

Transparent Authoritarianism?

An analysis of political and economic barriers to greater government transparency in China

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Abstract: In recent years, the Chinese Communist Party has experimented with a variety of mechanisms designed to improve bottom-up accountability and information flow within a fundamentally authoritarian single-party system. These include the institution of village elections, the relaxation of restrictions on journalists, and a more tolerant attitude toward small-scale protests, among other developments. The most recent such innovation has been the introduction of national regulations mandating the increased sharing of government-collected information. We exploit a newly released index of environmental transparency in Chinese cities to understand what political and economic barriers may inhibit or encourage a shift toward this new model of authoritarian rule. This exercise generates two key results. First, the financial strength of a city's government is a crucial determinant of transparency. Establishing the institutions to collect, organize, and disseminate information is costly and remains a low priority for cash-strapped local governments. Secondly, we find a strong "company town" effect in which cities whose economies are relatively dependent on a single industrial firm tend to resist implementing transparency requirements.

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Introduction

Transparent governance, the open sharing of information with citizens, is increasingly recognized as a crucial element of well-functioning democracy. 86 countries had instituted some form of freedom of information regulations by 2008, but the vast majority of these were democracies (Vleugels, 2008). Authoritarian regimes, by contrast, have generally tried to restrict their citizens' access to information, attempting to conceal catastrophic failures (as in the Chernobyl incident in the USSR) but also making secrecy the default even when the information in question might seem innocuous or even beneficial to the functioning of the regime, such as the content of economic regulations.

It is surprising, then, that in recent years China's government has taken significant steps to increase the access of ordinary people to government-collected information. Some of these efforts can be traced back to commitments to the international community, such as those involved in accession to the World Trade Organization in 2001 (Horsley, 2007). But even beyond initiatives targeting the openness of economic and trade regulations, the central government has taken significant steps toward increasing openness and facilitating more-responsive government at many levels. Muckraking journalists have substantial room to work as long as they do not aim too high in the hierarchy, some public protests are treated with a more gentle hand rather than an iron fist, and many NGOs can operate openly. Perhaps most remarkably, in 2007 the State Council introduced a new set of Open Government Information Regulations (OGI Regulations), which mandate disclosure of a wide array of information to ordinary citizens, either routinely or in response to requests. To be sure, these regulations are more restrictive than analogous freedom of information laws in democratic countries. Nevertheless, the new OGI regulations constitute an important incremental shift in China's approach to governance. Among other motivations, they were adopted in an effort to make it more difficult for lower-level arms of government to engage in corruption or less-extreme forms of poor governance unbeknownst to the center (Horsley, 2007). As with the (relatively) greater freedoms accorded to journalists, protesters, and NGOs, these regulations take advantage of the coincidence of interests between the central government and ordinary citizens in reducing corruption and ensuring compliance with some central mandates (Lorentzen, 2008a, 2008b).

This paper will focus on the implementation of these regulations in the context of environmental disclosure. The Ministry of Environmental Protection (MEP) was the most eager of all the national ministries to push for greater transparency, issuing its own implementing measures even before the State Council's overarching OGI Regulations were formally released (Ma, 2008). This was likely a

consequence of the persistent challenges it has faced in getting compliance from local governments, which have tended to favor economic growth over environmental goals (Economy, 2004, 2009). By routinizing the release of information on environmental quality and recruiting citizens as its allies, the Ministry may hope to exert greater pressure on local officials not to short-change the environment.

Yet the degree to which these new rules were implemented varies enormously from place to place. This is not inherently surprising given that China's complex bureaucratic system is characterized by a large degree of decentralization (Falkenheim 1980; Oksenberg & Tung, 1991; Park et. al. 1996; Solinger 1996; Jin et. al. 2005; Landry, 2008). Whatever their motivations, the expectations of central leaders are not always met, as local officials must constantly respond to a multi-dimensional array of sometimes contradictory demands from above. Taking advantage of transparency ratings compiled by two NGOs for 113 major Chinese cities, we will examine what factors may have contributed to greater or lesser compliance with these new regulations at the municipal level. Because most cities are for the most part two steps below the direct political control of central authorities, analyzing municipal institutions provides insight into the barriers facing the central government's attempt to introduce a 'democratic' practice in a non-democratic setting.

Two findings stand out. First of all, money matters. The wealthier a city is and the more stable the finances of its government, the more transparent it will be. This suggests that a major barrier to transparency is simply cost—collecting, vetting, and disseminating environmental information takes resources that many cities are hard-pressed to assemble. Rather than being unwilling to disseminate information more freely, some cities may simply be unable to afford the necessary institutional infrastructure. However, our second finding indicates that there is more going on than simple financial constraints. We find that the dominance of a single industrial enterprise in a city's economy is a remarkably robust negative predictor of transparency. Specifically, we demonstrate that the larger the enterprise relative to the city's size, the less transparent the city's environmental governance will be. This suggests that local governments favor economic development over the environment not just because they face conflicting mandates from the center, but also because they are influenced by powerful local economic interests. Cities whose economies comprise a number of small firms will be more willing to impose onerous disclosure requirements than ones in which one large firm is particularly influential.

We also examine the effects of leaders' personal characteristics. We find some indication that a mayor's past training in law is associated with higher levels of transparency, and that experience

studying or working abroad is (surprisingly) associated with lower levels of transparency. The most robust finding, however, is that the longer the mayor has been in office, the higher the city's transparency rating. This has two possible explanations. The first explanation links to the financial story above—because environmental transparency is a low priority, new mayors tend to allocate their time to other, more pressing matters. The second explanation links to the political economy of the city—the longer a mayor has been in office, the more able he is to push through transparency regulation in the face of opposition from entrenched economic interests.

This paper proceeds as follows. The next section provides more detail on the steps China has taken in recent years towards greater government transparency in general and on environmental transparency more specifically. We then discuss in detail the development and characteristics of our dependent variable, the Pollution Information Transparency Index (PITI) score. After this, we present the findings of our empirical analysis, looking first at potential explanations in the economy or political economy of the cities, then exploring the possible influence of the personal characteristics of mayors. Lastly, we address issues of selection bias and reverse causality before offering some concluding observations.

China's New Government Transparency Regulations

The State Council promulgated the Regulations on Open Government Information (OGI Regulations) on April 2007, to take effect a year later on May 1st, 2008. The regulations state that government departments should disseminate certain kinds of information routinely “on their own initiative” within 20 business days of its generation or updating, while other information should be disclosed upon request to citizens or organizations within 30 business days at most. All government departments at the county level and above are instructed to establish an Open Government Information office which among other responsibilities would manage the information gathered, determine what information should be disclosed, compile a catalogue of such information, and provide a guide for the use of those who would like to access or request information. In addition to providing general principles for determining what information should be released, the regulations specifically mention that government departments at the county level and above should “emphasize disclosure” of several specific kinds of information, including “...information on the supervision and inspection of environmental protection.” Fees may only be collected for costs of “retrieval, duplication, postage and the like,” and can be reduced or eliminated in cases of financial hardship (State Council, 2007).

The State Environmental Protection Administration (SEPA) issued its own Measures on Open Environmental Information (OEI Measures) in 2007, which provide more detailed instructions for implementation of the national regulations for its subordinate bodies.² In addition to reiterating the key points of the OGI regulations as they apply to environmental bureaus, it specifies sixteen specific types of information that should be disclosed automatically. These include environmental “laws, rules, regulations, standards, and other regulatory documents,” information on the allocation of emissions quotas and permits to enterprises, the amounts of pollution fees or penalties collected and any exemptions, reductions, or postponements granted, the results of the investigation of public complaints, names of firms in violation of environmental regulations, and so forth. The measures also impose specific obligations on enterprises to disclose information about their environmental protection efforts and pollution emissions, specifically ruling out the excuse that these kinds of information constitute “trade secrets” (SEPA, 2007). SEPA Vice-Minister Pan Yue noted at the time of the release of the Measures that this stipulation was made explicitly to eliminate a common justification for non-disclosure (CECC, 2008).

Analysts immediately noted a number of limitations in these new policies. Rather than following the “global ideal” in which there is a “clear presumption of disclosure with narrowly drawn exceptions to that principle,” the OGI regulations instead take a more cautious approach in which government agencies must take into account a number of considerations before releasing information (Horsley, 2007: 3-4). In particular, they include the important restriction that the information to be disclosed “may not endanger state security, public security, economic security and social stability” (State Council: Article 8). This echoes the expansive phrasing of the 1988 Law on Safeguarding State Secrets, which as a law takes precedence over the OGI Regulations. Since clear criteria have never been put forth as to what is or is not a state secret, this leaves government agencies a great deal of flexibility in determining what information they wish to release (Ding, 2009: 39, CECC, 2008). In addition, the continued subordination of the judiciary to the CCP means that attempts to use the legal system to compel disclosure face significant challenges (Ding, 2009). As a consequence, while some called the regulations a “turning point” (Horsley, 2007), others remained unimpressed (e.g. Ding, 2009).

² The State Environmental Protection Administration was elevated by the National People’s Congress to become the Ministry of Environmental Protection in March 2008. (Xinhua, March 11, 2008) http://news.xinhuanet.com/english/2008-03/11/content_7766369.htm

Dependent Variable: The Pollution Information Transparency Index

In an attempt to evaluate the success of these new regulations and to encourage compliance, China's non-governmental Institute for Public and Environmental Affairs (IPE) and the Natural Resources Defense Council--an American NGO--jointly created a Pollution Information Transparency Index (PITI). This index assigns 113 Chinese cities scores on eight different dimensions, for a total of 100 points possible. These dimensions are as follows:

1. Routine disclosure of firms that violate pollution standards (28 Points)
2. Reports of cleanup efforts by polluters (8 Points)
3. Disclosure of government audits of industries (8 Points)
4. Firm environmental behavior assessment reports (8 Points)
5. Provision of results of petitions and suits brought against polluters (18 Points)
6. Provision of reports on environmental impact assessments (8 Points)
7. Provision of lists of fines exacted on polluters (4 Points)
8. Compliance with requests for information requests (18 Points)

Within each dimension, cities were given points depending on assessments of to what degree the information provision was systematic, timely, complete, and user-friendly. Compliance with requests for information disclosure (Item 8) was assessed through letters and telephone calls by IPE and NRDC staff members (PITI, 2010). Some points were assigned for behaviors clearly mandated by the law, but additional points were assigned for other activities and disclosures that would be useful to the public. The index compilers estimate that basic compliance with the law would earn a score of approximately 63 points (Wang, 2009).

The first PITI index was released in June 2009, assessing performance as of one year after the regulations took effect. As would be expected given the loopholes in the formulation of these regulations, their novelty, and the typical challenges of implementing policy in China's nested bureaucratic system, implementation was far from perfect. The mean score was 31.06, the median was 26.6, and the lowest score (earned by the cities of Jilin and Xining) was only 10.2. Only three municipalities (Ningbo, Hefei, and Fuzhou) passed the 63-point level that could be attained through minimum compliance with the laws, with Ningbo earning the highest score in the sample, 72.9. The variation in scores was quite substantial, ranging from 10.2 to 72.9, as noted, with a standard deviation of 14.8.

The list of 113 cities was adapted from an earlier list of key environmental protection cities put out by the State Environmental Protection Administration.³ 45 cities were included on that list because they were provincial-level municipalities, provincial capitals, open coastal cities, or SEZs (SEPA, 2002). The remaining cities appear to have been included based on their importance for tourism, their population, and their GDP, as well as the desire to include additional cities from western regions. While this cannot be considered a random sample of China's cities at or above the prefecture-level, there is no *prima facie* source of bias. Our econometric analysis below verifies that selection effects have no major influence on a city's PITI score.

Sources of Variation in Environmental Transparency

What might explain the extraordinary extent of variation in environmental transparency across these cities, despite the fact that each has the same formal obligation to carry out the central regulations? We can roughly split the explanations into two categories: ability and willingness. Ability has to do with the economic and budgetary constraints affecting cities. Providing transparent, routine, timely disclosure of environmental information is costly: training and paying staff responsible for managing this data and deciding what can or should be disclosed is expensive; websites take time and money to set up and maintain; responding to citizen's requests for information is time-consuming. A survey of Chinese officials studying abroad found that 30% of respondents felt they did not have adequate financial resources or staff to fulfill information requests, while 64% reported that inadequate records systems prevented them from handling requests (Piotrowski et al., 2009). Chinese cities vary a great deal in the quality of their finances. The central government has mandated that local government pay for crucial social services such as education, healthcare, and social welfare, while providing no guarantee that funds would be made available for localities that lack the resources to do so, leaving many local governments in very poor financial shape (Wong 1995, 2002, 2009; Wong & Bird 2005). Thus, cities that have fewer resources or substantial other demands on their staff and finances may have found it difficult to implement the regulations within a year.

³ Three cities from the government's list (Haikou, Lhasa, and Sanya) were dropped by the PITI index compilers because they have low levels of industrialization. They were replaced by three other cities the compilers felt were important industrial cities in their regions (Dongguan, Erdos, and Yancheng) (Personal communication with NRDC).

Willingness, on the other hand, has to do with the values of citizens and officials, officials' incentives, and the political power of different groups in a city with respect to environmental disclosure. In a rough parallel to the Lipset (1960) modernization hypothesis that suggests that economic development may promote democracy, one might expect that wealthier citizens would be more likely to agitate for greater openness from their government, even in a non-democratic system. In a related but distinct theory, Inglehart argues that citizen values and expectations shift qualitatively towards "post-material" values when societies achieve a high level of economic development (Inglehart 1990, 1995, 1997). It is of course not the case that all of China can reasonably be qualified as a post-industrial or post-materialist society. Yet, given the high degree of social and economic inequality that divide urban and rural China as well as vast regional disparities (Wang & Hu 2001, Davis & Wang, 2009), it is reasonable to postulate that in cities where average standards of living are rapidly approaching the levels of developed industrial societies (at least for registered residents), people may be more demanding of their local governments about environmental issues than are residents of poorer cities whose social and economic conditions are much closer to those observed in less-developed societies (Tong 2005).

The political economy of cities may also have an effect on the willingness of city leaders to promote environmental transparency. Cities highly dependent on heavy industry or resource extraction may want to avoid damaging their major sources of city revenue, employment, and economic growth. Imposing onerous environmental disclosure requirements on enterprises might compel them to cut back on some profitable but polluting activities, or move these activities to other cities. Indeed, even collecting and disclosing city-level information could make it harder to turn a blind eye to major pollution sources. By contrast, cities primarily engaged in "clean" production activities might be more willing to exert pressure on remaining polluting industries by improving disclosure, and those hoping to develop tourism might actively desire to demonstrate their clean, green credentials.

In addition to the importance of different kinds of economic activity in a city, however, the size and scale of the enterprises engaging in it may also matter. If one or a few large firms plays a crucial role in a city's economy, their leaders may be able to exert greater leverage on city officials than would an equal number of smaller polluting enterprises, even if their economic importance is similar. They would face less of a challenge in coordinating to oppose moves to greater transparency, and are themselves likely to be important players in the local Communist Party. Thus, we might expect to see less transparency in cities dominated by large, well-established industrial firms.

We now explore these possibilities by examining the association of the PITI score with a number of demographic, economic, political and environmental variables. [Figure 1](#) presents some of the correlations between PITI scores and the key independent variables that we discuss in greater detail below and summary statistics are provided in the appendix.

We begin our analysis with a set of OLS estimates that regress municipal PITI scores against basic economic variables, measured in 2007 (the year the regulations were publicized). In [Table 1](#), the first column shows that a city's GDP has a strong statistical association with the transparency score. Substantively, the coefficient implies that a doubling of GDP will result in a PITI score 5.67 points higher. This might seem a small effect but note that the GDP of the cities in our sample ranges from 8 billion to 1.21 trillion RMB, a factor of 151. Another way to think about this is that a jump from the 25th to 75th percentile of GDP in this sample would be associated with an increase of about 12 PITI points.

While statistically strong, this result is not very informative about the mechanisms that lead some cities to be more transparent than others. As discussed above, a more-prosperous city may be more easily able to afford putting in place the institutions required to support a high level of transparency. However, it could also be that richer cities have richer citizens who take a greater interest in the quality of their environment and exert pressure on the city government to protect it. A third possibility is that the economic structure of rich cities may be qualitatively different from that of others. Economic development tends to be associated with growth in the service sector and the replacement of extraction and heavy manufacturing with cleaner industries. For instance, Guangdong's leadership has recently explicitly advocated a development plan akin to the "flying geese" strategy that explicitly calls for the relocation of polluting and low-value added industries to interior provinces, while the province would shift in turn to technologically and human-capital intensive sectors (Bo, 2008).

To address this, we break GDP down into GDP per capita and population in column 2. If population has a strong effect, controlling for GDP per capita, that would support the idea that there are certain fixed costs to collecting and providing environmental information that are more easily born by large cities. If a modernization or post-materialism hypothesis held, we would expect GDP per capita to contain two effects: a direct effect through GDP, the same as that of population, and an indirect effect reflecting a change in values. Together these factors should lead GDP per capita to have much larger coefficient than population (when both are on a log scale). In this specification, the coefficients of the two are quite close. This suggests that the ability to pay for transparency is really what matters. Regardless of whether it has more funds because the number of citizens is larger or because they have

higher incomes, more prosperous municipal governments tend to provide better environmental information to their citizens.

To further dig into the mechanisms by which a city's prosperity may influence its ability to provide environmental information, in column 3 we directly consider the impact of the city's budget revenue. Including this variable essentially eliminates any effect from population or per capita GDP. That is, it is not the wealth of the city as a whole that matters, but specifically the wealth of the city's government. A city with twice the budget revenues of an otherwise similar city would be expected to have a PITI score of about 5 points higher. This further reinforces the idea that ability to pay is a more important determinant of transparency levels than any value shift.

In column 4 we consider an additional dimension of the city's finances—the ratio of the city government's expenditures to its revenues. While one might expect that these would be tightly linked, they have in fact become increasingly decoupled, due to the center's re-centralizing of revenues and the large number of unfunded mandates imposed on localities, as discussed above. This is very apparent in our data, with 99 of the 113 cities in our sample having expenditures greater than their revenues. Interestingly, we find this variable to be an even better predictor of PITI scores than budget revenues. This suggests that investments in environmental transparency are treated as a low priority, as they are more likely to be made by cities that have a budget surplus (or at least a relatively smaller shortfall). Substantively, the coefficient of -20.32 implies that a move from the 25th percentile of this variable (with revenues covering 92% of expenditures) to the 75th percentile (with revenues covering only 60% of expenditures) should be associated with an 8.75 point decrease in the PITI score.

Surprisingly, the specification in column 4 reduced the estimated coefficient of budget revenue and caused its statistical significance to drop below conventional levels. However, a problem here is that population, per capita GDP, and budget revenue are highly collinear—measuring the level of municipal development in different ways, which tends to attenuate the estimated effects of all three variables. Therefore, we drop population and per capita GDP from the specification in column 5, and see that indeed the estimated effect of budget revenue again becomes large and statistically significant.

Column 6 introduces a key political economy variable that may affect a city government's willingness to promote transparency. This variable, **Single-Firm Dependence**, is the percentage of the population employed by the largest industrial enterprise in the city in 1999.⁴ The coefficient of 2.999 is highly

⁴ In order to use logged values, we assigned cities with no firms listed in our source the same employment level as the smallest firm in our sample. Any resultant bias would work against the results found here. We found very

statistically significant, and implies that an increase from the 25th percentile of this measure (0.5% of the population employed by one firm) to the 75th percentile (3.2% of the population employed by one firm) should be associated with a 5.4 point decrease in the PITI score. We believe that this relationship highlights the importance of the local political economy in urban politics and the legacy of the planned economy. A city's government might otherwise be willing to increase its level of environmental disclosure, despite the impact on narrowly-defined economic growth, but it will be unable or unwilling to do so when economic power is concentrated in one or a small number of industrial firms.

In column 7, we include a number of controls for other factors that might be expected to affect a city's degree of environmental transparency. While budget revenue again becomes insignificant due to the inclusion of population and per capita GDP, the estimated effects of the expense ratio and single-firm dependence only increase. The other controls do not generally have significant coefficients. SO₂ is included as a measure of pollution, as it is one of the major pollutants targeted in the current five-year plan.⁵ We included the ratio of FDI to GDP to see whether there is any evidence of a "race to the bottom" in which cities lower their environmental standards or reduce transparency in order to please highly mobile foreign investments. If anything, we see evidence of the opposite effect, a beneficial influence from foreign investment, with FDI having a slight positive association with transparency. In order to allow for the possibility that the importance of a large industrial firm has to do with the city's overall industrial structure, rather than the size of the firm per se, we control for the proportion of the city's GDP produced by the tertiary (service) sector and therefore not by the primary (agriculture and natural resources) or secondary (industrial) sectors. We find no such effect, reinforcing our belief that the effect of single-firm dependence is indeed working through the dynamic we described above.⁶

China's coastal cities, especially in the south and east, are widely considered to be more developed and modern both in their economies and politics. Surprisingly, however, we find a weakly significant result that being located in a coastal province has a negative effect, leading to a PITI score six points lower than it might otherwise be expected to be.⁷ Of course, the key thing to remember is that the

similar results when we use alternative measures, such as the registered capital of the firm or its sales revenues, each considered as a fraction of 1999 GDP.

⁵ A variety of other measures of pollution were also used in place of SO₂ in order to test the robustness of the finding. None had statistically significant effects when controlling for the other variables here.

⁶ Substituting the ratio of secondary industry or primary industry also did not lead to significant results.

⁷ Cities are defined as "coastal" if they belong to one of the coastal provinces between Shandong and Guangdong, or if they are categorized as SEZs or coastal open cities.

significantly greater wealth and therefore budget size of coastal cities leads them to have much higher transparency scores than inland cities overall. The point is that this difference results from their prosperity, not any other factor resulting from their coastal locations.

The government has designated a number of cities to be key points of tourism development, but we do not find this designation to be significantly associated with greater pollution transparency. This may be because the governments of such cities view the appearance of having a good environment to be more important than improving actual environmental conditions.

Our sample includes cities at four different political levels: centrally-administered municipalities, provincial capitals, prefecture-level cities, and cities under direct provincial administration. Because there are only four of the first and last categories in our sample, we group the central municipalities and provincial capitals together, but find that there is no significant association with administrative level and PITI score.

We control for the number of mobile phones per capita to allow for the possibility that greater telecommunications penetration facilitates citizen activism and encourages the government to behave in a more open fashion, but find no evidence of such an effect. Finally, we control for GDP growth over the previous ten years to see if cities that generally have more dynamic or effective governments might also be more easily able to implement the new transparency measures, but again this has no effect.

Effects of Leadership Characteristics

Although we find political economic factors compelling, they explain only part of the variation. Thus, we do not necessarily rule out other classes of political explanations of municipal behavior. As Bunce (1981) noted in her study of executive leadership, “leaders make a difference”, and this may be true of Chinese local leaders as well. Building on Landry’s 2008 dataset on municipal governance (and extending its coverage through the year 2008), we explored how the diversity of educational and professional experiences leading up to a leader’s appointment as Mayor may shape his preferences for or against transparency, once in power. Having collected reasonably complete biographies for the mayors and Communist Party secretaries of all 287 prefecture-level cities, we coded systematically for a variety of background characteristics that may influence how current leaders weigh the importance of both the

environment and open-government initiatives, and thus explain the degree of transparency that was measured in 2008.⁸

What incentives do mayors face? The point systems used to evaluate municipal performance are inordinately biased toward growth performance, leaving only a small fraction of the index for greening (绿化), sewage discharge treatment, and other environment-related issues. Thus, explicit promotion incentives still overwhelmingly favor GDP growth over the environment (Landry 2008). Yet environmental issues are looming larger in policy debates. Students at the Central Party School (where many mayors and secretaries pass through for short-term training) witnessed first-hand the controversy (largely initiated by the Party School) about introducing green GDP accounting in national statistics.⁹ The preparations for the 2008 Olympics games further highlighted the importance of reducing air pollution, not only in Beijing and but also in Northern China and beyond.

Furthermore, maintenance of social stability is also an important evaluation factor for leaders at all levels (Minzner, 2009). The occurrence of environment-related protests, such as that in 2007 in Xiamen over a proposed chemical plant (Jacobs, 2009) or that in Guangzhou in 2009 over a trash incineration facility (Moore, 2009) mean that even the most narrowly self-interested leaders cannot afford to entirely neglect environmental concerns. Thus there is a real possibility that different leaders may choose different strategies in their efforts to achieve growth with social stability, perhaps depending on their own personal experiences and strengths. We therefore examined the possibility that local leaders with certain kinds of experience may be more likely to preside over cities exhibiting greater environmental transparency.

Figure 2 summarizes the results of this coding exercise and displays the hypothesized impact that such experiences may have on a leader's willingness to push for greater transparency in his jurisdiction. In

⁸ We only consider the individuals in power as of May 2008, when the regulations formally came into place and the beginning of the PITI evaluation period.

⁹ See China MOE. 2004. 《国家环保总局副局长潘岳透露中国绿色 GDP 核算体系框架初步建立》 2004-09-01 [http://panyue.mep.gov.cn/zyhd/200907/t20090708_154488.htm]; Green Chinese Government Official Web Portal: "GDP Accounting Study Report 2004 issued" [http://www.gov.cn/english/2006-09/11/content_384596.htm]; Xinhuanet. 2006. 《环保总局统计局联合发布绿色国民经济核算研究成果》 [2006-09-07]; http://news.xinhuanet.com/environment/2006-09/07/content_5062140.htm; Xinhuanet. 2006. 《绿色 GDP: “低人一等”反受厚爱》 [2006-09-07] http://news.xinhuanet.com/fortune/2006-09/07/content_5059094.htm; China Daily. 2007. "Call for Return to Green Accounting" [2007-04-19] [http://www.chinadaily.com.cn/china/2007-04/19/content_853917.htm]

addition to law, experience in medicine or public health, environmental protection, or water conservancy seems likely to make a mayor more receptive to these initiatives. We also hypothesize that cadres who were trained or worked abroad, have worked on attracting international trade and investment or have worked as educators should also favor OGI measures that they may have encountered elsewhere or learned about throughout their studies. We also coded their biographies for factors that are conversely likely to push cadres away from transparency, namely experience in corporations or sectors of the economy (coal, oil and gas, power generation) that may be a marker of allegiance to business and bureaucratic interests that are often regarded as inimical to transparency and environmental protection.

The preliminary analysis of this data shows that only a few of these characteristics seem to impact PITI scores (see Table A1, in appendix). Even when grouping positive and negative traits into simple additive indices of pro- and anti-PITI respectively, we only detect weak significance ($p < .1$) for the positive effect of training in law (cols. 4 & 5) and (surprisingly) a negative impact for foreign experience. Yet, these effects are substantial: mayors trained in law are associated with a 7.16 point increase in their city's PITI scores, while those who are studied or were trained abroad are associated with a loss of 5.49 points. That said, we consistently find that that tenure in office seems to matter a great deal: longer-serving mayors are strongly associated with lower levels of transparency. There could be two reasons for this finding: one is that new mayors are sent to replace cadres who have performed poorly in a number of ways and need time to turn things around (since transparency would presumably not rank very highly on their lists of immediate concerns), leading to a low score early in their tenure. Another possibility is that new mayors who happen to be appointed to cities where the current Party secretary is the same city's previous mayor inherit policies of the party secretaries and are reluctant to challenge them. We rule this second possibility out in specifications 2, 5 and 7, where we also control for the incumbency of the CCP Secretary and the length of his tenure as Mayor in the same city.

These findings thus suggest that the division of authority and responsibility between mayors and secretaries is real and that it is mayors--and not secretaries--who have effective ownership of environmental and OGI issues. Our results indicate (as expected) that these issues are not a short-term priority, and that the specific background of mayors is of little significance. The latter finding may be both a blessing and a curse from the perspective of those hoping to encourage greater transparency. It is good news that there is no obvious group of mayors systematically standing in the way of greater transparency, but conversely it appears programs that seek to "train" or "expose" mayors to

international practices, or efforts to instill a greater respect for the rule of law by appointing ever more mayors formally trained in the law appear to have little reliable effect, at least in the short run.

Given these findings, we only include the salient leadership effects along with the core political-economy models that were discussed above. In [Table 2](#), model 1 shows how both a mayor's tenure and foreign exposure seem to impact their city's PITI score negatively. The result is unchanged when Secretary-specific variables discussed above are included (model 2). However, both the magnitude and the level of significance drop markedly when political-economic factors are introduced, in any of the variants that we discussed above, leaving coefficients for [Budget Expenditure](#) and [Firm dominance](#) unaffected. A possible explanation for this drop is that cities with unstable budgets will tend to have newer mayors, perhaps because the previous mayors were transferred to new postings following a period of poor economic performance, but further analysis is needed to validate this conjecture. However, mayoral tenure remains significant at the 10% level. This has two possible explanations. It may simply be another indication that environmental transparency tends to take a low priority—a newer mayor can only address a limited number of issues and will leave transparency to later. Alternatively, it may be another reflection of political power dynamics within the city. New mayors are less well-established and therefore will have a more difficult time implementing transparency in the face of opposition by entrenched economic interests than will mayors who have served for a longer period.

Selection Effects

Since PITI scores are based on a subset of only 113 cities out of the total of 287 municipalities at the prefecture or provincial rank, we must ensure that our findings are not sensitive to selection bias, and if we detect evidence of selectivity, we must account for it explicitly. As discussed above, the list of cities was drawn up by the central government based on their political, economic, and environmental importance. At this stage, the index's compilers do not intend to extend the index to cover more cities, as their primary goal is to prod China's major cities into greater compliance with the transparency regulations, so we must simply make our best efforts given the available data.

We gathered detailed information about all 287 cities listed in the 2008 edition of the *China City Statistical Yearbook* (and other relevant sources) in order to compare the PITI sample to the entire set of Chinese municipalities. The map in Figure 3 offers a simple graphical representation of both sites included in PITI (red dots) and the municipalities that are excluded from the report (black dots). At first

glance, we do not detect evidence of severe geographical bias, though several major cities in Heilongjiang (upper right corner), much of Yunnan, Gansu, and Sichuan, the interior of Fujian, as well as all of Tibet (Lhasa) and Hainan (Haikou and Sanya) are missing.

We therefore create a selection model to explore statistically whether the differences between the sample and the complete set are consequential. We include **population** (logged), since smaller cities tend to be excluded. The average size of PITI cities was 2.08 million in 2007, against only 0.79 million for excluded cities. Although large cities are likely to be more polluted, they are also likely to benefit from larger fiscal revenue and thus be better able to fund environmental projects. We conjecture that the leadership of larger municipalities has an incentive to be more transparent than their counterparts in smaller cities. For similar reasons, we also account for **GDP per capita** in 2007, since selected cities enjoyed an average value of 43,304 Yuan per capita, against 21,929 for non-selected cities. Finally, we control for two sets of characteristics that the government used in the creation of their list: All **open coastal cities, special economic zones (SEZ) and provincial capitals** were purposively selected because of their administrative, economic, and political importance,¹⁰ along with a large number of **designated tourist cities**.¹¹ As a precaution, we include both the **latitude** (because coal-burning cities north of the Yangzi River may be over-represented in the PITI report) and **longitude** (because of possible over-representation of eastern cities due to their economic importance) as additional control variables in the selection equation. Table Z provides descriptive statistics of the in- and out-of-sample cities.

Table 3 reports estimates based on a Heckman two equation systems (selection probit equation, bottom of the table) and “outcome” equations (where the dependent variable is the PITI score) that use the same variables as the regressions in **Tables 1 and 2**. Regardless of the specification of the main model, we find very that all the factors included in the selection equations (columns 1 though 5) are

¹⁰ This includes Beijing, Tianjin, Shijiazhuang, Qinhuangdao, Taiyuan, Hohhot, Shenyang, Dalian, Changchun, Harbin, Shanghai, Nanjing, Nantong, Lianyungang, Hangzhou, Ningbo, Wenzhou, Hefei, Fuzhou, Xiamen, Nanchang, Jinan, Qingdao, Yantai, Zhengzhou, Wuhan, Changsha, Guangzhou, Shenzhen, Zhuhai, Shantou, Zhanjiang, Nanning, Beihai, Haikou, Sanya, Chongqing, Chengdu, Guiyang, Kunming, Lhasa, Xian, Lanzhou, Xining, Yinchuan, and Urumqi.

¹¹ With the exception of Haikou, Sanya and Lhasa, 43 open coastal cities, special economic zones (SEZ) and provincial capitals. An additional 34 key tourist cities are included in the PITI report. These are: Datong, Baotou, Anshan, Fushun, Benxi, Jilin, Daqing, Mudanjiang, Wuxi, Xuzhou, Changzhou, Suzhou, Yangzhou, Shaoxing, Wuhu, Maanshan, Quanzhou, Jiujiang, Zibo, Taian, Weihai, Kaifeng, Luoyang, Jingzhou, Yueyang, Changde, Zhangjiajie, Shaoguan, Foshan, Zhongshan, Liuzhou, Guilin, Baoji, Xianyang. On the other hand, 18 key tourist cities are excluded from the report: Chengde, Dandong, Zhenjiang, Jinhua, Anqing, Bozhou, Sanming, Yichun (Jiangxi), Puyang, Shiyan, Jiangmen, Zhaoqing, Huizhou, Yangjiang, Qingyuan, Wuzhou, Leshan, and Yulin (Shannxi).

strong predictors of inclusion on the PITI list. All else being equal, cities that have a large population, are wealthy, located in northern China, or are administrative centers are likely to have been designated as environmental protection key points and therefore to have received a PITI score. We also find that **longitude** has a negative coefficient, which suggests that western cities are overrepresented, likely in an attempt to achieve greater geographic diversity.

The good news is that the factors that explain why a city is included in the study do not seem to bias the estimates of our main equations of interest. We detect evidence of selection bias only in the simple models of leadership characteristics (Columns 1 & 2), where ρ —deduced from the $\text{anth}(\rho)$ parameter estimate—is both positive and significant. However, once we introduce fiscal and political economy variables either by themselves (col. 3), or along with leadership variables (col. 4 and 5), the selection effect is no longer significant. By comparing coefficient estimates between the Heckman model (column 5) to the same set of predictors obtained by OLS with robust standard errors (column 6), we easily rule out selection bias. Finally, model 7 shows that with the exception of **Budgetary Revenue**, adding population and GDP as ordinary independent variables rather than specifying them as part of the selection equation, our key results about the impact of budgetary expenditures and the dominance of large industrial firm in the municipal economy are unaffected. We suspect that the smaller and insignificant coefficient for **Budgetary Revenue** is the result of multicollinearity between **Budgetary Revenue**, **GDP** and **Population**.¹²

Reverse Causality

With any simple cross-sectional analysis like this one, a major concern is the risk of reverse causality or omitted variable bias. Straightforward reverse causality would be a problem if the level of environmental transparency directly affected one of the explanatory variables, for instance if it tended to slow economic growth. This problem is mitigated somewhat because we measure GDP, population, and budgetary variables as of year 2007, a year before formal compliance with the transparency regulations was mandated. This is an imperfect correction, as some cities instituted their own open

¹² Pair-wise correlation matrix between population, GDP per capita and budgetary revenue (all logged):

	ln(pop)	ln(gdppc)	ln(budgetrev)
ln(pop)	1.0000		
ln(gdppc)	0.2251	1.0000	
ln(budgetrev)	0.6943	0.7575	1.0000

government legislation as early as 2002, and there has been movement toward more open government since as early as the 1990s (Horsley, 2007). However, recall that we found no evidence of an association between transparency and GDP growth, which we would expect if there were direct reverse causation. Single-firm dominance is less vulnerable to reverse causation, since we assessed it as of 1999. While it is theoretically possible that there is some unmeasured third factor influencing both the PITI score and our independent variables, we do not believe there are any highly plausible candidates for such a factor.

Conclusion

While the data we analyze only contain cross-sectional factors, these results provide some indications of the future trajectory of the Chinese government's transparency initiatives. First, the apparent importance of startup costs and the wealth of the city bode well as long as China's economy continues to grow. Expenses that appear unacceptably high to cash-strapped cities now will become more bearable with time. The political economy considerations captured by the single-firm dominance variable, however, inject a note of pessimism. China may be moving towards a corporatist economy in which a few large firms, tightly interlinked with the party-state that dominate the economy, rather than toward a robust market economy characterized by numerous small, competitive firms like those of Taiwan or Hong Kong. This might exacerbate the effect we find in this study. In China's case, single-firm dominance is magnified by the high degree of administrative decentralization that pushes a great deal of routine management to municipal and county governments. Even recent bouts of recentralization (such as the tax reforms of the 1990s) have happened in ways that may be highly inimical to transparency: these reforms allowed Beijing to capture the rewards of higher tax revenue, while keeping the pressure on local governments on the expenditure side and exacerbating the "unfunded mandate" problems of municipal and local governments (Wong, 2009). If this trend proves to be true, local governments may find themselves increasingly vulnerable to capture by large firms that comprise a significant proportion of the local economy, and therefore unable to enforce disclosure or compliance with other environmental regulations.

Addendum: Under- and over-performing cities

While these factors explain a great deal of the variation in transparency among Chinese cities, the relationships we describe here are by no means deterministic, as noted by the PITI's compilers (IPE & NRDC, 2010). It is informative and may serve as a guide to further qualitative and quantitative research to examine those cities that are notable under- or over-performers once the factors we have identified are controlled for. In order to take into account as many variables as possible without dropping observations, we examine the residual (un-predicted) variation in cities' PITI scores based on the model in Table 2, Column 5.

The ten cities that over-performed the most (had the largest positive residuals) are listed in [Table 4a](#). It is interesting to note that it is not just a matter of some cities that would be expected to perform well, such as Ningbo, performing even better than expected, but also that cities like Mudanjiang, Jingzhou, and Jiaozhou that we would have predicted to be backwaters manage to rise to the middle of the pack. Similarly, underperforming cities included places like Tianjin and Nanchang, which fell on the bottom of the list for reasons unexplained by the model ([Table 4b](#)). The unexpectedly good or bad performance of these cities suggests that there are important further insights to be gained about the factors that help cities escape the clutches of the political and economic factors enumerated in our model, or that hold them back even more.¹³ By contrast, while Shanghai ranked 7th on the PITI index and was highlighted as an “all-star” for its exemplary disclosure of records of pollution violations, this is almost precisely in line with the predictions of the model.¹⁴ Thus while Shanghai may offer a useful reference point for other city governments aiming to implement greater transparency, examining it is unlikely to generate insights into the political question of *why* some cities are unusually willing or unwilling to enforce disclosure rules.

¹³ Notably, Xiamen is one of the worse performers, suggesting that the 2007 mass protests against the building of a new paraxylene plant (Jacobs, 2009) convinced the city government of the need to restrict citizen access to information, or conversely that the protests were a consequence of a long-standing lack of transparency and resistance to citizen involvement.

¹⁴ Shanghai's predicted PITI score was actually 2.6 points higher than what it achieved in reality.

MAIN DATA SOURCES

PITI data is based on the work of IPE & NRDC. 2009. 《境信息公开 艰难破冰-污染源监管信息公开指数 (PITI) 暨 2008 年度 113 个城市评价结果》 [\[http://www.ipe.org.cn/uploadFiles/2010-05/1274760282937.pdf\]](http://www.ipe.org.cn/uploadFiles/2010-05/1274760282937.pdf)

Firm-level data for the year 1999 (aggregated by the authors at the municipal level) was obtained from the China Yearbook on Large-Scale Industrial Enterprises(中国大型工业企业年鉴) 2000, China Statistics Press.

Municipal-level variables for 2007 are based on the China City Statistical Yearbook (中国城市统计年鉴) 2008, China Statistics Press. (Available electronically at www.infobank.cn)

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Description of variables and data sources

Variable	Source and Definition
Mayor appointment date	Date of mayor's appointment, encoded as date (year/month) in Stata Source: Author's Database
Mayor foreign experience	Dummy variable for mayors with foreign experience Source: Author's Database
CCP secretary appointment date	Date of CCP secretary appointment, encoded as date (year/month) in Stata Source: Author's Database
Tenure of CCP secretary as mayor	Tenure of CCP secretary as mayor in months Source: Author's Database
Budgetary revenue	2007 budgetary revenue in 10000s Source: China City Statistical Yearbook 2008
Budgetary expenditures	2007 budgetary expenditures in 10000s Source: China City Statistical Yearbook 2008
Single-firm Dominance	Percentage of 1999 population employed by the largest industrial enterprise of the city Source: China City Statistical Yearbook 2000, China Large Industry Development Report 2000
GDP per capita	2007 GDP/2007 population Source: China City Statistical Yearbook 2008
Latitude (decimal degree)	Latitude of the seat of the municipality in decimal degrees
Longitude (decimal degree)	Longitude of the seat of the municipality in decimal degrees
Designated Tourism City	Dummy variable for cities selected as "Tourism Cities" by the Central government Source: China National Tourism Agency Website
GDP growth 1997-2007	Percent change in GDP from 1997 to 2007 Source: China City Statistical Yearbook 1998 and 2008
Mobile phones per capita	Number of 2007 mobile phone accounts per capita Source: China City Statistical Yearbook 2008
Provincial Capital or Central Municipality	Dummy variable for cities that are provincial capitals or central municipalities
GDP	2007 GDP in 10000s Source: China City Statistical Yearbook 2008
Population	2007 population in 10000s Source: China Statistical Yearbook 2008
SO2 Emissions	2004 SO2 emissions in mg/m3 Source: Institute of Public and Environmental Affairs Website
FDI ratio	Ratio of FDI (in US dollars) to GDP (in RMB) for 2007 Source: China City Statistical Yearbook 2008
Ratio of Services in GDP	Ratio of service industry in GDP for 2007 Source: China City Statistical Yearbook 2008
Coastal Province	Located in a coastal province between Guangdong and Shandong, plus designated open coastal cities
Open coastal city, SEZ, Prov. Seat	Dummy variable for cities designated as "open coastal cities," "special economic zones," or provincial seats (selection criteria for list inclusion)

Table 1: Main model, OLS regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	piti	piti	piti	piti	piti	piti	piti
GDP (log)	8.182*** (8.81)						
Population (log)		8.373*** (6.24)	-0.208 (-0.06)	4.508 (1.46)			5.645 (1.23)
GDP per capita		10.01*** (4.00)	0.868 (0.25)	-0.210 (-0.06)			4.564 (1.02)
Budgetary revenue (log)			7.687** (3.09)	2.500 (0.99)	5.632*** (4.83)	4.975*** (4.24)	0.0980 (0.03)
Budgetary expenditure ratio (2007) (log)				-20.32** (-3.12)	-14.79* (-2.48)	-15.56** (-2.83)	-27.54*** (-3.47)
Single-firm dominance						-2.999*** (-4.44)	-3.670*** (-3.66)
SO ₂ Emissions (log)							-1.749 (-0.73)
FDI ratio							1.623 (1.60)
Ratio of services in GDP							-14.68 (-1.15)
Coastal province							-6.214* (-1.71)
Designated Tourism City							2.000 (0.89)
Prov. Capital or Central Mun.							-1.245 (-0.26)
Mobile phones per capita							-0.0315 (-0.03)
GDP growth 1997-2007							0.0171 (0.14)
Constant	-96.86*** (-6.72)	-116.5*** (-4.66)	-77.25** (-3.04)	-15.52 (-0.48)	-37.76* (-2.31)	-42.88** (-2.73)	-44.26 (-1.08)
Observations	113	113	113	113	113	113	93
R ²	0.3305	0.3435	0.3869	0.4467	0.4326	0.4956	0.5942

t statistics in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2: Mayors, OLS regressions

	(1)	(2)	(3)	(4)	(5)
	piti	piti	piti	piti	piti
Mayor tenure (months)	0.318*** (4.94)	0.292*** (4.49)		0.118+ (1.91)	0.111+ (1.82)
Mayor foreign experience	-6.734* (-2.04)	-6.641+ (-1.91)		-3.169 (-1.10)	-3.292 (-1.13)
CCP Sec. tenure (months)		0.0453 (0.72)			0.0199 (0.51)
Tenure of CCP Sec. as Mayor		-0.0355 (-0.56)			0.00407 (0.10)
Population (log)			4.333 (1.46)	3.887 (1.34)	4.056 (1.39)
GDP per capita			2.789 (0.84)	2.562 (0.76)	2.655 (0.78)
Budgetary revenue (log)			1.575 (0.65)	1.081 (0.45)	0.960 (0.40)
Budgetary expenditure ratio (2007) (log)			-18.48** (-3.17)	-17.87** (-3.04)	-17.84** (-3.02)
Single-firm dominance			-2.975*** (-4.09)	-2.945*** (-3.98)	-2.947*** (-3.94)
Constant	210.1*** (5.78)	221.2*** (4.80)	-48.64 (-1.55)	29.04 (0.58)	35.52 (0.66)
Observations	113	113	113	113	113
R^2	0.1742	0.1805	0.5033	0.5238	0.5245

t statistics in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3: Sample Selection Models

OUTCOME EQUATION DV=PITI	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	piti	piti	piti	piti	piti	piti	piti
Mayor's tenure (months)	0.215 ^{***} (3.40)	0.212 ^{***} (3.42)		0.125 [*] (2.09)	0.117 [*] (1.97)	0.119 ⁺ (1.92)	0.111 ⁺ (1.82)
Mayor foreign experience	-5.360 ⁺ (-1.82)	-5.298 ⁺ (-1.76)		-3.502 (-1.28)	-3.569 (-1.29)	-3.287 (-1.13)	-3.292 (-1.13)
CCP Sec. tenure		0.00262 (0.05)			0.0171 (0.44)	0.0120 (0.30)	0.0199 (0.51)
Tenure of CCP Sec. as Mayor		-0.0100 (-0.19)			-0.00273 (-0.06)	0.00401 (0.09)	0.00407 (0.10)
Budgetary revenue (log)			6.543 ^{**} (2.95)	5.760 ^{**} (2.61)	5.791 ^{**} (2.58)	4.115 ^{***} (3.46)	0.960 (0.40)
Budgetary expenditure ratio (2007) (log)			-15.29 ^{**} (-2.77)	-14.85 ^{**} (-2.73)	-14.74 ^{**} (-2.72)	-15.21 ^{**} (-2.82)	-17.84 ^{**} (-3.02)
Single-firm dominance			-2.673 ^{***} (-3.37)	-2.605 ^{**} (-3.25)	-2.592 ^{**} (-3.13)	-2.965 ^{***} (-4.15)	-2.947 ^{***} (-3.94)
Population (log)							4.056 (1.39)
GDP per capita							2.655 (0.78)
Constant	156.6 ^{***} (4.45)	156.7 ^{***} (3.53)	-64.01 [*] (-2.17)	16.48 (0.33)	21.50 (0.40)	41.88 (0.86)	35.52 (0.66)

Table 3 (Cont.)

SELECTION EQUATION DV= included in PITI	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	piti	piti	piti	piti	piti	piti	piti
Population (log)	1.301 ^{***} (6.47)	1.305 ^{***} (6.47)	1.370 ^{***} (6.09)	1.351 ^{***} (5.87)	1.348 ^{***} (5.74)		
GDP per capita	1.427 ^{***} (6.19)	1.432 ^{***} (6.20)	1.522 ^{***} (5.85)	1.501 ^{***} (5.85)	1.498 ^{***} (5.82)		
Latitude (decimal degree)	0.0534 ^{**} (2.84)	0.0533 ^{**} (2.83)	0.0708 ^{***} (3.79)	0.0711 ^{***} (3.93)	0.0710 ^{***} (3.90)		
Longitude (decimal degree)	-0.0373 ⁺ (-1.83)	-0.0375 ⁺ (-1.81)	-0.0761 ^{***} (-4.38)	-0.0769 ^{***} (-4.48)	-0.0769 ^{***} (-4.50)		
Designated Tourism City	0.896 ^{***} (3.66)	0.897 ^{***} (3.65)	0.852 ^{**} (2.70)	0.858 ^{**} (2.92)	0.855 ^{**} (2.88)		
Open coastal city/SEZ/Prov. Seat	0.844 [*] (2.16)	0.837 [*] (2.11)	1.095 [*] (2.21)	1.111 [*] (2.30)	1.126 [*] (2.30)		
Constant	-18.47 ^{***} (-6.40)	-18.51 ^{***} (-6.35)	-15.89 ^{***} (-5.04)	-15.52 ^{***} (-4.79)	-15.47 ^{***} (-4.72)		
athrho	-0.989 ^{***} (-3.88)	-0.985 ^{***} (-3.66)	0.480 (0.93)	0.513 (1.10)	0.526 (1.06)		
Insigma	2.628 ^{***} (40.31)	2.627 ^{***} (40.01)	2.372 ^{***} (27.26)	2.352 ^{***} (27.18)	2.353 ^{***} (26.48)		
Observations	285	285	285	285	285	113	113
R ²						0.5179	0.5245

t statistics in parentheses

⁺ $p < 0.10$, ^{*} $p < 0.05$, ^{**} $p < 0.01$, ^{***} $p < 0.001$

Table 4a: Over-performers

City	Actual PITI score	Predicted PITI score	Over-performance
Mudanjiang	38.8	11.3	27.5
Hefei	66.6	40.0	26.6
Wuhan	61.2	34.6	26.6
Ningbo	72.9	46.4	26.5
Taiyuan	55.4	28.9	26.5
Jingzhou	40.0	18.1	21.9
Changzhi	42.9	24.5	18.4
Jiaozuo	36.1	17.8	18.3
Weihai	45.4	28.0	17.4
Shaoxing	52.6	35.3	17.3

Table 4b: Laggards

City	Actual PITI score	Predicted PITI score	Under-performance
Tianjin	25.2	41.8	-16.6
Zhanjiang	10.6	26.4	-15.8
Xiamen	26.6	41.2	-14.6
Baotou	14.0	27.8	-13.8
Nanchang	23.2	36.8	-13.6
Lanzhou	16.6	29.9	-13.3
Karamay	11.2	24.5	-13.3
Xining	10.2	22.9	-12.7
Jining	17.8	30.4	-12.6
Ordos	18.2	30.1	-11.9

Figure 1: Correlations between PITI scores and key independent variables

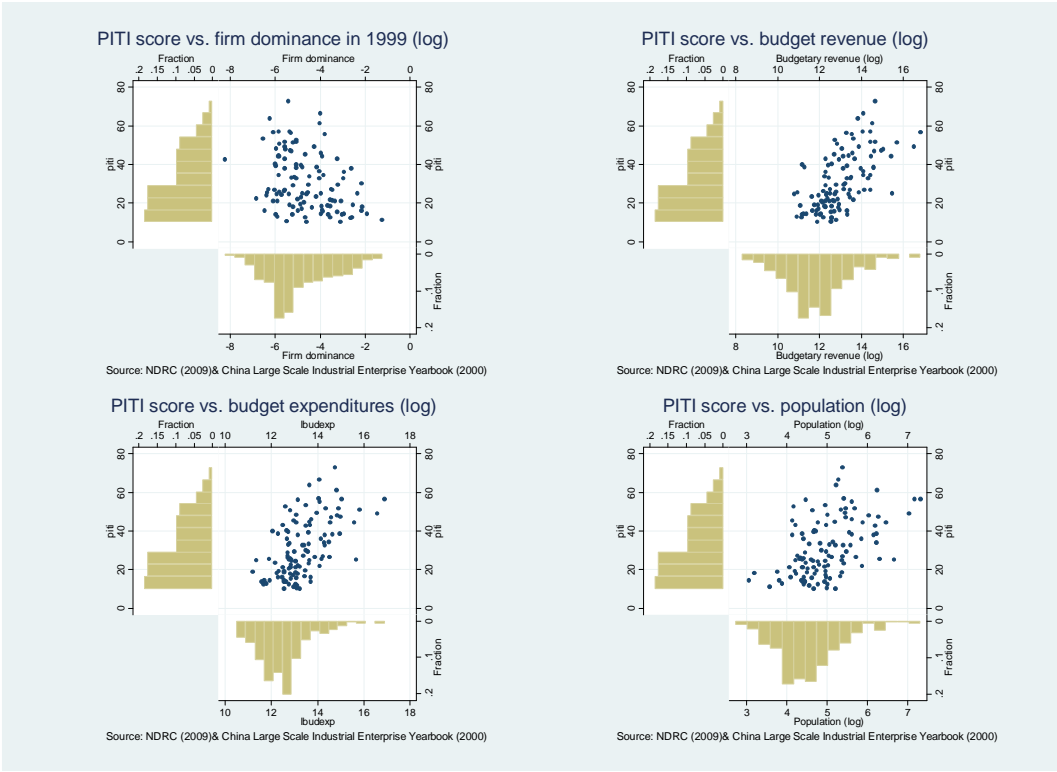


Figure 2: Educational and professional background of mayors and expected effect on support for transparency

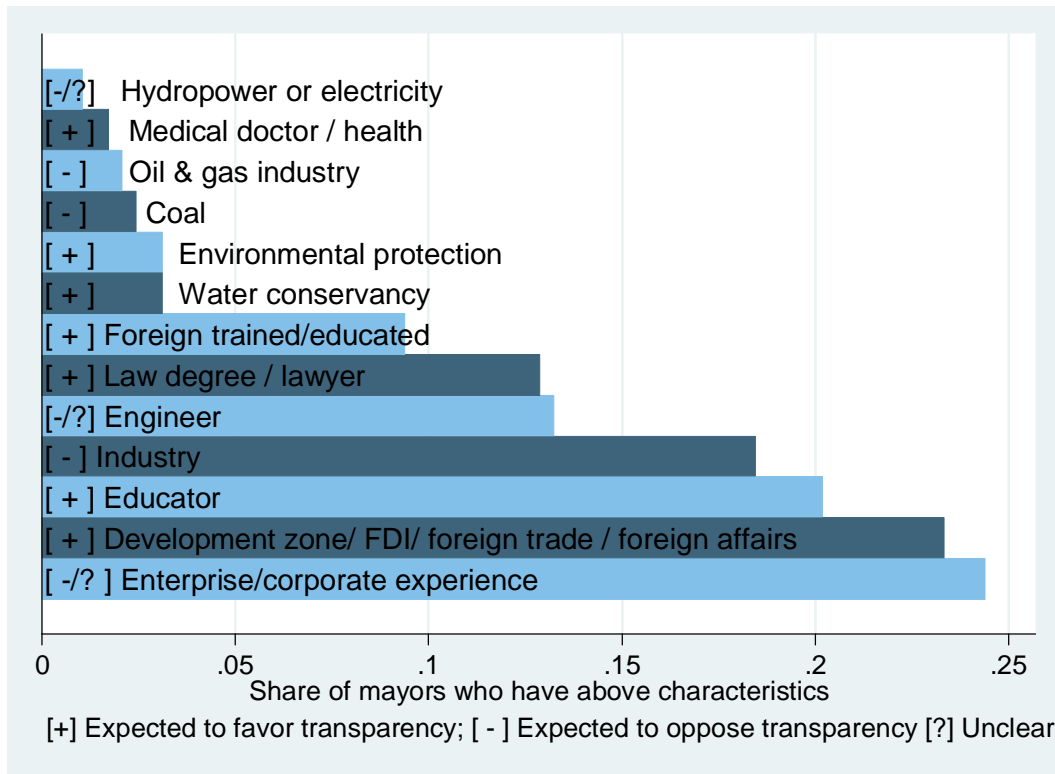
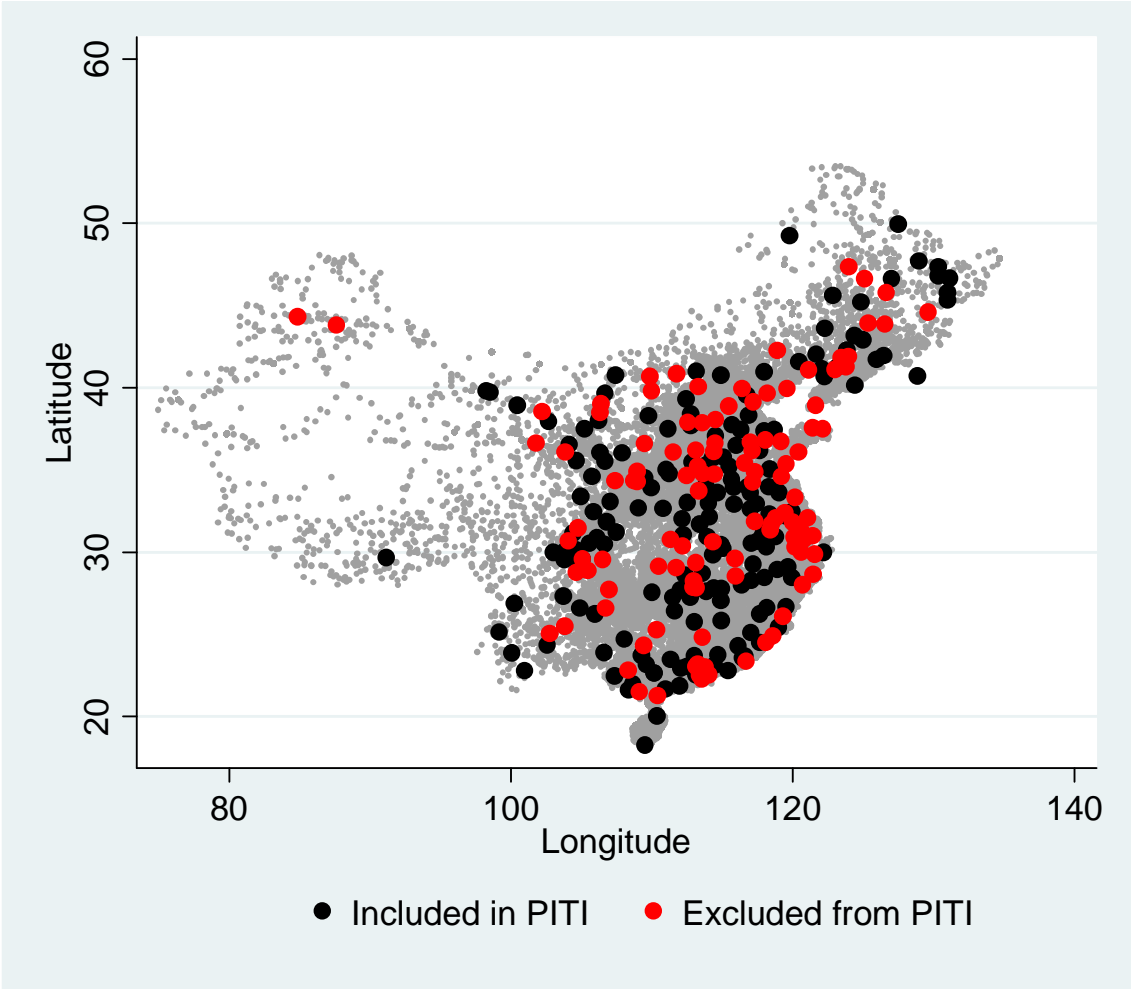
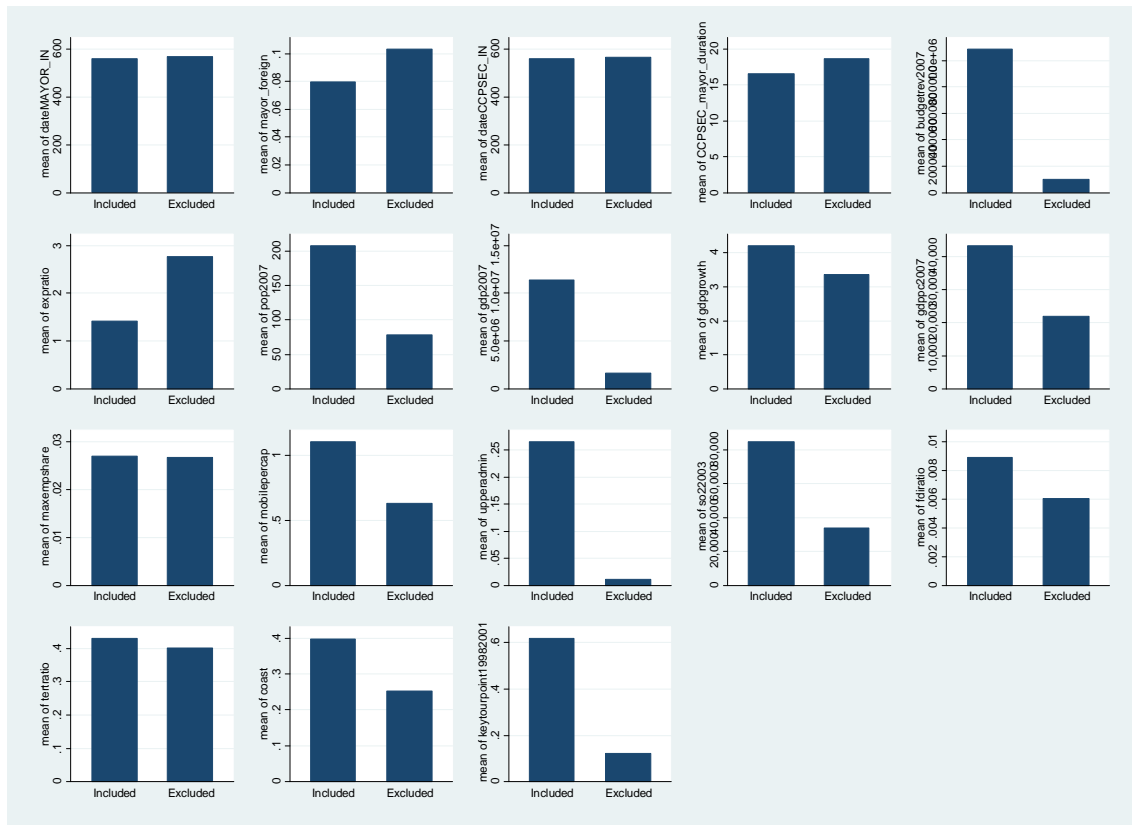


Figure 3: Map of cities included and excluded from the PITI index



Gray dots mark populated points

Figure 3: Main city characteristics (included in PITI versus excluded)



APPENDIX

Table A1 – Summary of key variables

	Obs	Mean	Std. Dev.	Min	Max
PITI score	113	31.065	14.823	10.2	72.9
Mayor tenure (months, as of 2008-12)	287	22.31707	16.88134	0	78
Mayor's date of birth	287	1959/05	49.5 months	1945/10	1968/10
Mayor foreign experience	287	0.094	0.292	0	1
CCP Secretary tenure (months, as of 2008-12)	287	24.11847	20.26641	0	104
Tenure of CCP Sec. as Mayor (0=never Mayor)	287	17.784	21.523	0	106
Budgetary revenue (2007)	286	491807.5	1643347	4078	2.06e+07
Budgetary expenditure ratio (2007)	286	2.230899	1.881525	.8029338	15.53188
Single-firm dominance (1999)	234	.0268408	.0455365	0	.3726322
GDP 2007 [Yuan]	285	5509943	1.20e+07	200977	1.21e+08
GDP 1997 [Yuan]	265	1246767	2294785	15121	2.70e+07
GDP growth 1998-2008 (%)	264	3.730	4.997	-0.307	55.589
GDP per capita (2007) [Yuan]	285	30403.88	20397.59	3836	135728
Ratio of services in GDP	285	0.414	0.107	0.086	0.724
Population (2007) [10,000]	286	129.9151	162.9603	15.3	1526.02
Population (1997) [10,000]	234	110.8885	134.7024	14.55	1127.22
SO ₂ Emissions	286	977.8112	462.3282	101	2253
FDI ratio	257	-5.706	1.524	-11.038	-3.252
Mobile phones per capita	283	0.821	0.782	0.135	8.683
Coastal province	287	0.310	0.463	0	1
Open coastal city/SEZ/Provincial seat	287	0.160	0.368	0	1
Provincial Capital or Central Municipality	287	0.111	0.315	0	1
Designated Tourism City	287	0.317	0.466	0	1
Latitude (decimal degree)	287	32.898	6.658	18.279	49.967
Longitude (decimal degree)	287	114.023	7.189	84.850	131.132

Table A2: Impact of leadership-level variables on PITI

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	piti	piti	piti	piti	piti	piti	piti
Mayor's tenure (months)	0.322 ^{***} (4.95)	0.296 ^{***} (4.49)	0.309 ^{***} (4.73)	0.305 ^{***} (4.74)	0.287 ^{***} (4.45)	0.293 ^{***} (4.17)	0.278 ^{***} (3.85)
CCP Sec. tenure (months)		0.0405 (0.64)			0.0256 (0.43)		0.0313 (0.47)
Tenure of CCP Sec. as Mayor		-0.0434 (-0.68)			-0.0393 (-0.60)		-0.0133 (-0.20)
Pro-PITI			1.807 (1.09)				
Anti-PITI			-0.329 (-0.23)				
Mayor experience in...							
_Law				7.160 ⁺ (1.81)	7.040 ⁺ (1.78)	6.795 (1.59)	6.563 (1.53)
_Environmental protection				4.432 (0.38)	3.706 (0.31)	3.105 (0.24)	2.266 (0.18)
_Foreign (train or study)				-5.647 ⁺ (-1.69)	-5.479 (-1.56)	-6.753 ⁺ (-1.73)	-6.849 ⁺ (-1.67)
_Water conservancy						17.26 (1.33)	17.18 (1.33)
_Medical / Health						-7.977 (-0.75)	-8.366 (-0.77)
_FDI						2.684 (0.74)	2.613 (0.71)
_Oil & gas						-14.14 (-1.47)	-13.85 (-1.40)
_Hydropower/ electricity						5.072 (0.80)	5.557 (0.81)
_Coal						4.520 (0.48)	4.545 (0.49)
_Industry						3.226 (0.92)	3.292 (0.93)
_Engineering						0.788 (0.19)	0.645 (0.15)
_Corporate						-0.506 (-0.16)	-0.406 (-0.12)
Constant	211.5 ^{***} (5.76)	220.4 ^{***} (4.77)	203.4 ^{***} (5.47)	201.8 ^{***} (5.53)	206.6 ^{***} (4.46)	193.6 ^{***} (4.83)	203.1 ^{***} (4.08)
Observations	113	113	113	113	113	113	113
R ²	0.1590	0.1659	0.1693	0.2015	0.2059	0.2537	0.2557

t statistics in parentheses

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$