0.1884***	0.1224***	0.1968***
	(4.90)	(10.93)	(5.03)	(11.35)
PRO⊿LAND*	0.0062**	0.0013	0.0057**	0.0016
	(2.32)	(0.24)	(2.12)	(0.30)
[Test of equality of the above coefficients]	[34.77***]		[519.85***]	
⊿*LAND*	0.0005	-0.0014***	-0.00002	-0.0010**
	(1.13)	(-3.54)	(-0.05)	(-2.45)
Other Variables	CONTROLLED			
Year FE	Yes	Yes	No	No
Industry FE	Yes	Yes	No	No
City FE	Yes	Yes	Yes	Yes
Ind-Year Effect	No	No	Yes	Yes
City-Year Effect	No	No	Yes	Yes
Cluster by City	Yes	Yes	Yes	Yes
Observations	372,496	277,115	372,496	277,115
Adj. R-squared	0.3632	0.3601	0.3511	0.3482

This table presents the regression results conditional on national political cycles. *D_NCCPC* is a binary variable that equals 1 if it is the current year or the previous year (i.e., year 2001, 2002, 2006, 2007, 2011 and 2012) of National Congress of the Communist Party of China (NCCPC), and 0 otherwise. In columns (1) and (2), we add all variables and city-, year- and industry- fixed effects into the model, whereas in columns (3) and (4), we replace city-, year- and industry- fixed effects with city-year and industry-year fixed effects. The Wald test provides the chi-square test statistics in the brackets for test of whether the coefficient on *PRO*⊿LAND* is significantly different between the two subsamples. T-statistics based on robust standard errors clustered at city levels are reported in parentheses. Variable definitions are provided in Appendix A. ***, **, * represent significance at the 0.01, 0.05 and 0.10 levels, respectively.

TABLE 7
The Moderating Effect of Government Subsidies

	RPRO			
	D_SUB=1	*D_SUB*=0	*D_SUB*=1	*D_SUB*=0
	(1)	(2)	(3)	(4)
PRO	0.1055***	0.1346***	0.1149***	0.1419***
	(4.60)	(7.06)	(5.05)	(7.34)
*PRO**⊿LAND*	-0.0015	0.0029**	-0.0018	0.0031**
	(-0.67)	(2.34)	(-0.81)	(2.44)
[Test of equality of the above coefficients]	[6.70***]		[8.45***]	
⊿LAND	0.0001	-0.0006	0.00003	-0.0004
	(0.52)	(-1.49)	(0.16)	(-0.82)
Other Variables	CONTROLLED			
Year FE	Yes	Yes	No	No
Industry FE	Yes	Yes	No	No
City FE	Yes	Yes	No	No
Ind-Year Effect	No	No	Yes	Yes
City-Year Effect	No	No	Yes	Yes
Cluster by City	Yes	Yes	Yes	Yes
Observations	71,121	532,105	71,121	532,105
Adj. R-squared	0.3243	0.3578	0.3141	0.3448

This table presents the regression results about the effect of government subsidies on the relationship between land transfer revenue and firm tax avoidance. *D_SUB* is a binary variable that equals 1 if the firm receives subsidies from the government, and 0 otherwise. In columns (1) and (2), we add all variables and city-, year- and industry- fixed effects into the model, whereas in columns (3) and (4), we replace city-, year- and industry-fixed effects with city-year and industry-year fixed effects. The Wald test provides the chi-square test statistics in the brackets for test of whether the coefficient on *PRO**⊿LAND* is significantly different between the two subsamples. T-statistics based on robust standard errors clustered at city levels are reported in parentheses. Variable definitions are provided in Appendix A. ***, **, * represent significance at the 0.01, 0.05 and 0.10 levels, respectively.

TABLE 8
Regressions for Different Types of Firms

	RPRO			
	FOREIGN=1	*FOREIGN*=0	*FOREIGN*=1	*FOREIGN*=0
	(1)	(2)	(3)	(4)
PRO	0.1736***	0.1371***	0.1758***	0.1437***
	(8.07)	(10.16)	(8.24)	(10.49)
*PRO**⊿LAND*	0.0006	0.0025**	0.0007	0.0030***
	(0.44)	(2.17)	(0.50)	(2.58)
[Test of equality of the above coefficients]	[20.73***]		[99.24***]	
⊿LAND	-0.0006***	-0.0003	-0.0006***	0.00003
	(-2.88)	(-1.05)	(-4.11)	(0.12)
Other Variables	CONTROLLED			
Year FE	Yes	Yes	No	No
Industry FE	Yes	Yes	No	No
City FE	Yes	Yes	No	No
Ind-Year Effect	No	No	Yes	Yes
City-Year Effect	No	No	Yes	Yes
Cluster by City	Yes	Yes	Yes	Yes
Observations	133,988	350,588	133,988	350,588
Adj. R-squared	0.2821	0.4076	0.2750	0.3935

This table presents the regression results for foreign-owned firms and domestic firms, respectively. *FOREIGN* is a binary variable that equals 1 if the firm is a foreign-owned enterprise, and 0 otherwise. In columns (1) and (2), we add all variables and city-, year- and industry- fixed effects into the model, whereas in columns (3) and (4), we replace city-, year- and industry- fixed effects with city-year and industry-year fixed effects. The sample period used in this test is 1999-2008. The Wald test provides the chi-square test statistics in the brackets for test of whether the coefficient on *PRO*⊿LAND* is significantly different between the two subsamples. T-statistics based on robust standard errors clustered at city levels are reported in parentheses. Variable definitions are provided in Appendix A. ***, **, * represent significance at the 0.01, 0.05 and 0.10 levels, respectively.

TABLE 9
Instrumental Variable Regressions

	IV1		IV2		IV3	
	First Stage	Second Stage	First Stage	Second Stage	First Stage	Second Stage
	⊿LAND	*RPRO*	*⊿LAND*	*RPRO*	*⊿LAND*	*RPRO*
	(1)	(2)	(3)	(4)	(5)	(6)
*ELASTICITY*RATE*	-0.0007***					
	(-10.21)					
*DEV*RATE*			-0.0002***			
			(-6.86)			
*FAR*RATE*					-0.0083***	
					(-10.84)	
⊿LAND		1.9975***		3.1290***		2.2204***
		(3.06)		(4.43)		(6.57)
PRO⊿LAND*		0.0334***		0.0330**		0.0605***
		(2.70)		(2.65)		(4.88)
Other variables				CONTROLLED		
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster by City	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.1954	0.3745	0.1952	0.3772	0.1806	0.3860
F statistics	719.29		719.27		875.07	
Observations	225,402	225,402	225,402	225,402	410,133	410,133

This table presents the results of IV regressions. *ELASTICITY* and *DEV* are constructed based using data from 35 cities according to Wang et al.'s (2012) approach, where *ELASTICITY* captures the estimates of the price elasticity of housing supply of cities, and *DEV* indicates the developable land ratio which equals the proportion of land suitable for housing construction. *FAR* is a variable reflecting the city-specific coefficients for residential land based on Brueckner et al. (2017), which covers 72 cities. All the instrumental variables are multiplied by the mortgage rate per year (*RATE*) to alleviate potential policy and other factors. T-statistics based on robust standard errors clustered at city levels are reported in parentheses. Variable definitions are provided in Appendices A and B. ***, **, * represent significance at the 0.01, 0.05 and 0.10 levels, respectively.

TABLE 10
Excluding Observations in Municipalities

	RPRO	
	(1)	(2)
PRO	0.1295***	0.1364***
	(7.00)	(7.29)
*PRO**⊿LAND*	0.0033**	0.0037***
	(2.36)	(2.58)
⊿LAND	-0.0008*	-0.0006
	(-1.87)	(-1.28)
Other Variables	CONTROLLED	
Year FE	Yes	No
Industry FE	Yes	No
City FE	Yes	No
Ind-Year Effect	No	Yes
City-Year Effect	No	Yes
Cluster by City	No	Yes
Observations	577,276	577,276
Adj. R-squared	0.3676	0.3551

This table presents the regression results after deleting the observations in municipalities (Being, Tianjin, Shanghai and Chongqing). The sample shrinks to 577,276 observations. In column (1), we include all the variables, city-, year- and industry- fixed effects into the model. In column (2), we add all the variables, industry-year and city-year fixed effects into the model. T-statistics based on robust standard errors clustered at city levels are reported in parentheses. Variable definitions are provided in Appendix A. ***, **, * represent significance at the 0.01, 0.05 and 0.10 levels, respectively.

TABLE 11
Other Robustness Checks

	RPRO			
	(1)	(2)	(3)	(4)
PRO	0.1940***	0.1521***	0.0982***	0.1097***
	(9.95)	(4.72)	(8.56)	(3.47)
PRO⊿LAND*	0.0035***	0.0029*	0.0021**	0.0032**
	(2.83)	(1.76)	(2.57)	(2.27)
⊿LAND	-0.0007**	-0.0007*	-0.0003**	-0.0006
	(-2.47)	(-1.89)	(-2.58)	(-1.50)
*PRO*INVEN*	-0.2244***			
	(-12.89)			
INVEN	0.0364***			
	(6.69)			
*PRO*DEP*	-0.1623***			
	(-6.26)			
DEP	0.3747***			
	(18.30)			
*PRO*LIA*	-0.0738***			
	(-6.80)			
LIA	-0.0872***			
	(-24.44)			
*PRO*ADMIN*	0.0194			
	(0.68)			
ADMIN	0.0387			
	(1.40)			
GDPGW		0.0028***		
		(3.45)		
*PRO*GDPGW*		-0.0004		
		(-0.26)		
lag.RPRO			0.5512***	
			(35.89)	
*PRO*lag.RRPO*			0.0800***	
			(4.43)	
MEANTAX				-0.0762
				(-0.83)
*RPO*MEANTAX*				0.2841
				(1.59)
Other Variables		CONTROLLED		
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes
Cluster by City	Yes	Yes	Yes	Yes
Observations	647,743	626,205	471,932	649,611
Adj. R-squared	0.4366	0.3602	0.6218	0.3604

This table presents a battery of robust tests using alternative models. Column (1) represents the results controlling other firm-level characteristics that may influence the difference between imputed profit and real profit, namely inventory scaled by total assets (*INVEN*), current depreciation scaled by total assets (*DEP*), current liabilities scaled by total assets (*LIA*), and administrative expenses scaled by total assets (*ADMIN*), and their interactions with imputed profits are added into the model. Columns (2)-(4) include local GDP growth (*GDPGW*), the real profits of last year (*lag.RPRO*), city-level real corporate tax rate measured as the mean of

TAX in each city (*MEANTAX*), and their interactions with *PRO*, respectively. T-statistics based on robust standard errors clustered at city levels are reported in parentheses. Variable definitions are provided in Appendix A. ***, **, * represent significance at the 0.01, 0.05 and 0.10 levels, respectively.

TABLE 12
Alternative Measures of *⊿LAND*

	RPRO			
	⊿LAND1	*⊿LAND1*	*⊿LAND2*	*⊿LAND2*
	(1)	(2)	(3)	(4)
PRO	0.1406***	0.1474***	0.1406***	0.1476***
	(7.48)	(7.75)	(7.52)	(7.81)
PRO⊿LAND*	0.0063***	0.0060***	0.0065***	0.0066***
	(2.87)	(2.66)	(2.71)	(2.60)
⊿LAND	-0.0008	-0.0002	- 0.0012*	-0.0005
	(-1.16)	(-0.30)	(-1.74)	(-0.69)
Other Variables	CONTROLLED			
Year FE	Yes	No	Yes	No
Industry FE	Yes	No	Yes	No
City FE	Yes	No	Yes	No
Ind-Year Effect	No	Yes	No	Yes
City-Year Effect	No	Yes	No	Yes
Cluster by City	Yes	Yes	Yes	Yes
Observations	648,103	648,103	649,434	649,434
Adj. R-squared	0.3602	0.3475	0.3601	0.3474

This table presents robust tests using alternative measures of *⊿LAND*. In columns (1) and (2), we replace *⊿LAND* with *⊿LAND1,* where *LAND1* is defined as state-owned land transfer revenues divided by local GDP. *⊿LAND1* equals *LAND1* in year t-1 minus *LAND1* in year t, divided by *LAND1* in year t-1. In columns (3) and (4), we replace *⊿LAND* with *⊿LAND2,* where *LAND2* is defined as state-owned land transfer revenues divided by fiscal expenditure of the whole city. *⊿LAND2* equals *LAND2* in year t-1 minus *LAND2* in year t, divided by *LAND2* in year t-1. In columns (1) and (3), we add all variables and city-, year- and industry- fixed effects into the model, whereas in columns (2) and (4), we replace city-, year- and industry- fixed effects with city-year and industry-year fixed effects. T-statistics based on robust standard errors clustered at city levels are reported in parentheses. Variable definitions are provided in Appendix A. ***, **, * represent significance at the 0.01, 0.05 and 0.10 levels, respectively.

TABLE 13
Testing the Mechanism of Tax Enforcement

Panel A. Tax enforcement measured by other methods

	OFFICE_g	*Tax audit_g*
	(1)	(2)
L.⊿LAND_P	0.0079**	0.1559**
	(2.43)	(2.04)
Inflation	-2.0550	0.669
	(-1.22)	(0.04)
GDP	-0.2552	1.3290
	(-2.18)	(1.51)
GDP_growth	0.5945	-2.6570
	(1.44)	(-0.82)
IND1	-0.0043	-0.0365
	(-0.62)	(-1.42)
IND2	0.0030***	-0.0098
	(3.61)	(-0.72)
Unemployment_Rate	-0.0236	-0.4837
	(-0.84)	(-1.46)
Year FE	Yes	Yes
Province FE	Yes	Yes
Cluster by Year	Yes	Yes
Cluster by Province	Yes	Yes
Observations	289	130
Adj. R-squared	0.1919	0.2982

This table presents the regression results of fiscal pressure and tax enforcement. We use *OFFICE_g* and *Tax audit_g* as proxy for tax enforcement intensity. First, *OFFICE_g* refers to the growth rate of the officer number in local taxation bureau. Second, we capture regional tax authority enforcement by the probability of a tax authority audit measured by the ex post realizations of actual face-to-face audits, and take annual number of audited firms by the provincial tax authority in a particular province to measure audit probability. *Tax audit_g* stands for the annual change rate in tax audit, which captures the tax authority enforcement intensity for a region with different fiscal pressure. Those two variables are manually collected in Tax Year Book of China. *⊿LAND_P* equals *LAND_P* in year t-1 minus *LAND_P* in year t, and the divided by *LAND_P* in year t-1, where *LAND_P* is defined as state-owned land transfer revenues divided by fiscal revenue at province level. We take one-year lag value of the variable, i.e., *L.⊿LAND_P* in the regression. Control variables include the growth rate of CPI index (*Inflation*), the logarithm of provincial GDP (*GDP*), the growth rate of provincial GDP (*GDP_growth*), the proportion of first industry to provincial GDP (*IND1*), and the proportion of second industry to provincial GDP (*IND2*). we also control *Unemployment_Rate*, which is defined as registered unemployment rate at province level. Year-, province- fixed effects are controlled. T-statistics based on robust standard errors clustered at year and province levels are reported in parentheses. Variable definitions are provided in Appendix A. ***, **, * represent significance at the 0.01, 0.05 and 0.10 levels, respectively.

Panel B. Tax enforcement measured as growth rate of local tax officers

	RPRO			
	D_OFFICE_g=1	*D_OFFICE_g*=0	*D_OFFICE_g*=1	*D_OFFICE_g*=0
	(1)	(2)	(3)	(4)
PRO	0.1321***	0.1247***	0.1378***	0.1297***
	(5.99)	(5.42)	(6.01)	(5.58)
PRO⊿LAND*	0.0054**	-0.0002	0.0057**	0.00003
	(2.33)	(-0.07)	(2.44)	(0.01)
[Test of equality of the above coefficients]	[93.21***]		[69.29***]	
⊿*LAND*	-0.0002	-0.0004	-0.0010*	-0.0005
	(-0.41)	(-0.83)	(-1.94)	(-1.01)
Other Variables	CONTROLLED			
Year FE	Yes	Yes	No	No
Industry FE	Yes	Yes	No	No
City FE	Yes	Yes	No	No
Ind-Year Effect	No	No	Yes	Yes
City-Year Effect	No	No	Yes	Yes
Cluster by City	Yes	Yes	Yes	Yes
Observations	278,483	312,446	278,483	312,446
Adj. R-squared	0.3846	0.3806	0.3708	0.3686

This table presents the regression results of the mechanism test. We collect the number of provincial tax officials and calculate the growth rate of tax officers (*OFFICE_g*). We separate our sample into two groups according to the median value of *OFFICE_g*. *D_OFFICE_g* that equals 1 indicates higher tax enforcement and 0 otherwise. In columns (1) and (2), we add all variables and city-, year- and industry- fixed effects into the model, whereas in columns (3) and (4), we replace city-, year- and industry- fixed effects with city-year and industry-year fixed effects. The Wald test provides the chi-square test statistics in the brackets for test of whether the coefficient on *PRO*⊿LAND* is significantly different between the two subsamples. T-statistics based on robust standard errors clustered at city levels are reported in parentheses. Variable definitions are provided in Appendix A. ***, **, * represent significance at the 0.01, 0.05 and 0.10 levels, respectively.

APPENDIX A
Variable Definitions

Firm-level Variables

RPRO	Pre-tax accounting profits divided by total assets.
PRO	Imputed profits divided by total assets, and imputed profit is calculated as follows: PRO=Y-MED-FC-WAGE-CURRD-VAT; where Y: firm's gross output; MED: intermediate inputs; FC: financial charges (mainly interest payments); WAGE: total wage bill; CURRD: amount of current depreciation; VAT: value-added tax.
TAX	The ratio of firm's actual corporate income tax to its reported pre-tax profit.
FINANCE	The ratio of firm's financial charges to its total assets, which is a proxy for the firm's access to credit markets.
RSALE	The ratio of firm's sales to its total output.
SIZE	The logarithm of the number of employees.
SOE	A binary variable set equal to 1 if the firm is state-owned enterprise, and 0 otherwise.
FOREIGN	A binary variable set equal to 1 if the firm is foreign-owned enterprise, and 0 otherwise.
LAND	State-owned land transfer revenues divided by local fiscal revenue of the whole city.
⊿LAND	The change of the state-owned land transfer revenues proportion, which equals *LAND* in year *t*-1 minus *LAND* in year *t*, and the divided by *LAND* in year *t*-1.
DEFICIT	The mean value of the fiscal deficit ratio over the past five years, where deficit ratio is calculated as the fiscal expenditure minus fiscal revenue and then divided by local GDP.
D_DEFICIT	A binary variable set equal to 1 if DEFICT is greater than the sample median, and 0 otherwise.
D_SUB	A binary variable set equal to 1 if firm receives subsidies form the government, and 0 otherwise.
GDPGW	Local GDP growth per year.
D_GDPGW	A binary variable set equal to 1 if local GDP growth rate (*GDPGW*) is greater than sample median.
D_NCCPC	A binary variable set equal to 1 if it is the current year or previous year (namely, year 2001, 2002, 2006, 2007, 2011 and 2012) of National Congress of the Communist Party of China (NCCPC).
ELASTICITY	An instrument variable which stands for the estimates of the price elasticity of housing supply of cities.
DEV	Developable land ratio, an instrument variable which captures the proportion of land suitable for housing construction.
FAR	An instrument variable which stands for the city-specific coefficients for residential land.
RATE	The mortgage rate in year *t.*
LAND1	State-owned land transfer revenues divided by local GDP.
⊿LAND1	The change of the state-owned land transfer revenues proportion, which equals *LAND1* in year *t*-1 minus *LAND1* in year *t*, divided by *LAND1* in year *t*-1.
LAND2	State-owned land transfer revenues divided by local fiscal expenses of the whole city.
⊿LAND2	The change of the state-owned land transfer revenues proportion, which equals *LAND2* in year *t*-1 minus *LAND2* in year *t*, divided by *LAND2* in year *t*-1.
D_SWAGE	A binary variable set equal to 1 if the municipal party committee secretary's age is smaller than 55.

TENURE	The length of the secretary's term, which equals current year minus the appointment year and plus one. If the secretary takes office prior to June in year *t*, we assume year t to be the beginning year; and if he takes office after June in year *t*, we assume year (*t*+1) to be the beginning year.
SWAGE_AD	The relative age advantage of the secretary of Municipal Party Committee, which equals *D_SWAGE* multiplies *TENURE.*
DSWAGE_AD	A binary variable set equal to 1 if *SWAGE_AD* is greater than the sample median, and 0 otherwise.
Region-level Variables	
LAND_P	State-owned land transfer revenues divided by local fiscal revenue at province level.
⊿LAND_P	The change of the state-owned land transfer revenues proportion, which equals *LAND_P* in year *t*-1 minus *LAND_P* in year *t*, and then divided by *LAND_P* in year *t*-1.
Tax audit_g	The annual change rate in tax audit, where tax audit is the annual number of audited firms by the provincial tax authority.
OFFICE_g	The annual change rate in the number of local tax officer.
Inflation	The inflation index, which equals CPI index in year *t* minus CPI index in year *t*-1 and then divided by CPI index in year *t*-1.
GDP	The logarithm of provincial GDP
GDP_growth	The growth rate of provincial GDP
IND1	The proportion of first industry to provincial GDP
IND2	The proportion of second industry to provincial GDP
Unemployment_rate	The registered unemployment rate at province level

APPENDIX B-1

Estimates of the Price Elasticity of Housing Supply by City

City	Elasticity	City	Elasticity	City	Elasticity
Xining	37.05	Xi'an	8.04	Fuzhou	3.85
Yinchuan	21.98	Shijiazhuang	7.89	Xiamen	3.47
Changsha	17.14	Nanchang	6.78	Nanjing	3.42
Urumqi	16.71	Harbin	6.30	Qingdao	2.89
Zhengzhou	16.50	Shenyang	5.75	Jinan	2.68
Hefei	13.03	Changchun	5.40	Hangzhou	2.65
Guangzhou	12.62	Tianjin	5.10	Ningbo	2.27
Nanning	11.45	Lanzhou	4.90	Shanghai	1.52
Guiyang	9.71	Wuhan	4.66	Beijing	0.53
Huhhot	9.63	Chongqing	4.51	Shenzhen	0.49
Taiyuan	9.16	Dalian	4.41	Kunming	-7.70
Haikou	8.83	Chengdu	4.36		

APPENDIX B-2

Developable Land Ratio by City

City	DEV	City	DEV	City	DEV
Yinchuan	0.9900	Hefei	0.8982	Hangzhou	0.8317
Shenyang	0.9802	Urumqi	0.8726	Qingdao	0.8310
Shanghai	0.9797	Nanjing	0.8668	Ningbo	0.7997
Zhengzhou	0.9680	Guangzhou	0.8651	Taiyuan	0.7992
Harbin	0.9668	Xiamen	0.8641	Shenzhen	0.7942
Changchun	0.9666	Dalian	0.8548	Guiyang	0.7913
Haikou	0.9631	Huhhot	0.8529	Chongqing	0.7733
Shijiazhuang	0.9572	Jinan	0.8504	Kunming	0.6437
Chengdu	0.9454	Beijing	0.8409	Xining	0.6287
Xi'an	0.9387	Nanchang	0.8392	Lanzhou	0.5835
Tianjin	0.9354	Nanning	0.8351	Fuzhou	0.5739
Changsha	0.9128	Wuhan	0.8328		

APPENDIX B-3

City-specific Coefficients of Residential Lands

City	Coefficient	City	Coefficient	City	Coefficient
Qinhuangdao	-0.011	Tianjin	0.687	Shenzhen	0.894
Xi'an	-0.011	Huzhou	0.688	Weihai	0.904
Erdos	0.027	Hohhot	0.702	Zhengzhou	0.908
Kaifeng	0.103	Huizhou	0.717	Taizhou	0.913
Yingkou	0.120	Beijing	0.724	Fushun	0.928
Zhongshan	0.234	Jinzhou	0.735	Dalian	0.941
Quanzhou	0.268	Yantai	0.741	Shenyang	0.945
Anshan	0.296	Chongqing	0.744	Huai'an	0.960
Shanghai	0.316	Taiyuan	0.751	Nanchang	0.963
Foshan	0.323	Luoyang	0.765	Changsha	0.964
Ezhou	0.382	Hefei	0.768	Xiamen	0.972
Yangzhou	0.425	Nanjing	0.775	Daqing	1.005
Tangshan	0.428	Shaoxing	0.775	Zhenjiang	1.026
Zibo	0.496	Wuhan	0.788	Xuzhou	1.043
Linyi	0.510	Qingdao	0.799	Harbin	1.084
Guangzhou	0.538	Hangzhou	0.802	Jiaxing	1.085
Chengdu	0.547	Fuzhou	0.815	Nanchong	1.086
Weifang	0.549	Dongguan	0.827	Mianyang	1.114
Suqian	0.564	Wuxi	0.841	Changde	1.137
Suzhou	0.573	Ningbo	0.843	Yancheng	1.242
Ji'nan	0.637	Guiyang	0.856	Nanning	1.289
Urumqi	0.659	Changzhou	0.857	Kunming	1.318
Lianyungang	0.662	Langfang	0.867	Jiujiang	1.453
Jilin	0.672	Changchun	0.893	Nantong	1.554