What Makes Local Governments More Accoutable? Evidence from a Website Reform*

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Abstract

In decentralized economies local governments are responsible for public investments. There is evidence from around the world, however, that some local governments collect bribes and pick inefficient public target investments such as white elephants projects. What can influence local governments to reduce corruption and to improve its public investments? Ferraz and Finan (2012) show that local governments in Brazil are less corrupt when the mayor can stand for re-election and when the media actively monitors it. In China, however, local (county-level) leaders are not elected and the party and government tightly control the media. Nevertheless, using a large-scale reform in which some counties were required to their post data and to establish communication links with their constituents on their websites, we find that corruption fell substantially and public investment sharply increased in treated counties. We interpret these findings using a model where county leaders benefit from being promoted and from collecting rents and, higher-level governments use postings from private citizens on social media to monitor country governments under their jurisdiction. Consistent with the model's mechanism that the reform would encourage citizens in treated counties to make inquiries and to file grievances that the county's overseeing government could observe and use to evaluate county-leaders, we find that citizens of treated counties massively increased their blogging on the social media using words related to government transparency, corruption and public investments.

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1 Introduction

In decentralized economies local governments are responsible for public investments including schools, roads, ports, transport and health services. There is evidence, however, that some local governments collect bribes and invest in inefficient public projects (see Olken and Pande, 2012, for a survey). How corrupt are local governments? And, what forces can influence them to reduce corruption and to increase investments in useful public investments? Ferraz and Finan (2012), in their evidence-based study of Brazil, use a randomized survey of local governments (municipalities) and document widespread corruption. They find that politically inclusive institutions, including local voting and a reasonably free media, play an important role because municipal governments are less corrupt when the mayor can stand for re-election and when newspapers and/or radio stations actively monitor the municipal government. However, there are few evidence based studies of conditions under which local governments reduce corruption and improve public investments in systems where political institutions are more exclusive.[1]

In this paper, we use a large scale policy reform of China's local governments (counties) to understand when local governments reduce their corrupt activities and invest in more public projects. Like Brazil, China is a decentralized systems where county governments are responsible for providing a broad set of public investments and services (Qian, Roland and Xu, 2016; Xu, 2011). And, like Brazil, local government corruption is problematic: most notably, there is much popular discussion and growing evidence that local government officials collect huge rents from illegal land deals (see Ang, 2016; Cai et al, 2011; Chen and Kung, 2016 and 2019). However, in contrast to Brazil, in China local (county-level) governments leaders are not elected and the state closely control the media.

The reform required one hundred counties to post their data and to set up communication links on their county websites. In China there are roughly 2800 counties located in 31 provinces that are under jurisdiction of the central government; and each county is under the jurisdiction of a province. During 2011 the central government required each province to select two to four counties under its jurisdiction for treatment. Treated counties were required to post their data for taxes, regulations, investments etc on a unified government e-platform. Treated counties were also

[1]The classification of political institutions into those that are exclusive (or sometimes called extractive) and inclusive is developed in Acemoglu and Robinson (2012).

required to install communication links on their website enabling their constituents to send inquires and to file grievances and to receive responses from their county government in a timely fashion. According to our reading of the reform implementation, all treated counties set up online forums and some also set up a link to the popular social media outlet Sina-Weibo.

Drawing lessons from this reform about how local governments can become less corrupt and also provide better public investments in systems where political institutions are exclusive is challenging for several reasons. First, treatment was not randomly assigned because provinces were required to choose counties that already had functional websites in place, stable public finances, etc. However, we draw on methods in Gentzkow (2006) and show the cross-county variation in treatment is as good as random because, controlling for variables that shaped whether a county was selected, the treated and control counties are balanced.

Another challenge is finding credible measures of county-level corruption. Our baseline measure is the overall value of mismanagement in the state sector taken from annual county audits. These data are arguably reliable because the county auditors work under the supervision of auditing agencies in the higher level (prefectural) governments and, thus, have strong incentives to obtain reliable information. Because there is the potential concern that county auditors could persuade the agencies in their prefecture to under-report corruption post-treatment (i.e, after the reform is enacted), we use three alternative corruption measures. Following Cai et al (2011) we use business entertainment spending in state, private and foreign firms as a measure of bribes paid to the government: this data comes from an annual survey that Ministry of Finance and the State Administration of Taxation oversee, and regional tax authorities implement the collection.[2] Importantly, while there may be systematic mis-reporting, there is no reason to believe the misreporting changes post-treatment and in treated counties. Because there is evidence that counties under-price sales and use non-transparent methods for selling land to collect bribes (see Cai et al, 2013), we also use land sale prices and shares of sales sold in open forums including tenders, auction and bids. Because land sale prices in open forums include bids, tenders and auctions and are straightforward to collect; and just whether or not a sale is open or negotiated is straightforward, we are confident

[2]See Giannetti et al (2017, p.5) for a detailed description of the data and its reliability. They note that the "survey is conducted in a specific time in each year and is based on a uniform, comprehensive survey system. Survey answers are collected and subsequently verified by local tax authorities. Information is subsequently further verified using technical algorithms to minimize potential reporting errors. A special tax force of the local tax authorities also audits survey respondents."

these data are reliable.

We measure public investment using county level administrative data for fixed asset investments (FAI) per capita [3] A large component of FAI in China includes infrastructure investment, which is critical for for growth in China [4] However, Chen and Kung (2016) point out that when corrupt county leaders receive windfalls in the form land revenues, they pick inefficient public investments, for example, ostentatious parks that promote their self-image while ignoring more efficient projects, such as education or social security. Chen and Kung collect disaggregated county-level that could be used to test whether governments chose particular investment categories that are a priori productive or not. However, this country level disaggregated investment data does not cover the period when the website reform is enacted. Nevertheless, the website reform was designed to discourage from choosing inefficient public investments.[5]

Using the baseline audit data and a difference-in-difference estimation setup, we find that our baseline measure of corruption declined by more than one-sixth of its sample standard deviation in treated versus control counties. These results are robust to pre-trends and corrections for selection. In addition, these results still hold, though are smaller in magnitude, when we use business entertainment expenses and shares of land sales to measure corruption.[6] We also find that post-treatment in treated versus control counties public investment increased by about two ninths of its sample standard deviation and county leaders' probability of being promoted increased by more than seven-percentage points.

In order to interpret these findings, we use a monitoring model in the spirit of Becker (1968) where county-leaders gain utility from being promoted within the government/party hierarchy and also from collecting rents. Rent-seeking reduces utility through two channels: first, the probability of being "caught" and, thus, having to pay a monetary fine increases; and, second, being caught lowers the probability of promotion.[7] In addition, rent-seeking may increase or decrease the county leader's utility depending upon whether it causes economic output to increase or to decrease.

[3]Components of FAI include include capital construction, renewal and transformation, real estate development investment, other state-owned fixed assets investment, urban collective fixed asset investment, rural collective fixed asset investment, private housing investment in urban and it is a general term for the amount industrial and mining areas, rural individual fixed assets investment.

[4]See DeMurger, (2001); Fleisher et al (2010); and, Banarjee et al (2012).

[5]We are currently developing methods for testing whether county-level public investments promote growth and welfare..

[6]We cannot draw any conclusions using land-sale prices because they exhibit a trend before the reform was enacted.

[7]Demotions in the current position could be also be incorporated. However, because demotions are rare events, for simplicity, we keep them out of the model.

County leaders' promotion prospects strongly improve when their counties achieve strong economic output (e.g., see Li and Zhou, 2006; and, Manion, 1985). However, just whether corruption "greases the wheels" and increases growth is controversial (see Bardhan, 1997; and, Aidt, 2009). If corruption does not grease the wheels, leaders trade off the private benefits of rent-seeking against the costs associated with lower promotion prospects. However, if it greases the wheels, officials enjoy both the private benefits of rents (net of penalties) and better promotion prospects. Our empirical findings are consistent with the view that rent seeking does not grease the wheels.

In the model county-leaders know that its overseeing government selects and promotes them based on the county's economic output and their rent-seeking. In addition, county leaders know that their overseeing government observes the economic output n their county and their rent-seeking activity with probability less than one. County leaders expect that once the reform has been enacted, their overseeing government will more closely monitor their economic performance and their rent-seeking activity for two reasons. First, county leaders understand that because their provincial (overseeing) government participated in designing the reform and chose the county to be treated, then their overseeing government would naturally increase the intensity of its traditional methods monitoring of the county.[8] Second, using the data posted and the information links on the county websites, constituents can easily send inquires and complaints via the website; and they can become more informed when the county government responds to their concerns using the website. And, as argued by King et al (2013) and Qin et al (2017), citizen communications on websites and the social media in general provides additional information to the governments overseeing county governments.

While we do not have direct evidence that the overseeing governments increased their traditional monitoring activities, it seems self-evident that they would do so during a reform. And, we find evidence consistent with the interpretation that county governments reduced corruption and increased public investments because their constituents were more informed and were monitoring them more closely. First, compared to control counties, during the reform treated counties complied with regulations and increased the links and images on their websites by twenty-two percent or more than one-quarter of a sample standard deviation. Taking links and images as a proxy for information and communication capacity on a county webpage, this finding suggests that reform

[8]Traditional methods include having lower level government and party officials collect data more carefully or collect more kinds of data

made it easier for constituents in treated counties to gather information and to communicate with their governments. We find more direct evidence of this in our case study of the Shunde county in the Guangdong province in the next section. Finally, using private postings on the Chinese social media (Sina Weibo), we document that there was a virtual tweet storm for a large battery of words related to transparency, corruption and public public investment following the enactment in treated versus control counties. This suggests the citizens in treated versus control counties provided information via inquiries and grievances about the performance of their county governments that higher level overseeing governments could use to better monitor the county governments under their jurisdiction.

Because upgrading their websites forced county governments to operate more transparently, our study contributes to several micro-econometric studies that identify the impact of government transparency. Renikka and Svensson (2005) find when newspapers in Uganda increased government transparency and provided information about a national educational grant program, corrupt leakage of the grant fell, local spending on education increased and student attendance and learning outcomes improved. Freedom of information acts (FIOAs) increase transparency because they require governments to provide information about their activities in a timely fashion. Peisakhin (2012) finds citizens in India who are given an FIOA can register to vote in roughly the same amount of time as a control group that had to pay bribes. Pan (2017) analyzes how the Chinese government since 1999 uses online transparency initiatives in an effort to limit local corruption. In a random sample of almost two-million county government webpages, Pan shows how local-level officials use the internet to "construct their self-image" and, thus, empower themselves. The reform studied in this is not included in Pan's study and, it has different provisions.

At a broader level just whether transparency can make governments more effective is unclear. Olken and Pande (2012, p.31) argue more transparency can discourage talented individuals from working in the public sector and Mas (2017) shows that public pay disclosure requirement in California has led to an increase in the quit rate of high-level city managers. However, in a cross-country study that uses public perception data, Djankov et al (2010) show that the public disclosure of pay to politicians is associated with less corruption and better quality government. Our study indicates that more transparency in system with politically exclusive institutions makes local government more accountable.

Chen and Kungs' (2016) study of county-level corruption in China considers the period (1999-2008) and finds that the "windfalls" from land sales going to county governments made the promotion system based less on economic performance (i.e. GDP growth) and, based more on political connections. Our study covers a later period and shows how leaders of treated counties, who reduced corruption and increased public investments, were more likely to be promoted. During the period of the Chen and Kung study only 6.4% of county leaders were promoted; in our study promotions were more common and applied to more than 12% of county leaders.

This paper builds on the Ferraz and Finan (2011) study of Brazil. Using audit data, they carefully identify that second term mayors (who are not eligible for re-election) steal on average $55,000 more than first term mayors (who are eligible for re-election). They find that the presence of a local newspaper and/or radio state that can actively monitor the municipal government eliminates the corruption of second term versus first term mayors. In contrast to municipalities in Brazil where mayors are elected, high-level Government and Party leaders appoint and promote county-leaders in China; and, in China the state more carefully controls the media.

During the past two decades, authoritarian regimes have been building internet platforms where citizens can post grievances. Authoritarian leaders may use citizens' grievances about lower level officials' conduct to punish these officials (Dmitrov 2014; Qin et al, 2017). However, because autocrats may post false and self-serving information on these platforms (Earl and Kimport, 2011; Guriev and Treisman, 2015; Kalathil and Boas, 2010; MacKinnon, 2012). This is not a concern in our study because the data on county websites does not include information about central leaders. A potential concern is that bureaucracies located between the counties and the central government that aggregate grievances might strategically manipulate the upward flow of information. Pan and Chen (2018) show in a case study of a Chinese province that, while such administrative organs strategically omit data, they do not grossly misrepresent or falsify grievances and inquiries.

The next section contains an overview of the website reform. Section three develops a model that guides our empirical work. Section four describes our data, section five describes our estimation framework and robustness checks, section six contains our empirical results and section seven concludes.

2 Institutional Background

In an effort to reduce local corruption, since 1999 the national leaders in China have been requiring its local level governments to post information on the internet (Pan, 2017, on-line Appendix pp.1-3). For example, there is a general understanding that county governments collect unreported side-payments and bribes in negotiated land transactions with developers. In effort to reduce potential corruption, as of August 31 2004 county governments were required to post information about their commercial land sales on publicly accessible websites (Cai et al, 2013).

We focus on an initiative for county governments enacted January 4, 2012 that has different provisions than previous transparency initiatives discussed in Pan (2017). In early 2011 the Central Government issued a document entitled, the "Opinions on Deepening the Disclosure of Government Affairs and Strengthening Administrative Services." Then, in September of 2011, the General Office of the State Council issued "Opinions of the National Government Affairs Openness Leading Group on Implementing the Electronic Platform to Strengthen the Openness of County Government Affairs and the Pilot Work of Administrative Services." According to these documents, each province was required to select two to four counties that would participate in establishing a unified electronic government platform that would disclose data about the county's activities and performance and would also include a link that would enable the county residents and the county government to communicate with each other. In each province, the government affairs openness leadership team, the departments in charge of information disclosure and government websites, and the industrial and information departments were charged with selecting counties for this initiative that already had strong web-based information disclosure systems and government services in place. Figures 1 illustrates the spatial distribution of treated counties.

The idea was that public disclosure would encourage county governments and parties to reduce corruption and to serve their constituents more efficiently. In preparation for the reform, treated counties were required to comprehensively sort out, clean up and strictly regulate the items that they were required to post on the e-platform. The government platform was comprised of the electronic government network, government websites, business management systems, data service centers and information security systems. Thus, information on government affairs and the government services directory in pilot counties was released through an electronic government platform that was easily accessible by the entire Chinese society.

The county's data in the Basic Directory has three sections. The first section has sixty-five items including key policies, regulations, special funds, and government administrative powers. The second has 295 items related to administrative matters including development, reform, education, police civil administration, judicial administration, public finance, land resources, the environment, housing and urban construction, etc. The final part has twenty five items related to government services including marriage and unemployment registries and health insurance applications, etc.

Links on county website typically named something like "interactions between citizens and government" allow county constituents to post inquiries and grievances which the county typically posts on the on the website along the government responses.. For example, Figure A1 in the Appendix illustrates the home page for Shunde county's website about a year after the enactment (December 21, 2012).[9] Going from left to right on the top line, the home page contains the government transparency link, the on-line service link, the interaction between government and citizens link, and additional links containing general information about Shunde county, directions for conducting searches, etc. Figure A2 shows the transparency link and sub-links that direct users to all of Shunde county's data including a regulations catalog, a description of the scope of government activities, transaction data for collective assets, auditing information, etc. Figure A3 is the on-line services link where county constituents make inquiries and complaints and where the relevant government agencies respond. Sub-links include government registration and inspection services, a personal link where one can review results of an application, etc. Figure A4 is the interaction link for the government and citizens. Sub-links include a mailbox to the county leader, a forum of government business, Sina Weibo posts, and a survey about public opinion and grievances.

We have read the Shunde website and found that after the reform was enacted the county made its data available and its constituents made many inquires and received responses from the government.[10] The interaction between constituents grew over time. In 2012, the first year of the reform, in the online forum there were 5,166 posts (blogs) and 19,668 followed posts. The government responded to 80-percent (4,410) of the posts. By 2013 the number of posts on the online more than tripled 18,229 and the followed posts more than quadrupled to 86,363. While the overall number of government responses almost doubled to 7,964, the response rate fell to 44 percent.

[9]Shunde is a well-off county with population of roughly 1.2 million; it is located in Guangdong, which is one of the richest provinces in China.

[10]Our source can be found through the link: http://zwgk.shunde.gov.cn/ind.php?UnitID=10gknb=1

Reporting corruption is a sensitive issue in China, and a citizen that reports that somebody is corrupt must also submit supporting documentation. Nevertheless, in 2013 the Procurate received 517 accusations of corruption with documentation, and handled all of them.

By 2014 in Shunde, the website contained rich data and there was an active interaction between the county constituents and the government. For example, the Land and Urban Construction Bureau of Shunde had set up a "micro interview" platform through the social media link (Sina-Weibo) where it could easily receive inquiries and complaints from constituents and respond. This is significant, in particular, because this bureau is involved in land deals and, thus, is likely to be suspected of being corrupt. Nevertheless, in 2014 this bureau made all 133,760 of it files open to the public and received 87,182 inquires about these files.

There is evidence that, similar to the county government in Shunde, many treated county governments made their data available to their constituents. For example, in the Yongkong county in Zhejiang Province, the government installed a channel on the local cable TV that frequently reports their data. [11] We do not have similar examples of how, similar to Shunde, treated county governments facilitated effective communication with their constituents. However, later in the paper we will document that during the reform constituents in treated counties significantly increased their communication on social media (Sina-Weibo) about corruption, government transparency and public investments. While it is possible that some treated counties may have set up communication links that did not facilitate communication, this evidence indicates that the reform at least energized constituents to engage in a discussion of issues that the reform addressed. Moreover, as the work on social media in China (King et al, 2013; Pan, 2017; and Qin et al, 2017) and in autocracies in general (Dmitrov, 2014) suggests county leaders understood that their overseeing governments who evaluated their performance, were paying attention to this increased social media activity.

3 Theoretical Considerations

In the model there is a representative county leader who lives for two periods. In the first period, he/she collect rents, R, and supplies public investments, G, that enhance county-level growth. In

[11] See http://new.ifeng.com/shendu/lwxwzk/detail_2013_12/09/31919857_0.shtml. Additional evidence is available on websites from Changsha County in Hunan Province, Anming in Yunan and Meilan in Hainan and that can be accessed from the previously cited website. Evidence for Yuexiu in Guangdong can be found at www.gz.gov.cn/GZ00/qxnb/201403/2633545.shtml

the second period, the government overseeing the county either promotes or does not promote the county leader. In China there are thirty one provincial governments under jurisdiction of the central government. Each provincial government has multiple prefectures under its jurisdiction that, in turn, have many counties under their jurisdiction. However, the provincial government oversees the counties because it determines the selection and promotion of county leaders based on information that it collects from its agencies and also on the basis of suggestions and grievances from the general public posted on the county website and social media outlets such as Sina-Weibo.[12]

The website reform was enacted with the understanding that rent-seeking detracts from growth and welfare. However, Ang (2016) argues rent seeking in China has "greased the wheels" of economic activity because it gives county officials strong incentives to push forward growth promoting projects such as the construction of roads and railroads and schools. To incorporate this, public investments are assumed to be concave in rent seeking:

$$G = G\{R, .\},\ and\ G^{''}\{R\} < 0, G\{0\} >> 0 \tag{1}$$

where rent-seeking greases the wheels when $G^{'} > 0$ and does not when $G^{'} \leq 0$.

A county leader's promotion prospects improve when he/she makes more public investments (which increase economic output) and reduces his/her rent-seeking. Thus, county leader's expected promotion prospects are assumed to be increasing and concave in public investments that the provincial government detects:

$$\pi_{mg}\pi_P\{G\} = \pi_{mg}\pi_P\{G(R)\} : \pi_P^{'} > 0, \pi_P^{''} \leq 0 \tag{2}$$

where $\pi_P\{G)$ is the probability of promotion when public investments are perfectly observed and π_{mg} is the probability of detection. Moreover, the absolute decline in the probability of being promoted is increasing and convex in detected rent seeking activity:

$$\pi_{mr}\pi_d\{R\} : \pi_d^{'} > 0, \pi_d^{''} \geq 0 \tag{3}$$

where $\pi_d\{G)$ is the absolute value of the decline in the probability of demotion if the provincial

[12]See the regulation "Several Provisions on Strengthening the Construction of the County-Party Leader's Committee," issues on April 12, 2009.

government perfectly observes rents and π_{mr} denotes the probability of detection. The overall probability of promotion, PP, is then

$$PP\{\pi_{mg}, \pi_{mr}, R\} = \pi_{mg}\pi_P\{G\{R\}\} - \pi_{mr}\pi_d\{R\} \tag{4}$$

and expected period two utility is $PP\{\pi_{mg}, \pi_{mr}, R\}(U^P - U^L) + U^L$ where U^P and U^L denote period two continuation payoffs when a county leader is and is not promoted: $U^P > U^L$, where $U^L = 0$ with no loss of generality.

Because promotions are highly competitive, they are uncertain even when R=0: $PP\{\pi_{mg}, \pi_{mr}, 0\} = \pi_{mg}\pi_P\{G((0\} - \pi_{mr}\pi_d\{0\} << 1$. Consistent with our understanding that the reform was designed to reduce rent-seeking, we assume $PP\{\pi_{mg}, \pi_{mr}, R\}$ is non-increasing in R:

$$\partial PP/\partial R = \pi_{mg}\pi_P^{'}G^{'} - \pi_{mr}\pi_d^{'} \leq 0 \tag{5}$$

Moreover, if monitoring is ineffective, the county leader keeps his/her rents; otherwise, he/she pays $\chi > 0$.[13]

Period 1 expected private benefits of rent-seeking are $(\ 1 - \pi_{mr}\chi)R$:

$$1 - \pi_{mr}\chi > 0 \tag{6}$$

The county leader chooses R* in order maximize rents net of expected fines in period one plus expected utility in period two:

$$Choose\ R^* > 0 : Maximize\ L = (1 - \pi_{mr}\chi)R + PP\{\pi_{mg}, \pi_{mr}, R\}U^P \tag{7}$$

Differentiating equation (7), the first order and second order conditions are

$$\partial L/\partial R^* = 1 - \pi_{mr}\chi + \partial PP/\partial R * U^P = 0 \tag{8}$$

$$\partial^2 L/\partial R^*\partial R^* = \partial^2 PP/\partial R\partial R * U^P = (\pi_{mg}\pi_P^{''}(G^{'})^2 + \pi_{mg}\pi_P^{'}G^{''} - \pi_{mr}\pi_d^{''})U^P < 0 \tag{9}$$

[13] And, $\chi \geq 1$ when the county-leader returns all rents and pays an additional fine.

The first order condition shows the marginal benefit of an additional unit of rents equals marginal cost which includes the period one marginal expected penalty, $\pi_{mr}\chi$, and the period two marginal expected loss in utility, $-\partial PP/\partial R * U^P$, because rent seeking lowers the expected utility from being promoted.[14] By inspection of equation (9), the second order condition is negative and R^* is a maximizer.

Differentiating the first order condition with respect to π_{mr}, then

$$-\partial^2 L/\partial R^* \partial \pi_{mr} = (\chi + \pi_d^{'} U^P) > 0 \tag{10}$$

which is the impact of the an improvement of monitoring rents, π_{mr}, on marginal costs. Since $\partial R^*/\partial \pi_{mr} = -\partial^2 L/\partial R^* \partial \pi_{mr}/\partial^2 L/\partial R^* \partial R^*$, equations (9) and (10) imply rent seeking is decreasing in π_{mr}. This is a standard moral hazard result. And, because $\partial G/\partial \pi_{mr} = \partial R^*/\partial \pi_{mr} G'$, public investments are increasing when $G' < 0$ (no greasing the wheel) and decreasing when $G' > 0$ (greasing the wheel).

Differentiating the first order condition with respect to π_{mg}, then

$$-\partial^2 L/\partial R^* \partial \pi_{mg} = \pi_P^{'} G^{'} U^P \tag{11}$$

which is the impact of improving the monitoring of public investments, π_{mg}, on marginal costs. Since $\partial R^*/\partial \pi_{mg} = -\partial^2 L/\partial R^* \partial \pi_{mg}/\partial^2 L/\partial R^* \partial R^*$ and $\partial G/\partial \pi_{mg} = \partial R^*/\partial \pi_{mg} * G,'$ an increase in π_{mg} causes rent seeking to fall, and public investments to increase when $G' < 0$. However, when $G' > 0$, rent seeking and public investments increase.

Our reading of the reform is that it led county leaders to believe that their overseeing government would monitor their outcomes and rent-seeking activity more intensely for two reasons. The first reason, which seems self-evident, is that an overseeing government would monitor its treated counties more intensely during an anti-corruption reform. The second reason is that citizens living in treated counties have more information and this enables them to post more informed grievances and inquiries on social media which the overseeing government can use for evaluating and making promotion decisions for the leaders of the the county government under its jurisdiction.

Thus we can derive have two testable hypotheses about the impact of the reform:

[14]This inequality holds by by assumption (5).

H1: If rent seeking does not grease the wheels, the website reform causes rent-seeking to decline and public investments to increase.

H2: If rent seeking greases the wheels, the impact of the website reform on rent-seeking and public investments is ambiguous. If the reform more strongly improves monitoring of rents, then rent seeking and public investments decline. However, if the reform more strongly improves monitoring of public investments, then rent seeking, and public investments increase.

In our empirical sections, we will document that corruption declines and public investments increase, indicating that rent seeking does not grease the wheels. In this case, leaders in treated counties should in general have a better chance of promotion because they are less corrupt and they supply more public investments:

H3. If rent seeking does not grease the wheels, then under general conditions the website reform causes a treated county-leader's probability of being promoted to increase (see the Appendix for a proof).

We can also make predictions about the differential impact of the reform in counties that are close and distant from their overseeing governments. Du, Lu and Tao (2014) and Huang et al (2017) document that it cheaper for overseeing governments in China to monitor business activities and the activities of state owned enterprises in locations that are closer. In this case, the probability of detecting rents and public investments is increasing in a county's closeness to its overseeing government:

$$\pi_{mr} = \pi_{mr}(c); \pi_{mg} = \pi_{mg}(c) : \pi_{mr}^{'} < 0,\ \pi_{mg}^{'} < 0 \tag{12}$$

where c denotes closeness.

In the Appendix, we show the positive impact of an improvement in π_{mr} on marginal costs in equation (11) is weaker for closer counties under very general conditions. And, the positive impact of an improvement in π_{mg} on marginal costs in equation (11) is also weaker for closer counties. Thus, we would expect the treatment effect of improving the monitoring of rents and also public investments is stronger in more distant counties. An overly strong sufficient condition for this to hold is an improvement in π_{mr} and π_{mg} each make the second order conditions in equation (9) even more concave. However, in the Appendix we show that under a robust set of parameters rent seeking is decreasing and convex in both π_{mr} and π_{mg}.

This implies the following testable hypotheses.

H4: If rent seeking does not grease the wheels, then, under general conditions, the reduction rents is more profound in distant counties.

H5: If rent seeking does not grease the wheels, then, under general conditions, the increase in public investments is more profound in distant counties.

4 Data

The data for this study are collected from various official statistical publications and public databases. China contains thirty-one provinces of which four, Beijing,Tianjin, Shanghai and Chongqing, are centrally administrated municipalities. Because these operate quite differently than the remaining twenty-seven provinces they are excluded from the sample. The province Tibet is excluded because its data coverage is incomplete. Thus, using twenty-six of the thirty-one provinces we compile a dataset including 2144 unbalanced counties in China covering, at most, the period 2005-2014, where 2005-2011 and the 2012-2104 are the pre-treatment and post-treatment periods. Selected summary statistics are presented in Table 1.

Corruption and public investment

We use the value of mismanagement to measure corruption from the China Audit Yearbook, 2006-2015. In order to compare corruption between counties, we divide the value of mismanagement in state sector by the general budget income of county. Mismanagement covers five broad items including: the implementation of the state budget and public finances; party and government officials' wasteful activities; specific projects such as poverty alleviation and affordable housing, social security, education, environmental remediation; fixed investment projects such as construction; and, activities of state owned enterprises with special attention paid to their loans.

As discussed in the introduction, because there are potential concerns about under-reporting of our baseline corruption measure in treated counties during the reform (post-treatment), we use several alternative corruption measures. A corruption measure developed by Cai et al (2011) is business entertainment expenses in state, private and foreign firms in a county divided by sales. This data comes from the Annual Tax Survey database 2007-2014, which the Ministry of Finance and the State Administration of Taxation of China reports annually. We can trace the location of each firm using its tax ID and 6-digit location code. The survey includes firms in agricultural, manufacturing

and service sectors. We exclude firms in the financial industry, nonprofit organizations and social groups. The firms with missing information in key variables are also excluded as are firms whose numbers of employees, sales, asset are negative. Since this an indirect measure of corruption, there is perhaps less concern that there will be strategic under-reporting in treated counties during the reform (i.e., post-treatment) than with more direct data from the National Audit Office.

Finally, there is evidence that county governments under-price industrial land sales in order to collect rents (Cai et al., 2013). Thus, we use land sale prices and transactions as a proxy for corruption. Parcel-level data on land transaction are collected from the official websites of China's Ministry of Land and Resources (http://landchina.mlr.gov.cn) and this records most land transactions from 2007 to 2014. Each land parcel transaction includes the transacted price, hectares of the land, location of the land, how the land is used, and what types of land are transacted.

The enactment of the website reform precedes that widespread and well known anti-corruption reform under Xi Jinpeng by less than a year, and, the two reforms overlap during 2013 and 2014. Thus, to tease out the impact of the website reform, we use the categorical variable, "inspection," which denotes whether or not the Central Commission for Discipline Inspection conducted inspections for the anti-corruption reforms in a province during a particular year.

We use public investment expenditures normalized by population (10,000 RMB per capita) to measure public investments. The source for public investment spending is the National County (Prefectural) Social Economic Statistical Yearbook 2006-2015.

Quality of County Websites

Data from the Internet Archive during 2008-2010 (https://archive.org/) is used to measure the quality of county websites pre-treatment. Using the front page of a county website, we count the number of characters, the number of images and the number of links. If more than one web page was stored in the internet archive, we use the front page of the most recent website.

County-Level Economic Conditions

The China County Statistical Yearbook covering the years 2006-2015 is a source for general budgetary income and contains the list of counties classified as mountainous and impoverished. County level financial information including income, expenditures, transfers, the number of government employees, etc. comes from the National Prefecture and County Finance Statistics 2009.

The distance between each county and the capital city of its overseeing provincial government is

calculated using the longitude and latitude of each county, which can be obtained from a Baidu map (http://map.baidu.com). To address county-level administrative changes during the period of 2005 to 2014, we use the 2005 boundary classifications, and this can be accessed from the website of Ministry of Civil Affairs of the People's Republic of China (http://www.mca.gov.cn/article/sj/tjbz/a/201713/20170822

County Economic Leaders

Formally, the party secretary and the head of government (the mayor) are the joint political leaders in a county. However, because, the party secretary, de facto, is in charge (for example, see Chen and Kung, 2016) we collect data for party secretaries from the official website of each county and the Provincial Yearbook. We then search the Baidu Encyclopedia (Baidu Baike) for their gender, age, year of education, duration of their tenure as party secretary and when (if ever) they were promoted.

Constituents' Use of Social Media

In order to proxy for county-constituents' reaction to the reform, during 2009-2014 we scrape the county-level websites for Sina-Weibo, which is the major blogging and social media network in China. We focus on citizens' reactions and thus, exclude the blogging activity of government and party entities. In order to measure how the reform affects constituent interest in government corruption, accountability and transparency, we count how many times a year the following twenty-four key words have been mentioned: "E-government," "Government affairs openness," "Government service," "Government service pilot reform," "E-platform," "Government convenience services," "Government website," "Corruption," "Anti-corruption," "Supervision," "Government openness," "Transparency," "Monitoring," "Clean government," "Administrative function," "Government affairs platform," "Administrative system," "Service-oriented government," "Administration by law," "Open," "Transparency," "Information sharing," "Government information," and "Government Network." To measure how the reform affects constituents' interest in public investments we count the postings o the following twenty-six key words: "public investment,""Public transportation," "Highway," "Railway," "Airport," "Light Rail Train," "Subway," "Port," "Telecommunications," "Power grid," "Water supply," "Electricity supply," "Hydraulic project," "Public service," "Aviation," "Communication," "Garden," "Greening," "Garbage removal," "Sewage treatment," "Electricity power," "Gas," "Tap water," "Environmental protection," "Environmental sanitation," and "Ecosystem."

5 Empirical Framework

To test our predictions about the impact of the reform, we compare corruption, public investment and party secretary promotions before and after the reform for treated counties versus non-treated counties. The baseline DID framework is:

$$Outcome_{ct} = \alpha_c + \beta Treatment_c \times post_t + \gamma_t + e_{ct} \tag{13}$$

where c and t represent county and year. The dependent variable $Outcome_{ct}$ can be corruption, public investment, promotions, websites and use of social media in each county in a particular year; α_c and γ_t represent county and year fixed effects; and, e_{ct} is the error term.

The identifying assumption for differences-in-differences estimation is that the treated counties would have followed the same time trends as non-treated counties if the reform was not enacted as of January 4, 2012. A challenge to this assumption is that treated counties are not randomly selected, and the divergence between treated and non-treated counties is generated from pre-existing differences between them. To deal with this, we use the approach of Gentzkow (2006): we first identify the selection criteria for the treated counties; and, then we control for the different trends between treated and non-treated counties post-treatment.

According to our reading of the reform documents, the central government required the provincial governments to select counties that had good operating e-government capacity and that operated openly and provided adequate services. To measure the county e-government capacity, we control for the page size, the number of images and links on the front page of their websites pre-treatment (2008-2010). In addition, according to our reading of the regulations from provincial governments, they selected counties for treatment on the basis of geography (remoteness) and the quality of its public finances. We proxy for geography using dummy variables including whether the county is mountainous and whether the county is the capital within its prefecture. And, to proxy for public finances, we control for county employees as a share of the total budgetary income in 2009 and also use a dummy variable for whether or not a county is impoverished as set at the national level.

Table 2 Panel A reports balance checks for the selection variables. On average, the treated counties have better e-government capacity because they have 84.5-percent more words on their

web pages, with 42-percent more images and 47-percent more links. Public finances, measured by the number of government employees divided by total government total income, is 2.7-percentage points smaller in the treated counties, suggesting that their governments are more efficient. Treated counties appear to be more open (less isolated) since 27.7% of them are mountainous versus 39.3% of non-treated counties. These patterns suggest treated counties are in a better position to provide services since a smaller share are categorized as impoverished and mountainous, and a higher share are provincial capital cities.

In Panel B, we compare treatment and control counties by various economic development indicators, including the average urban wage, financial transfers from the central government to the county governments, financial deficits, land transaction and several measures of firm performance. Once we control for the seven selection variables for treatment, the economic development indicators do not exhibit any statistical significance differences. Hence, in what is crucial for our identification strategy, the control and treated counties are balanced.

Another potential concern is that treated counties are selected on the basis of their leadership.[15] For example, provincial leaders might select counties that have young and well educated leaders, who would try to push through reforms in order to get promoted. Or, counties might be selected where it is easy to replace incumbent leaders with new leaders who would tend to have stronger incentives to push through reforms. To address these concerns, Panel C compares treated and control counties by the average age and average years of education of their leaders and also by the average number of new leader. In all cases, we fail to reject the null that there is no conditional difference between treated and untreated counties pre-treatment.

In Panel D we test for whether our outcome variable are conditionally balanced pre-treatment. We fail to reject the null for our baseline corruption measure, entertainment expenditures and prices; however, the share of open land sales in 2009 is 8.9-percentage points higher in the treated counties. And, public investment in 2010 and promotion of party secretaries are both conditionally balanced.

To control for trends in corruption generated by the selection variables over time, we interact them with a third-order polynomial function of time, $X_c \times f(t)$. The new specification is:

[15] We thank Jennifer Pan for this suggestion.

$$Corruption_{ct} = \alpha_c + \beta Treatment_c \times post_t + \gamma_t + X_c \times f(t) + e_{ct} \quad (14)$$

As a further check of our identifying assumption, we conduct several robustness checks, including a graphic verification of whether treated counties and non-treated counties have similar trends in corruption before treatment, placebo tests that have random assignment of treatment status and a falsified timing for the implementation of the reform.

6 Empirical results

6.1 Corruption

Columns (1) and (2) of Table 3 report results for our baseline measure of corruption. Column (1) presents estimates that control only for county and year fixed effects. The treatment effect variable, $Treatment_c \times post_t$, shows corruption fell by almost 12-percentage points, which is more than one-sixth of its sample standard deviation and, this effect is significant at the 1-percent level. To address the concern that the result in column (1) is biased due to the non-random selection of treated counties, in column (2) we include the interaction between the seven treatment selection variables and a third order polynomial function of time. We continue to find a negative and significant coefficient of $Treatment_c \times post_t$ with only a negligible reduction in its magnitude.

6.2 Robustness checks

The empirical results in Table 3 rely on the assumption that, *conditional on the selection variables for treatment*, the government does not select treated counties on the remaining factors. A necessary condition for the identifying assumption is treated and non-treated counties have similar time trends in corruption pre-treatment. If the time trends are roughly parallel pre-treatment, and change post-treatment, we can be confident that the website reform caused these changes. In Figure 2, we plot the time trends of differences in corruption from 2005 to 2014 where we include, as in Table 2 Column (2), county and year fixed effects, and controls interacted with a third order polynomial of time. The small black circles in figure 2 are the coefficients for treatment versus control counties interacted with year dummies, and the whiskers on the lines containing these point estimates are the upper and lower bounds of the 95-percent confidence intervals. The year just prior to treatment,

2011, is the baseline for comparison. Simple inspection indicates the parallel trends assumption holds: pre-treatment (2005-2010) there are never significant differences in corruption in treated versus control counties (compared to the baseline year of 2011) and the point estimates are tightly centered around zero. There is no significant decline in corruption in the first year of the reform (2012); however, this difference becomes significant and strong in 2013 and 2014.

Table 4 contains several robustness checks. The website reform was enacted in early January of 2012 and, in mid-December of 2012 the Central Commission for Discipline began to conduct inspections in the provinces for Party's widespread anti-corruption campaign. Figure A5 in the Appendix depicts the spatial distribution of inspections across China's provinces in 2013 and 2014. In order to control for the potential confounding effect of the Anti-Corruption campaign, Column (1) includes the dummy variable "inspection" which indicates whether or not an inspection was conducted in a county's province during a particular year. While inspections, as expected, significantly reduce corruption, the impact of the web-site reform also remains statistically significant and its quantitative impact is still roughly one-sixth of a sample standard deviation.

The mild downward spike in Figure 2 in 2009 raises a potential concern that something unobserved occurred in 2009 indicating a pre-trend. In fact, in November 2008, the central government announced an economic stimulus package of four trillion RMB (equivalent to 586 billion USD) to minimize the influence of the global financial crisis and enacted this program primarily during 2009-2010.To account for this, in Column (2), we add the dummy variable $Treatment_c \times year_{20092010}$ which equals one in 2009 and 2010, and zero otherwise. The treatment effect coefficient remains significant and becomes somewhat stronger, suggesting that our results are not contaminated by pre-trends. Finally, in column (3) we replace the selection control interacted with a third degree polynomial in years with the same controls interacted with a year dummy variables and, find that our results are robust.

We also report a placebo test that randomly assigns treatment status to counties in the county. Specifically, we randomly select 80 of the 2,144 counties in the sample for treatment, and also randomly assign the timing of adoption of the transparency reform. If our identifying assumption is satisfied, the coefficient of $Treatment_c^{false} \times post_t^{false}$ should be zero. To have sufficient power to reject the null that $Treatment_c^{false} \times post_t^{false}$ is zero, we repeat this test 1000 times. In figure 3, the distribution of the coefficients for $Treatment_c^{false} \times post_t^{false}$ is plotted. By inspection, it

is clear that the distribution is centered around zero, indicating there is no substantial omitted variables in the specification.

When corruption does not grease the wheels, our theory predicts that the impact of reform on corruption is, under general conditions, stronger in counties more distant from their provincial (overseeing) government. Table 5 reports results for a regression where we add the triple difference-in-difference term to the baseline specification (Table 3 Column (2)) $Treatment_c \times post_t \times distance_c$. Results indicate that an additional 100 kms between the provincial and county capital lowers corruption by 0.050 points. Thus, a one-standard deviation increase in distance (1.843 x 100 kms) is associated with a -0.092 point drop in corruption or roughly one seventh of its sample standard deviation.

Alternative measures of corruption.

This section considers several alternative measures of corruption. Table 6 reports results for business entertainment expenses. Column (1) includes controls only for firm and year fixed effects; and, the coefficient $Treatment_c \times post_t$ is statistically significant and business entertainment expenses fall by 0.07-percentage points, or 3% of its sample standard deviation. To address concerns about the non-random selection of treated counties, Column (2) includes the interactions between the seven selection variables and a third order polynomial function of time. Results indicate that $Treatment_c \times post_t$ remains statistically significant and its magnitude changes only negligibly. Results are very similar in Column (3), which controls for inspections.

To check for the validity of our identification strategy, Figure 4 plots the coefficients and ninety-five percent confidence intervals for the treatment*Year Dummies, where 2011 is the baseline and controls from Column (2) in Table 6 are included. Pre-treatment (2007-2011), all the coefficients are, in the statistical sense, indistinguishable from zero, suggesting that there are no pre-trends. The average treatment effect of the reform during 2012-2014 is roughly -0.7 percentage points and significant at the 5-percent level (see Table 6). However, the event study in Figure 3 indicates the reform only has an impact in 2014 which is stronger (corruption falls by 0.1 percentage points) and somewhat noisier (significant at the 10-percent level).

Before 2002, county governments conducted land sales primarily using private negotiations in which the transacted price was much lower than the market price (Cai et al, 2013). In 2004, county governments were required to conduct all state owned urban (commercial) land sales using open

transactions including auctions, listings and tenders. However, county governments could still use private negotiations for industrial land transactions.

The corruption model of Shleifer and Vishny (1993) predicts government officials can set prices artificially low and withhold sales in order to collect bribes. Thus, if the reform reduced corruption, we would expect land prices rise and the share of transactions conducted openly would increase. To test these predictions, we collect parcel level land transaction data during 2007-2014 from the website of China's Ministry of Land and Resources. The results in Table 7 are consistent with these expectations: industrial land prices in treated counties increased by about 14-percent or roughly 8-percent of a sample standard deviation; and, the probability that industrial land transactions were open (versus negotiated) increased by almost 8 percentage points. These findings include controls for selection, county and year fixed effects.

Figures A6 and A7 in the Appendix illustrate the coefficients and 95-percent confidence intervals for Treatment*Year Dummies for industrial land prices and open land transactions. In the case of industrial land prices, Figure A6 shows that in each pre-treatment (2007-2011) year, we fail to reject the null that each Treatment*Year interaction variable is zero, suggesting there are no pre-trends. However, the very low point estimate of Treatment*Year in 2007 and the subsequent increase in point estimates for this interaction variable during 2008, 2009 AND 2010 raises concerns that there is a potential pre-trend. In the case of open land transactions, Figure A7 shows, again, that we fail to reject the null that Treatment*Year is zero each year pre-treatment. And, by inspection, there is less concern about pre-trends. Moreover, post-treatment, there is an immediate and statistically significant (always at the 10-percent level) increase in the share of open land transactions.

Using our baseline audit measure, business entertainment expenses and open land transactions, we find that the reform causes corruption to fall. However, we cannot test for the impact of the reform using industrial land prices, because pre-trends are a concern.

6.3 Public Investment

Table 8 examines the reform's impact on public investment. Whether or not we use the inspections dummy variable to control for Xi Jinpeng's anti-corruption reform, the website reform's impact is substantial, roughly two-ninths of its sample standard deviation, and significant at the 10-percent level. Put in different terms, the point estimates indicates that public investment per capita

increased by roughly 4,400 RMBS or roughly 710 per capita in US dollars. Figure A8 in the Appendix shows that time trends are all statistically indistinguishable from zero for each year pre-treatment (2007-2011). While there is a mild uptick in the point estimates for time trends during 2010-2011, post-treatment increases in time trends are more pronounced. Moreover, time-trends post treatment are statistically significant at the 10-percent level which is consistent with the estimated average treatment effects in Table 8. Thus,, we are confident that the reform caused investments in public investment to increase in treated counties.

In Table 9, we examine the heterogeneous effect of distance on public investment. Under general conditions, our theory predicts the impact of the reform on public investment should be stronger for more distant counties. The estimate for the triple difference in difference estimator, Treatment x post x public investment, indicates that adding 100 kilometers between the county and the provincial capital increases public investment by roughly 3,680 RMB per capita or, almost 600 US dollars. However, this effect is noisy and has p-value that is not significant even at the 20-percent level.

6.4 Promotions

Our model also predicts that if rent-seeking does not grease the wheels, then the reform would increase the probability that county-leaders in treated versus control counties are promoted. The results in Table 10 are consistent with this prediction. Here we add an additional post-treatment year, 2015, so that there is more time for the overseeing government to evaluate a county-leader's performance. Controlling for selection, county and year fixed effects, the probability of promotion increases by 7.4-percentage points This result is precisely estimated at the 5-percent level and also has a strong impact, accounting for roughly 22-percent of the sample standard deviation. Put in different terms, the promotion rate for the sample is roughly 12%, so treatment increase promotion prospects by more than 50%.

Figure A9 in the Appendix shows that each year pre-treatment (2002-2011) time trends are all statistically insignificant at 5-percent level. However, a concern is there is a large increase in time trends between 2007 and 2008; and, the point estimate for 2008 is large (more than 10-percent) and significant at the 10-percent level. Nevertheless, during the pre-treatment period (2002-2011) time trends are generally zero; while jump are in the range of 5-percent to 12-percent during 2002, 2008

and 2010, in the following year these time trends drop and are close to zero. Post-treatment, these time trends also exhibit a zig-zagging pattern. In 2012 and 2015 promotion probabilities exceed 10-percent and are significant at the 5-percent level. During the 2013 and 2014, they are less than 5-percent and statistically insignificant. This suggests that pre-trends are not an issue and our estimates are credible.

6.5 Citizen Monitoring

Our argument is because county leaders believed that post-treatment their overseeing (provincial) government would monitor their outcomes and rent-seeking more closely, these county leaders reduced corruption and increased public investment. As previously argued, it is almost self-evident that the provincial government would increase its usual monitoring of its treated activity during a period of reform. However, if citizen gained more access to their county government's data and could more easily communicate with their county government, then this more informed communication from citizens could be used by the overseeing government as another way for strengthening its monitoring of its county governments.

Results in Table 12 uses the log of the number of links and images on a county website as a proxy for its availability of data and communication links. Estimation results indicate that there was a 22% increase in links and image on county websites in treated versus control counties post-treatment. While the estimates are somewhat noisy (significant at the 10-percent level) , the quantitative impact is large and accounts for roughly two-ninths of the sample standard deviation of website links and images, suggesting that citizens in treated counties gained more access to their county government's data.

Table 13 and Table A1 in the Appendix provide evidence that constituents in treated counties communicated much about government corruption, government accountability and transparency in public forums post-treatment. Table 13 contains fourteen relevant words scraped from Sina-Weibo websites, and Table A1 contains ten additional words. The results indicate that the reform unleashed the Chinese equivalent of a "tweet storm." Twenty out of twenty-four word increases are significant at the 5% level including "Government service" (19.5 %increase); "Corruption" (12% increase); "Govt openness" (28 % increase); "Transparency" 14 % increase); "Monitoring" (22 % increase). In addition, Tables 14 and A2, provides evidence of a massive increase of words related to

public investment, for example, "Highway" (25.6% increase); "Airport" (35.6%); "Railway" (15%); and, "Subway" (15%).

7 Conclusion

How can local governments be encouraged to be less corrupt and to provide more productive public investments when political institutions are exclusive? Using the case of China, we show that a website reform encouraged county governments to reduce corruption and to increase public investments. Moreover, leaders in the treated counties had higher promotion rates following the enactment of this reform.

In order to interpret our findings, we have developed a model i the spirit of Becker (1968) where county leaders trade off their personal benefits of rent seeking against its costs in terms of expected penalties and reduced promotion prospects. Because the reform causes corruption to fall and public investments to increase, our model indicates corruption does not grease the wheels of growth. The model also suggests that county leaders reduce corruption because they expect that their outcomes (public investments) and rent-seeking will be more closely monitored for two reasons. First, their overseeing government is likely to increase the intensity of its traditional monitoring methods during a reform. And, secondly, the reform gives citizens more information which they can use to make more informed grievances and inquires that the overseeing government uses to evaluate the county leaders. While it is almost self-evident that overseeing governments increase the intensity of their traditional monitoring practices during reforms, we also find evidence from Sina-Weibo suggesting that citizens in treated counties used information on the e-platform to make more informed grievances and inquiries.

In their study of municipal governments in Brazil, Ferraz and Finan (2010) show that that electoral incentives and media are effective tools for fighting corruption. In China, however, county officials compete for promotions and, thus, are concerned with just how their overseeing government will evaluate them and, do not stand for popular elections. Moreover, the local media in China provides less information than in Brazil. Thus, our study suggests that broad public disclosure on publicly accessible e-platforms in combination with promotion incentives is a strategy for improving local government accountability when political institutions are exclusive.

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Figure 1. Spatial Distribution of Treated Counties

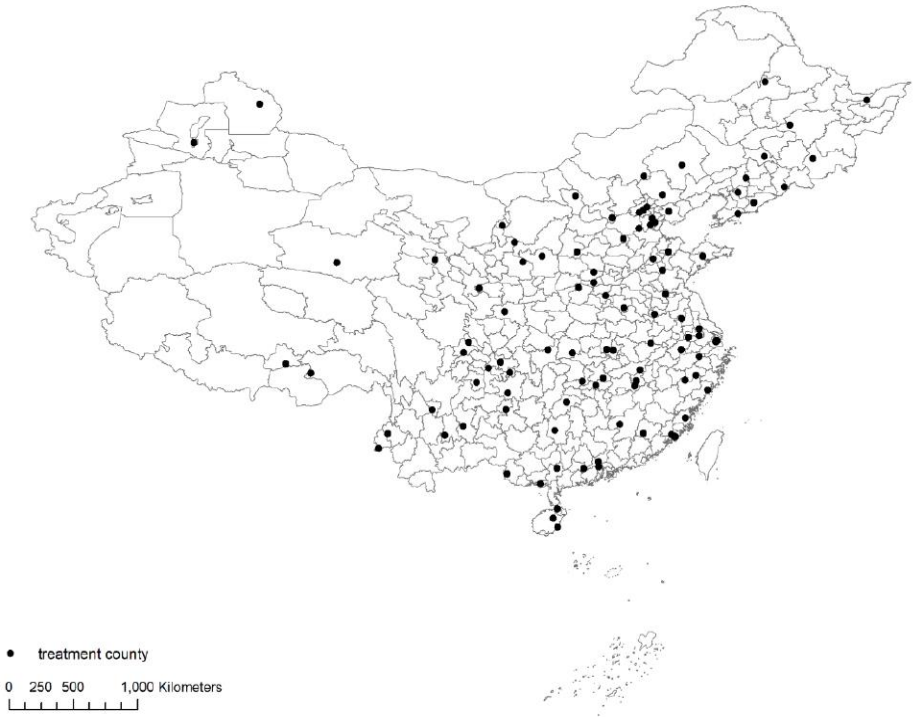
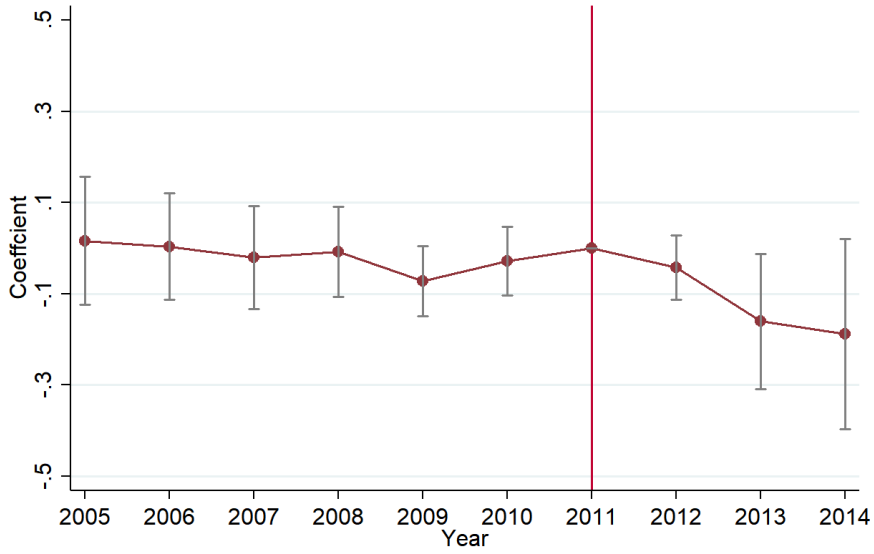
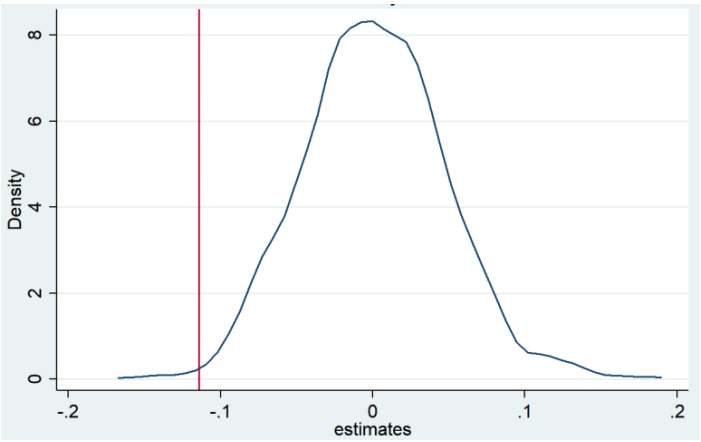


Figure 2 Estimated Coefficients for Corruption – Baseline Measure



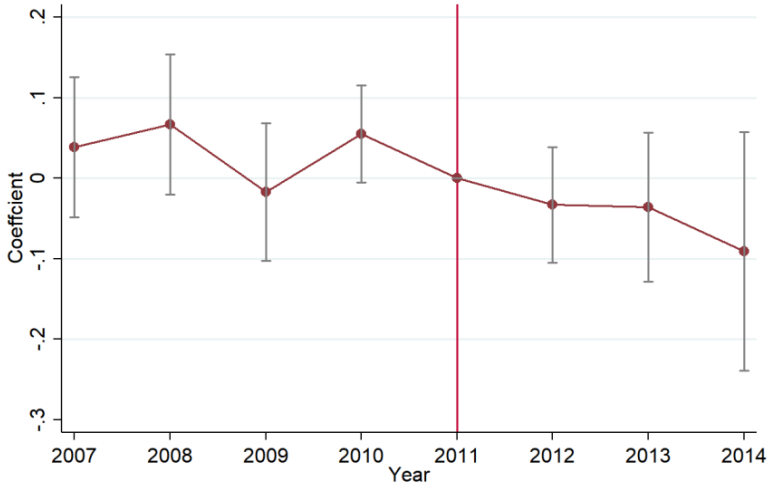
Notes: The points represent coefficients of treatment interacted with Year Dummies. The default year is 2011. The dependent variable is Corruption.

Figure 3. Placebo Test



Notes：The figure shows the kernel density of the estimated coefficients from 1000 simulations randomly assigning treatment status to counties. The vertical line represents the point estimate of the treatment effect result of column 2 in Table 3.

Figure 4. The Estimated Coefficients for Corruption – Business Entertainment Expenses



Notes: The points represent coefficients of treatment interacted with Year Dummies. The baseline year is 2011.The dependent variable is Business entertainment as a percentage of sales.

Table 1. Summary statistics

Variables	Definition	Mean	S.D	Data coverage
County variable				
Treatment	Dummy for treated counties	0.041	0.197	2005-2014
Post	Dummy for year>=2012	0.296	0.457	2005-2014
Corruption and Fixed Investment				
Mismanagement	Overall Mismanagement value (millions)	141.066	584.259	2005-2014
Budgetary income	General budgetary income (millions)	661.335	1301.515	2005-2014
Corruption	Mismanaged amount divided by general budgetary income	0.287	0.656	2005-2014
EE	Business entertainment expenses (1000 yuan)	268.880	3084.859	2007-2014
Sales	Sales (100 million)	5443.546	5372909	2007-2014
EE_sales	Business entertainment as a percentage of sales	0.836%	2.383%	2007-2014
Land price	Total price of an industrial land parcel (log)	5.711	1.690	2007-2014
Land allocation	=1 if an industrial land was sold by open transaction, 0 otherwise	0.584	0.492	2007-2014
Inspection	Dummy for inspections of provincial governments by the Central Commission for Discipline Inspection. It is 1 if one province was inspected, and 0 otherwise	0.133	0.340	2005-2014
Fixed investment	Fixed investment normalized by population (10000 yuan per capita)	1.430	2.063	2005-2014
Quality of County Websites				
Page size	Number of words in the front page of county website (log)	9.241	4.426	2008-2010
Images	Number of images in the front page of county website(log)	3.294	2.063	2008-2010
Links	Number of links in the front page of county website(log)	4.031	2.416	2008-2010
Website construction	Total number of links and images (log) in front page	5.760	0.813	2008-2014
County-level Economic Conditions				
Public finance	Number of government employees divided by total government income	0.118	0.088	2009
Mountain	Dummy for mountainous county	0.385	0.487	2009
Poverty	Dummy for national poverty county	0.267	0.442	2009
Provincial capital	Dummy for county located within provincial capital cities	0.086	0.281	2009
Distance	Distance to the seat of province (100 km)	2.289	1.843	2009
County Leaders Characteristics				
Promotion	Dummy for whether one county party secretary was promoted or not	0.122	0.328	2002-2015
Gender	Dummy for gender, 1=male, 0=female	0.964	0.187	2002-2015
Duration	The number of years for being county party secretary	5.274	1.740	2002-2015
Age	Age of the county party secretary	47.316	3.951	2002-2015
Education	Years of education of the county party secretary	17.623	1.658	2002-2015
Social Media Words related to Government Accountability and Corruption				
E-government	Number in Sina Weibo (log)	0.018	0.129	2009-2014
Government affairs openness	Number in Sina Weibo (log)	0.028	0.173	2009-2014
Government service	Number in Sina Weibo (log)	0.112	0.334	2009-2014
Government service pilot reform	Number in Sina Weibo (log)	0.005	0.062	2009-2014

E-platform	Number in Sina Weibo (log)	0.006	0.075	2009-2014
Government convenience services	Number in Sina Weibo (log)	0.094	0.299	2009-2014
Government website	Number in Sina Weibo (log)	0.104	0.345	2009-2014
Corruption	Number in Sina Weibo (log)	0.396	0.577	2009-2014
Anti-corruption	Number in Sina Weibo (log)	0.140	0.360	2009-2014
Supervision	Number in Sina Weibo (log)	0.535	0.682	2009-2014
Government openness	Number in Sina Weibo (log)	0.804	0.822	2009-2014
Transparency	Number in Sina Weibo (log)	0.128	0.354	2009-2014
Monitoring	Number in Sina Weibo (log)	0.287	0.513	2009-2014
Clean government	Number in Sina Weibo (log)	0.181	0.402	2009-2014
Administrative function	Number in Sina Weibo (log)	0.009	0.097	2009-2014
Government affairs platform	Number in Sina Weibo (log)	0.021	0.140	2009-2014
Administrative system	Number in Sina Weibo (log)	0.012	0.109	2009-2014
Service-oriented government	Number in Sina Weibo (log)	0.006	0.071	2009-2014
Administration by law	Number in Sina Weibo (log)	0.095	0.304	2009-2014
Open	Number in Sina Weibo (log)	0.000	0.007	2009-2014
Transparency	Number in Sina Weibo (log)	0.805	0.822	2009-2014
Information sharing	Number in Sina Weibo (log)	0.128	0.354	2009-2014
Government information	Number in Sina Weibo (log)	0.020	0.131	2009-2014
Government Network	Number in Sina Weibo (log)	0.070	0.283	2009-2014
Social Media Words Related to Fixed Investment				
Infrastructure	Number in Sina Weibo (log)	0.214	0.445	2009-2014
Public transportation	Number in Sina Weibo (log)	0.055	0.268	2009-2014
Highway	Number in Sina Weibo (log)	1.006	0.982	2009-2014
Railway	Number in Sina Weibo (log)	0.441	0.690	2009-2014
Airport	Number in Sina Weibo (log)	0.318	0.637	2009-2014
Light Rail Train	Number in Sina Weibo (log)	0.032	0.227	2009-2014
Subway	Number in Sina Weibo (log)	0.123	0.418	2009-2014
Port	Number in Sina Weibo (log)	0.081	0.326	2009-2014
Telecommunications	Number in Sina Weibo (log)	0.321	0.585	2009-2014
Power grid	Number in Sina Weibo (log)	0.169	0.411	2009-2014
Water supply	Number in Sina Weibo (log)	0.161	0.433	2009-2014
Electricity supply	Number in Sina Weibo (log)	0.341	0.606	2009-2014
Hydraulic project	Number in Sina Weibo (log)	0.344	0.567	2009-2014
Public service	Number in Sina Weibo (log)	0.078	0.285	2009-2014
Aviation	Number in Sina Weibo (log)	0.161	0.456	2009-2014
Communication	Number in Sina Weibo (log)	0.151	0.408	2009-2014
Garden	Number in Sina Weibo (log)	0.251	0.530	2009-2014
Greening	Number in Sina Weibo (log)	0.304	0.557	2009-2014
Garbage removal	Number in Sina Weibo (log)	0.011	0.102	2009-2014
Sewage treatment	Number in Sina Weibo (log)	0.072	0.261	2009-2014
Electricity power	Number in Sina Weibo (log)	0.312	0.556	2009-2014
Gas	Number in Sina Weibo (log)	0.112	0.371	2009-2014
Tap water	Number in Sina Weibo (log)	0.265	0.563	2009-2014

Environmental protection	Number in Sina Weibo (log)	0.575	0.795	2009-2014
Environmental sanitation	Number in Sina Weibo (log)	0.215	0.505	2009-2014
Ecosystem	Number in Sina Weibo (log)	0.661	0.795	2009-2014

Table 2. Balance Tests

Variable	Treatment	Control	Unconditional Difference	Conditional difference
Panel A: Selection variables				
Page size (log)	9.977	9.132	0.845**	
	(3.704)	(4.508)	(0.417)	
Images (log)	3.678	3.257	0.420**	
	(1.899)	(2.080)	(0.212)	
Links (log)	4.460	3.986	0.474**	
	(2.131)	(2.442)	(0.239)	
Public finance	0.093	0.120	-0.027***	
	(0.036)	(0.087)	(0.004)	
Mountain	0.277	0.393	-0.116**	
	(0.450)	(0.489)	(0.050)	
Poverty	0.145	0.274	-0.129***	
	(0.354)	(0.446)	(0.040)	
Provincial capital	0.181	0.085	0.096**	
	(0.387)	(0.279)	(0.043)	
Panel B: Other characteristics				
Agricultural grain output 2010 (log)	12.234	11.991	0.243	0.184
	(1.313)	(1.201)	(0.161)	(0.149)
Government transferred funds 2009 (log)	3.177	2.752	0.425	0.206
	(3.603)	(3.383)	(0.413)	(0.407)
Average urban wage 2010 (log)	10.361	10.254	0.107*	0.086
	(0.471)	(0.359)	(0.060)	(0.059)
Financial deficit divided by total public income in 2009	0.672	0.059	0.008	0.004
	(0.073)	(0.074)	(0.008)	(0.008)
Average hectares of land transaction 2010 (log)	9.892	9.872	0.020	-0.145
	(1.220)	(1.202)	(0.144)	(0.132)
Average asset 2010 (million)	131.757	114.609	17.147***	2.858
	(718.629)	(968.646)	(6.442)	(7.048)
Average firm output 2010 (million)	119.547	98.144	21.403***	8.388
	(756.140)	(796.856)	(6.708)	(6.941)
Average firm net profit 2010 (million)	6.964	5.191	1.773**	1.064
	(101.243)	(116.215)	(0.888)	(0.907)
Number of firm employees 2010	181.409	167.770	13.639**	5.144
	(698.92)	(646.550)	(5.925)	(6.057)
Panel C: County leaders characteristics				
Average birth year of county leaders in 2010	1964.438	1964.390	0.048	0.450
	(1.991)	(3.475)	(0.538)	(0.506)
Average education of county leaders in 2010	18.078	18.132	-0.055	0.115
	(1.891)	(1.711)	(0.519)	(0.541)
Number of new county leaders in 2010	1.500	1.400	0.100	0.080
	(0.516)	(0.512)	(0.129)	(0.119)

Panel D: Dependent variables				
Corruption (2010)	0.104	0.162	-0.058**	-0.031
	(0.207)	(0.356)	(0.024)	(0.024)
Fixed investment (2010)	1.632	1.359	0.273**	0.090
	(1.065)	(1.752)	(0.136)	(0.136)
Land price (2009)	4.904	5.068	0.164***	-0.035
	(0.846)	(0.947)	(0.033)	(0.034)
Land allocation (2009)	0.738	0.679	-0.059***	-0.089***
	(0.40)	(0.467)	(0.016)	(0.016)
EE_sales (2010)	0.718	0.720	-0.002	0.021
	(2.040)	(1.927)	(0.018)	(0.177)
Web construction (2010)	5.707	5.753	-0.046	-0.099
	(0.975)	(0.836)	(0.139)	(0.078)
Promotion (2010)	0.175	0.138	0.037	0.035
	(0.382)	(0.345)	(0.043)	(0.043)

Table 3. Baseline Results for Corruption

	(1)	(2)
Dependent variable	Corruption	Corruption
Treatment× post	-0.118***	-0.114***
	(0.039)	(0.040)
County fixed effect	YES	YES
Year fixed effect	YES	YES
Control × T		YES
Control × T2		YES
Control × T3		YES
Year coverage	2005-2014	2005-2014
Observations	20,359	20,359
R-squared	0.336	0.338
Number of Clusters	2165	2165

Notes: Robust standard errors, clustered at the county level are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All observations are at the county-year level. The variables "control" denotes the key criteria the province used in selecting the treatment counties. Control variables are interacted with a third order polynomial function of time.

Table 4. Robust check for the effect of treatment on Corruption

	(1)	(2)	(3)
Dependent variable	Corruption	Corruption	Corruption
Treatment× post	-0.110***	-0.128***	-0.116***
	(0.039)	(0.040)	(0.042)
Inspection	-0.286***		
	(0.038)		
Treatment× year_2009_2010		-0.049	
		(0.033)	
County fixed effect	YES	YES	YES
Year fixed effect	YES	YES	YES
Control × T	YES	YES	
Control × T2	YES	YES	
Control × T3	YES	YES	
Control× Year dummy			YES
Year coverage	2005-2014	2005-2014	2005-2014
Observations	20,359	20,359	20,359
R-squared	0.342	0.338	0.339
Number of Clusters	2165	2165	2165

Notes: Robust standard errors, clustered at the county level are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All observations are at the county-year level. The variables "control" denotes the key criteria the province used in selecting the treatment counties. "Inspection" is the dummy for inspections of provincial governments by the Central Commission for Discipline Inspection. "year_2009_2010" is one if year is 2009 or 2010, zero otherwise. Control variables are interacted with a third order polynomial function of time. Control variables are interacted with the year dummies which more flexibly control for the time effects of control variables on outcome variables in Column (3).

Table 5. Triple difference effects of treatment on corruption

	(1)
Dependent variable	
Corruption	
Treatment× post× distance	-0.050**
	(0.022)
Treatment× post	YES
post× distance	YES
Treatment× distance	YES
County fixed effect	YES
Year fixed effect	YES
Control × T	YES
Control × T2	YES
Control × T3	YES
Year coverage	2005-2014
Observations	20333
R-squared	0.337
Number of cluster	2143

Note: Robust standard errors, clustered at the county level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. In column (1) and (2), all observations are at the county-year level. The variables "control" denotes seven key criteria the province used in selecting the treatment counties. Interactions of the seven selection variables with a third-order polynomial function of time are included.

Table 6. The Effect of Treatment on Firm Business Entertainment Expenses

	(1)	(2)	(3)
Dependent variable Business entertainment expenses as a percentage of sales			
Treatment× post	-0.074**	-0.072**	-0.074**
	(0.029)	(0.030)	(0.031)
Inspection			0.058*
			(0.035)
Firm fixed effect	YES	YES	YES
Year fixed effect	YES	YES	YES
Control × T		YES	YES
Control × T2		YES	YES
Control × T3		YES	YES
Year coverage	2007-2014	2007-2014	2007-2014
Observations	694,210	694,210	694,210
R-squared	0.508	0.508	0.508
Number of Clusters	2063	2063	2063

Notes: The dependent variable is business entertainment as a percentage of sales. Robust standard errors, clustered at the county level are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All observations are at the firm-county-year level. The variables "control" denotes key criteria the province used in selecting the treatment counties. Interactions of the selection variables with a third-order polynomial function of time are included in column (2). "Inspection" is the dummy for inspections of provincial governments by the Central Commission for Discipline Inspection.

Table 7. The Effect of Treatment on Industrial Land Transactions

	(1)	(2)	(3)	(4)
Dependent variable	Industrial land price (log)	Land open transaction	Industrial land price (log)	Land open transaction
Treatment× post	0.138**	0.078**	0.140**	0.077**
	(0.066)	(0.032)	(0.066)	(0.032)
Inspection			-0.030*	0.009
			(0.017)	(0.010)
County fixed effect	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES
Control × T	YES	YES	YES	YES
Control × T2	YES	YES	YES	YES
Control × T3	YES	YES	YES	YES
Year coverage	2007-2014	2007-2014	2007-2014	2007-2014
Observations	135,791	137,246	135,791	137,246
R-squared	0.688	0.493	0.688	0.493
Number of cluster	2000	2002	2000	2002

Notes: Robust standard errors, clustered at the county level are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All observations are at the land parcel-county-year level. The variables "control" denotes the key criteria the province used in selecting the treatment counties. In column (1) and (3), the dependent variable is the log of the industrial land price. In column (2) and (4), the dependent variable is an indicator for whether the land was transacted in an open transaction, such as a tender, auction or bidding. All regressions control for year fixed effects, county fixed effects, and interactions of the selection variables with a third-order polynomial function of time. "Inspection" is the dummy for inspections of provincial governments by the Central Commission for Discipline Inspection.

Table 8. The Effect of Treatment on in fixed investment

	(1)	(2)
Dependent variable	Fixed investment	Fixed investment
Treatment× post	0.444*	0.445*
	(0.250)	(0.250)
Inspection		-0.064
		(0.076)
County fixed effect	YES	YES
Year fixed effect	YES	YES
Control × T	YES	YES
Control × T2	YES	YES
Control × T3	YES	YES
Year coverage	2005-2014	2005-2014
Observations	18,590	18,590
R-squared	0.741	0.741
Number of cluster	1936	1936

Notes: Robust standard errors, clustered at the county level are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All observations are at the county-year level. The variables "control" denotes the key criteria the province used in selecting the treatment counties. Control variables are also interacted with the year dummies which more flexibly control for the time effects of control variables on outcome variables. "Inspection" is the dummy for inspections of provincial governments by the Central Commission for Discipline Inspection.

Table 9. Triple difference effects of treatment on fixed investment

	(1)
Dependent variable	
Fixed Investment	
Treatment× post× distance	0.368
	(0.382)
Treatment× post	YES
post× distance	YES
Treatment× distance	YES
County fixed effect	YES
Year fixed effect	YES
Control × T	YES
Control × T2	YES
Control × T3	YES
Year coverage	2005-2014
Observations	18,586
R-squared	0.743
Number of cluster	1936

Note: Robust standard errors, clustered at the county level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All observations are at the county-year level. The variables "control" denotes seven key criteria the province used in selecting the treatment counties. Interactions of the seven selection variables with a third-order polynomial function of time are included.

Table 10. Effects of treatment on the promotion of county party secretary

	(3)
Dependent variable	Promotion
Treatment× post	0.074**
	(0.035)
County fixed effect	YES
Year fixed effect	YES
Control × T	YES
Control × T2	YES
Control × T3	YES
Treatment trend	YES
Year coverage	2002-2015
Observations	21,399
R-squared	0.111
Number of cluster	1970

Notes: Robust standard errors, clustered at the county level are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All observations are at the county-year level. The variables "control" denotes the key criteria the province used in selecting the treatment counties. Promotion is 1 is the county party secretary is promoted, and 0 otherwise. The county party secretary is defined to be promoted if he or she was promoted to be a party secretary at prefecture level, vice party secretary at prefecture level, mayor, vice mayor, assistant mayor, acting mayor, Standing Committee member of a city, General Secretary of a prefecture. Treatment-specific linear time trends are included to control for the differences in time trends between the treatment and control groups. Total working time as the party secretary was also controlled.

Table 11. Effects of treatment on website construction

	(1)
Dependent variable	Website construction
Treatment× post	0.218*
	(0.129)
County fixed effect	YES
Year fixed effect	YES
Control × T	YES
Control × T2	YES
Control × T3	YES
Year coverage	2008-2014
Observations	8,584
R-squared	0.615
Number of cluster	1693

Notes: Robust standard errors, clustered at the county level are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All observations are at the county-year level. The dependent variable is measured by total number of links and images (log) in the front page of the website of each county. The variables "control" denotes the key criteria the province used in selecting the treatment counties.

Table 12. Effects of treatment on key words from social media excluding government Weibo

	(1) E-government	(2) Government Affairs Openness	(3) Government service	(4) Government service pilot reform	(5) E-platform	(6) Government Convenience services	(7) Government website	(8) Corruption	(9) Anti-corruption	(10) Supervision	(11) Government Openness	(12) Transparency	(13) Monitoring	(14) Clean government
Treatment× post	0.086***	0.138***	0.195***	0.108***	0.099***	0.070**	0.103**	0.120**	0.107**	0.186***	0.280***	0.142***	0.216***	0.058
	(0.024)	(0.026)	(0.039)	(0.020)	(0.022)	(0.034)	(0.043)	(0.057)	(0.043)	(0.068)	(0.072)	(0.041)	(0.051)	(0.041)
County fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Control × T	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Control × T2	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Control × T3	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year coverage	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014
Observations	10,712	10,712	10,712	10,712	10,712	10,712	10,712	10,712	10,712	10,712	10,712	10,712	10,712	10,712
R-squared	0.261	0.240	0.340	0.261	0.232	0.321	0.284	0.436	0.308	0.511	0.625	0.373	0.376	0.332
Number of cluster	1822	1822	1822	1822	1822	1822	1822	1822	1822	1822	1822	1822	1822	1822

Notes: Robust standard errors, cluster at county level are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All observations are at the county-year level. The variables "control" denotes the key criteria the province used in selecting the treatment counties

Table 13. Effects of treatment on key words related with fixed investment from social media excluding government Weibo

	(1) Infrastructure	(2) Public transportation	(3) Highway	(4) Railway	(5) Airport	(6) Light Rail Train	(7) Subway	(8) Port	(9) Telecommunications	(10) Power grid	(11) Water supply	(12) Electricity supply	(13) Hydraulic project	(14) Public service
Treatment× post	0.137**	0.121***	0.256***	0.150**	0.366***	0.106**	0.151**	0.110**	0.230***	0.120**	0.167***	0.198***	0.140**	0.146***
	(0.055)	(0.042)	(0.077)	(0.067)	(0.095)	(0.045)	(0.073)	(0.055)	(0.062)	(0.051)	(0.061)	(0.063)	(0.057)	(0.047)
County fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Control × T	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Control × T2	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Control × T3	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year coverage	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014
Observations	10,706	10,706	10,706	10,706	10,706	10,706	10,706	10,706	10,706	10,706	10,706	10,706	10,706	10,706
R-squared	0.394	0.458	0.690	0.515	0.547	0.508	0.538	0.499	0.469	0.358	0.396	0.477	0.435	0.369
Number of cluster	1821	1821	1821	1821	1821	1821	1821	1821	1821	1821	1821	1821	1821	1821

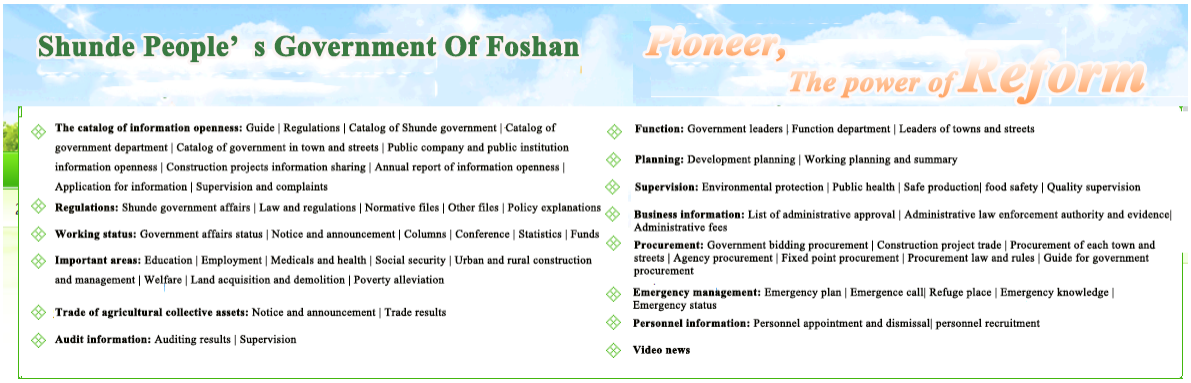
Notes: Robust standard errors, cluster at county level are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All observations are at the county-year level. The variables “control” denotes the key criteria the province used in selecting the treatment counties

Appendix Figure A1. The front webpage of Shunde in Foshan in Guangdong Province on 21 Dec 2012



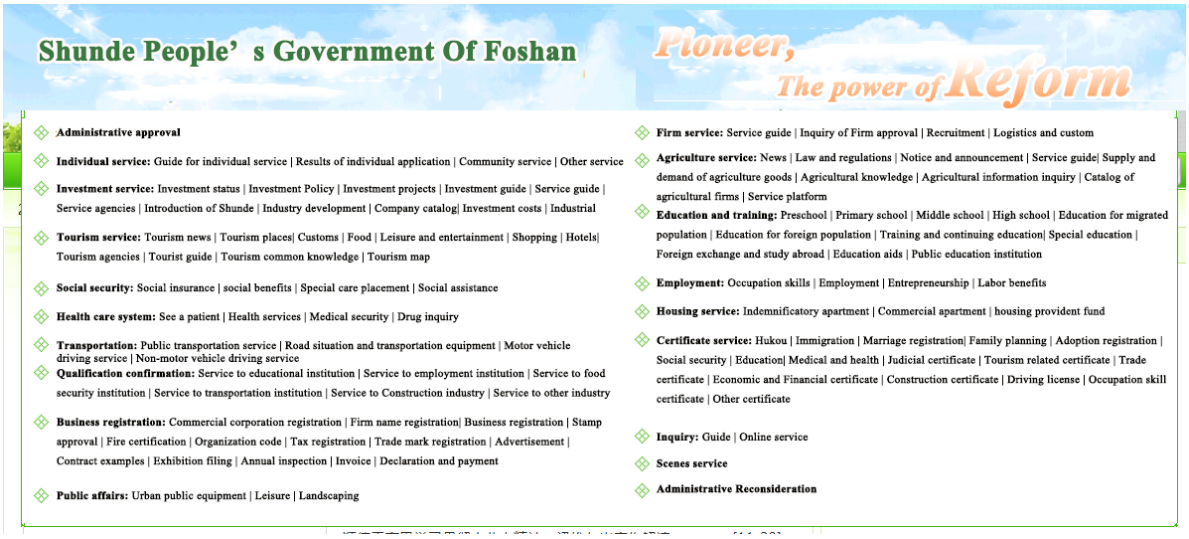
Source: https://web.archive.org/web/20121221103048/http://www.shunde.gov.cn/

Appendix Figure A2. The transparency link in the front webpage of Shunde in Foshan in Guangdong Province on 21 Dec 2012



Source: https://web.archive.org/web/20121221103048/http://www.shunde.gov.cn/

Appendix Figure A3. The online service link in the front webpage of Shunde in Foshan in Guangdong Province on 21 Dec 2012



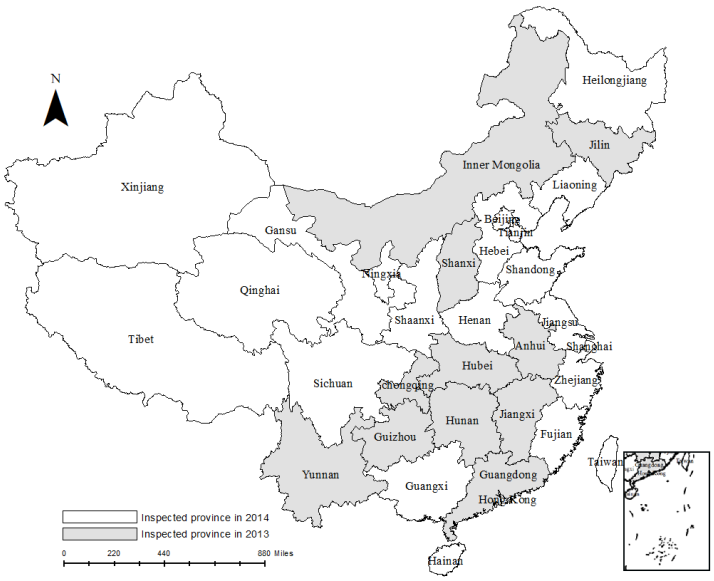
Source: https://web.archive.org/web/20121221103048/http://www.shunde.gov.cn/

Appendix Figure A4. The interaction between government and citizens in the front webpage of Shunde in Foshan in Guangdong Province on 21 Dec 2012



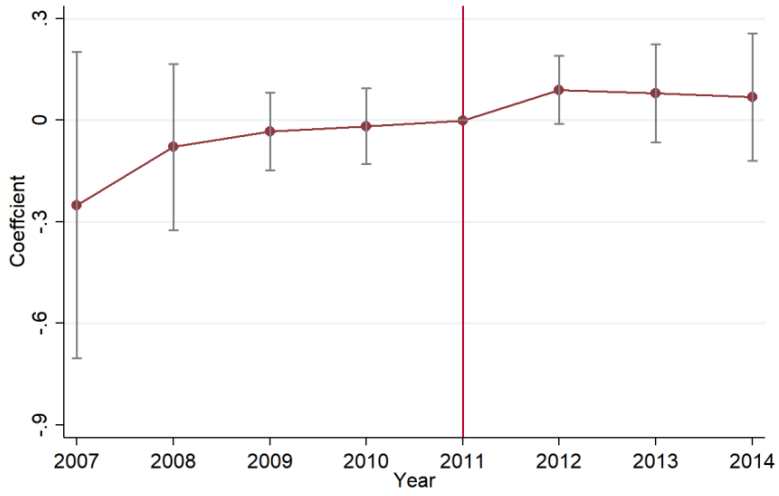
Source: https://web.archive.org/web/20121221103048/http://www.shunde.gov.cn/

Figure A5. The anti-corruption inspection across the country



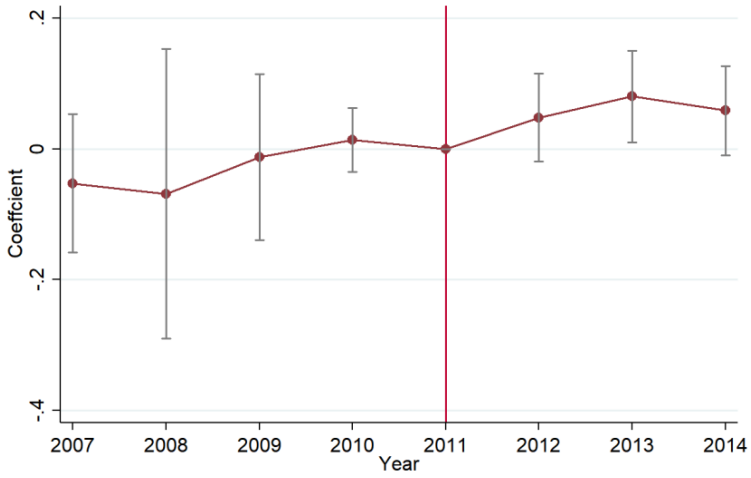
Source: http://www.ccdi.gov.cn/special/zyxszt/index.html

Figure A6. Estimated Coefficients for Industrial Land Price



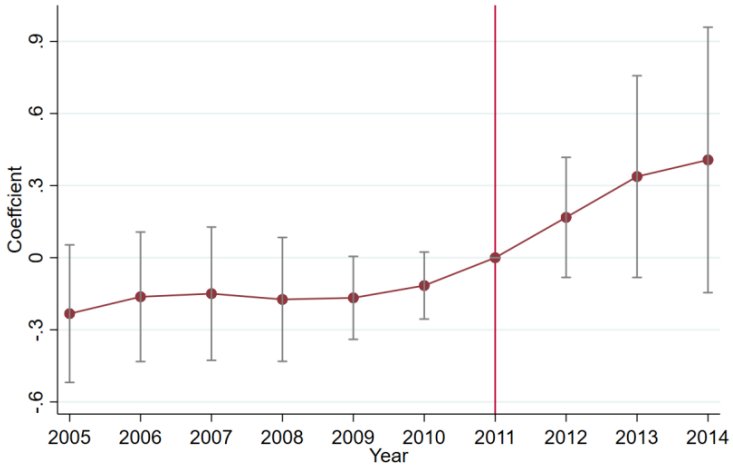
Notes: The points represent coefficients of treatment interacted with Year Dummies. The baseline year is 2011. The dependent variable is Industrial Land Price.

Figure A7. Estimated Coefficient for Land Open Transaction Dummy



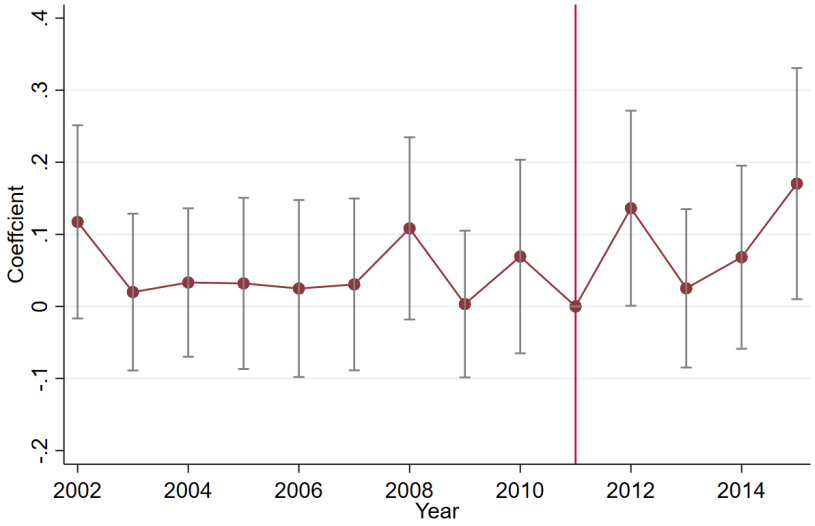
Notes: The points represent coefficients of treatment interacted with Year Dummies. The baseline year is 2011. The dependent variable is Land Open Transaction Dummy.

Figure A8. Estimated Coefficient for fixed investment



Notes: The points represent coefficients of treatment interacted with Year Dummies. The baseline year is 2011. The dependent variable is fixed investment. The confidence interval is much larger because additional counties do not report the fixed investment in 2014. Compared to other years, around 120 counties do not report the statistics of fixed investment in 2014.

Figure A9. Estimated Coefficient for promotion of County party secretary



Notes: The points represent coefficients of treatment interacted with Year Dummies. The baseline year is 2011. The dependent variable is promotion of County party secretary. Treatment-specific linear time trends are included to control for the differences in time trends between the treatment and control groups

Table A1. Effects of treatment on other key words from social media excluding government Weibo

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Administrative function	Government affairs platform	Administrative system	Service-oriented government	Administration by Law	Open	Transparency	Information Sharing	Government information	Government network
Treatment× post	0.035***	0.108***	0.005	0.001	0.070**	0.304***	0.142***	0.004	0.120***	0.036*
	(0.013)	(0.027)	(0.012)	(0.008)	(0.029)	(0.067)	(0.041)	(0.016)	(0.033)	(0.022)
County fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Control × T	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Control × T2	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Control × T3	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year coverage	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014
Observations	10,712	10,712	10,712	10,712	10,712	10,712	10,712	10,712	10,712	10,712
R-squared	0.188	0.268	0.245	0.204	0.260	0.625	0.373	0.247	0.270	0.248
Number of cluster	1822	1822	1822	1822	1822	1822	1822	1822	1822	1822

Notes: Robust standard errors, cluster at county level are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All observations are at the county-year level. The variables "control" denotes the key criteria the province used in selecting the treatment counties.

Table A2. Effects of treatment on other key words related with fixed investment from social media excluding government Weibo

	(1) Aviation	(2) Communication	(3) Garden	(4) Greening	(5) Garbage removal	(6) Sewage treatment	(7) Electric power	(8) Gas	(9) Tap water	(10) Environmental protection	(11) Environmental sanitation	(12) Ecosystem
Treatment× post	0.191***	0.105**	0.306***	0.294***	0.034**	0.073**	0.169***	0.123**	0.157**	0.175**	0.310***	0.248***
	(0.065)	(0.042)	(0.080)	(0.073)	(0.013)	(0.034)	(0.055)	(0.049)	(0.065)	(0.081)	(0.076)	(0.065)
County fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Control × T	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Control × T2	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Control × T3	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year coverage	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014	2009-2014
Observations	10,706	10,706	10,706	10,706	10,706	10,706	10,706	10,706	10,706	10,706	10,706	10,706
R-squared	0.436	0.345	0.492	0.516	0.236	0.311	0.409	0.386	0.442	0.578	0.479	0.631
Number of cluster	1821	1821	1821	1821	1821	1821	1821	1821	1821	1821	1821	1821

Notes: Robust standard errors, cluster at county level are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All observations are at the county-year level. The variables “control” denotes the key criteria the province used in selecting the treatment counties