The Visible Hand behind China's Growth

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1. Introduction

China has the best growth record in the world in recent years. According to World Bank, China's total GDP in terms of current dollar has grown from US$148 billion in 1978 to 4.3 trillion in 2008, next to the United States (14.2 trillion) and Japan (4.9 trillion). The astonishing growth of the Chinese economy demonstrates the effects of creating markets and allowing people to trade their goods and services. However, China is far from a free market society. Its capital market is underdeveloped and allegedly has little relevance in playing a formal role in allocating efficiency (e.g., Allen Qian and Qian, 2005; Allen, Qian, Zhang, and Zhao in this conference). Paradoxically, in spite of the growth and physical infrastructure development, China still has under developed institution and its economic system is tainted with corruption. Its economy is fragmented and filled with local monopolists; its human capital market apparently is underdeveloped for years. Despite the extraordinary growth, Chinese people's saving rates are still very high while consumption rates are low. Differences in wealth, living environment, social services, and life quality enjoyed by Chinese citizen of different locations, urban or rural, coastal or inland, remain substantial. There are signs of social unrests in some locations.

These paradoxical characters of China's development raise curiosity. China's government still commences much control on the economy. It makes good sense therefore to investigate how the country's bureaucrat allocation system functions in resource allocation. Understanding how the Chinese government manages its

economy can help us to address these paradoxes. Studies of the Chinese bureaucratic system and factors shaping bureaucrat incentives are only emerging.

We take a stab of the issues by examining the promotion decisions of China's local (city) level bureaucrats and how it may have affected the trends of China's development. We advance the literature in two important aspects. First, the literature has only preliminary evidence linking promotion of provincial leaders to regional growth; we analyze a broader number of potential factors. Second, we conduct our investigation at the city instead of provincial level. Through a series of economic reforms, the central government has decentralized many decision rights of running the economy to city level governments, and the competition among the local governments have been argued as an important disciplinary force of local development (Du and Xu, 2008; Xu, 2009). In addition, to understand the linkage between bureaucrat's promotion incentives and development, the more micro city level analysis provides more information than the provincial level studies.

In a nutshell, we suggest that the Chinese government runs its sub-economies based on incentivizing responsible leaders with promotions based on performance defined by the central. Hence, the local leaders aim to deliver the performance indicators but may sacrifice development in other dimensions. We show that the performance indicators that determine promotion are tangible growth and investment by the private sector and foreign owned companies. This system contributes to China's high growth in tangible dimensions. At the same time, it explains China's slower development in other dimensions, like environmental protection and social

securities. We speculate that the system also explains China's slower development in critical institutions that can lead to a robust and formal merit based capital market.

2. The government system

China had years of a planned economy (1949 to 1978) and suffered from the disastrous "Cultural Revolution." At the end of the "Revolution" the country became hungry for changes – both in terms of ideology and in terms of social organization. The nation ended the "Revolution" and supported the reforms that started in 1978. Almost everything China does now is the opposite of what it did during the Cultural Revolution. For example, China now emphasizes social harmony and stability while during the Cultural Revolution she emphasized class struggle and continuous 'revolution." China now emphasizes pragmatic economic progress; the maxim is "a cat which catches mice is a good cat." On the contrary, in the old era she emphasized ideology and politics above economics.

China has chosen gradualism in her reforms. The process is characterized in Chinese as "feeling the stones to cross the river" – government analyzes, runs small scale policy experiments, and then makes large scale changes using an amended policy. Most of the economy was controlled by large state owned firms at the beginning of the reform in 1978. The gradual steps of changes towards a market economy are well known and documented elsewhere (Wu, 2005). The critical steps include the granting of autonomy to farm coops, the development of township and village enterprises, the establishment of the dual prices system, the formal allowance of private ownership, the corporatization and various reforms of state owned

enterprises, allowing university graduates to seek their own employment and thus the development of a labor market, the gradual liberalization of foreign direct investment, the development of commercial laws, security laws, and labor laws, and the development of social security systems and health insurance, etc.

The steering hands of China's 30 years of economic evolution are inside the Communist Party. Researchers have begun to pay attention to how the communist government does the job.

China is a vast country with diverse dialects, sub-cultures, economic endowment, capabilities, and development. The Chinese government runs this vast and variegated country like a conglomerate runs diverse sub-units. It has a decentralized five-level pyramidal system that a higher level monitors and controls critical appointments at a lower level. The 5 levels of bureaucracy include the central government (zhongyang, 中央), provinces (sheng, 省), prefectures (diqu, 地区), counties (xian, 县), and townships (xiang, 乡镇) (Lieberthal, 1995).

But there is a twist. A unique feature of China's public governance is that it is a dual track system including the Communist Party hierarchy aside from the regular government administrative hierarchy. At each level of the hierarchy there is a party committee and "Organization Department" which manage most cadres and officials. (In the central, there is the central Organization Department.) Also, there is a party secretary who represents the Party at various important government bodies and state owned enterprises. Under China's one-party political system, the party secretary

dominates the head government bureaucrat in key decision makings, even though the bureaucrat is the nominal leader.

The central Organization Department and party leaders appoint people to be provincial heads (governors) and provincial level party secretaries. They in turn lead the provincial Party committee and Organization Department which directly appoint and supervise a few key government and party leaders one level down to major cities, and so on.[1]

The incentive structure in this system starts with the central. Our submission is that the central rewards performing cadres with promotion up a rank or a few ranks. Each cadre does the same to officials under his/her supervision so they will deliver the performance that contributes to his/her own performance. This practice is repeated at each level. Hence, the Chinese government runs the sprawling government units like a large corporation running many loosely linked units by a pyramidal structure that the level above assigning key managers to level below and at each level promotion incentives based on performance is provided.

Similar and rather detailed observation is made by political scientists, (e.g., Landry, 2008). Economists make similar observations too. For example, Li and Zhou (2005) using a 1979 to 1995 sample show that China's provincial bureaucrat promotion is primarily based on GDP growth rates and affiliation with the central government. Their finding suggests that China's central government runs the country

[1] Within each level, there are of course further sub-divisions composed of multiple layers. Generically, the "Organization Department" and the Party Committee control personnel decision in the lower layers. Top layer personnel decisions are in the hand of the higher layers' Organization Department and Party Committee as posited in the text. At the highest level, personnel decisions have to be approved by the People's Congress.

like a firm, inducing lower level bureaucrat desirable behaviors by tying their promotion with performance outcome indicators.

In such a system, the assigned performance indicators play a key role in achieving outcomes. Assigned local leaders respond to performance indicators because they would like to be promoted for career advancement and for reaching to a higher level, e.g., a richer location or to a higher hierarchical position. Promotion leads to greater control of economic resources and political power, which delivers both higher personal satisfaction and also more tangible and intangible personal benefits.. While the managers will pursue self-interest, they inevitably will also be influenced by the performance indicators.

Therefore, critically, we need to identify the key performance indicators based on which local bureaucrats compete for promotion. We note here that the actual promotion selection is likely much more complicated and influenced by many factors, e.g., connections (*guanxi*), intangible personal dynamics, etc. Also, as far as we know, there is not an explicit rule book on what leads to promotion. We are attempting to use statistics to support or refute the intuition: the seeking of the systematic statistical relation between promotion and a collection of factors related to China's development controlling for individual variations.

3. What performance leads to promotion?

In this section we analyze China's city level data to identify important promotion factors of local party secretaries and mayors.

3.1. Data and Sample

We track turnovers of party secretaries and mayors of 36 cities from 1994 to 2008, including 27 provincial capital cities (省会), 5 sub-provincial cities (副省级城市), and 4 direct administrative city (直辖市, Beijing, Chongqing, Shanghai, and Tianjin).[2]

We initially obtain the names of all party secretaries and mayors of these cities from *China Directory*, which reports the information since 1994. We then search official news sources, including Xinhua News, People Net and various local governments' websites to obtain the CVs of the bureaucrats. From the CVs we obtain the bureaucrats' personal and career information.

For each of the 36 cities we compile bureaucrat turnover history from 1994 through 2008. We observe 223 turnovers during the period. We exclude 16 turnovers because the departing bureaucrats' tenure is less than one year. Our final sample includes 207 bureaucrat turnovers, 104 of which are party secretaries and 103 are mayors. Appendix 1 provides information about the turnovers by city and year.

Table 1 shows the distribution of the city level bureaucrat turnovers by year and by province. Overall, turnovers occur regularly in all the years and regions. In a given year between 1994 and 2008, there are 2 to 21 turnovers. Turnovers are more

[2] A comprehensive list of China's provincial, sub-provincial, and regional cities and their leading bureaucrats can be found at http://leaders.people.com.cn/GB/58318/102443/index.html.

frequent in more recently years than in earlier years. During the period, a given province has 4 to 12 turnovers of city level party secretaries (and mayors).

3.2. Identifying promotion

To identify whether a bureaucrat is promoted, we compare the bureaucrat's position before and after turnover. A bureaucrat is promoted if one of the following conditions holds. First, the bureaucrat moves to a higher level government position. For example, a city party secretary becomes a provincial governor. Second, the bureaucrat moves to a same level government position but with more power. For example, a city mayor becomes the party secretary of the city. And third, the bureaucrat moves to a same level position with more resources, captured by per capita GDP of the location in question. For example, a mayor of a city in Yunnan Province becomes a mayor of a city in Zhejiang Province.

Table 1 shows the distribution of promotion by year and by region, in terms of number of promotion and the percentage of promotion among all turnovers. Overall, almost 43 percent of the political turnovers are classified as promotion. There is not a clear pattern of time or regional concentration of promotion. Table 1 also shows the distribution of non-promotion cases. 56 (26% of all turnovers) involve transferring a bureaucrat to another comparable position, while 61 (30%) are demotion or punishment cases.

3.3. Determinants of promotion

Our primary objective is to identify whether regional objectives are important to bureaucrat promotion, controlling for their personal characteristics.

We are concerned of several groups of city level promotion factors. The first potential promotion factor is economic growth, measured as the growth of total or per-capita GDP. The second class of promotion factor is investment. We include variables to capture investment activities by SOEs (Investment by SOEs), by the private sector (Investment by private sector), by foreigners in the form of foreign direct investment (FDI), and infrastructure spending by the city government (Infrastructure spending). The third class of promotion variables is employment, captured by growth of SOE and private sector employees (Growth of SOE employees and Growth of employees in private firms). The fourth class of promotion variables is city government's investment in welfare and intangibles, including education and health spending, growth of hospital bed, and growth of green space. Finally, we use ETC to measure local institution development, defined as the city's firm spending on eating, drinking and entertainment (Cai, Fang and Xu, 2007). All the variables proxy for these regional factors (except for ETC) are estimated as the three-year average prior to the year of turnover. The city level data for constructing the variables are from China City Statistical Yearbook (1995-2008) and the Annual Statistical Almanac of the cities covered by the sample (1995-2008).

Consistent with Li and Zhou (2005), the personal level control variables are the bureaucrat's age (Age), education level (Education), whether received a university

degree from a prestigious (Peking or Tsinghua) university (University), and the total number of years since in the position (Tenure) up to the year of his turnover (See also Xu, Wang, and Shu, 2007; Zhang and Gao, 2007). We also include an indicator variable equal to one if the bureaucrat has worked in a central government position (Connection).

Appendix 2 provides a list of all variables used in the study, their definitions and data sources. Table 2 reports the summary statistics of all dependent and independent variables in the promotion regressions. A typical bureaucrat in our database is 51 years old, has a university degree, and has been in the position for 4 years upon his departure of the position. About 16 percent of the bureaucrats have been previously affiliated with a central government agency.

We regress the promotion indicator variable on the above independent variables, using a probit model. Alternatively, we adopt an ordered probit model. Promotion numeric, the dependent variable, of the ordered probit regression is defined to be 3 if a bureaucrat is promoted, 2 if a bureaucrat holds the same level position and 1 if a bureaucrat is demoted or penalized. The total number of observation is 158, smaller than the total available number of turnovers because of missing data of some city level variables. Standard errors are clustered at the regional level.[3]

Table 3 reports the regression results. We separately consider the effects of total and per-capita GDP in Panel A and B, respectively. Due to their high correlation,

[3] North-eastern, Northern, Central, Eastern, Southern, South-western, and Western regions.

we include growth of SOE employees and the growth of employees in private firms in separate regressions.

Consistent with the literature, promoted bureaucrats are younger, better educated and have shorter tenure. Also consistent with the prior studies, total GDP growth positively affects promotion (Panel A). However, we notice that per capita GDP growth is not (Panel B). Interestingly, while the private sector and foreign investment help bureaucrat promotion, SOE investment and government infrastructure spending do not. While investment is important, employment growth, either in the state or the private sector, does not affect promotion. None of the intangible development indicators (education and health spending, growth in hospital beds and green space) are important to bureaucrat promotion. Neither is institutional development such as government quality (captured by ETC) important. A bureaucrat's connection with the central government has a positive but insignificant effect on his promotion outcome, suggesting that political connection (*guansi*), measured by prior central government job affiliation, is not a primary consideration in this sample.

In summary, contrary to journalistic belief, China's city level bureaucrat promotion is not primarily based on political connection (*guansi*). Instead, bureaucrat promotion is most strongly related to tangible performance – total GDP growth, attracting private sector investment either by home residents or foreign firms. Still, intangible performance on social welfare proxied by education spending, green space expansion, and spending on health care all do not help bureaucrat promotion.

4. Regional development subsequent to bureaucrat promotion

We are interested in whether such a system has detectable post promotion impact. We therefore ask whether a bureaucrat promoted due to his outstanding performance of a criterion will continue to result in superior local development subsequent to the promotion. For example, a bureaucrat can be promoted due to abnormal growth of GDP during his term. The past GDP growth may help future GDP growth because the prior local development set the stage for subsequent development or the prior promotion generates a robust incentive for the successor to continue the effort to boost local GDP. However, a bureaucrat can prop up local GDP in order to get promotion. In that case we might observe subsequent GDP grow at a slower rate.

We apply a methodology similar to Bertrand and Mullainathan (2003) that allows us to incorporate the full panel of data into a difference-in-difference regression analysis. The methodology compares the effects of an event (promotion) on a group that is affected by the event (the treatment group) to another group that is unaffected (the control group).

In our context, the treatment group includes observations of the years subsequent to party secretaries' promotion due to their superior (above provincial average) GDP growth performance during the three years prior to the promotion. We focus on party secretaries' promotion instead of mayors, because the formers are key decision makers. If we alternatively focus on mayors' promotion, we obtain similar but weaker results. The control group consists of the rest of city-year observations,

including observations of the years prior to the bureaucrats' promotion and the years of those cities whose bureaucrats are not promoted at all or promoted for other reasons.

We use the following regression framework to perform the difference in difference analysis:

$$Performance_{it} = \alpha_i + \alpha_t + \beta \,\mathrm{Pr}\, omoted_{it} + \delta X_{it} + \varepsilon \quad (2)$$

where i indexes city, and t indexes time; $\mathrm{Performance}_{it}$ is a set of performance measures; α_i is city fixed effect and α_t is time fixed effect; $\mathrm{Promoted}_{it}$ is a dummy variable equal to one if the observation is associated with a year after the year when a city's party secretary has been promoted because of abnormal (above provincial average) GDP growth, and otherwise zero; X_{it} is a vector of control variables. The fixed effects help controlling for time and city heterogeneities because we pool turnover data from different years and cities. The regression model is estimated on alternative performance measures using annual data.

One draw back of the methodology is that it does not account for time varying regional level shocks. For example, a top down policy to boost regional economy can happen at the same time of a bureaucrat's promotion, therefore it becomes ambiguous whether subsequent GDP growth is due to the promotion or the policy shock. To mitigate the concern we construct net performance measures by subtracting away provincial performance from city performance.

Table 4 reports the summary statistics of all the dependent and independent variables. For informativeness we report statistics before netting out the provincial numbers. Table 5 reports the regression results. Panel A reports the results of the GDP performance regressions. The regressions control for human capital stock (measured by the number of higher education students over population) and initial total (or per capita) GDP level. The results show that a bureaucrat promoted due to his superior record of GDP growth will likely result in higher GDP growth rate subsequent to his promotion. However, the promotion's effect on subsequent growth of per capita GDP is statistically insignificant.

We next analyze the effects of GDP driven promotion on private sector development. The dependent variables are, alternately, private firm sales over sales by SOEs, private firm investment over SOE investment, private firm employees over SOE employees, and foreign investment over GDP. The set of regressions control for initial local wealth level measured by lagged per capita GDP. The results in Panel B shows that GDP led bureaucrat promotion is associated with subsequent higher ratio of private firm sales, investment, and employment relative to SOEs, suggesting a beneficial effect of private sector development. However, the GDP led promotion is associated lower subsequent foreign investment.

Panels C and D of Table 5 report regression results of the effects of GDP led promotion on subsequent per capita income, consumption, hospital beds, green space, and education expenditure. The results show that a bureaucrat promoted due to successful boost of local GDP has positive effects on urban per capita income and consumption, but less or insignificantly so on rural income and consumption. The

promotion has significant negative effects on subsequent per capita hospital beds and green space. The promotion has no distinguishable effect on subsequent education development.

A city may have more than one promotion due to abnormal GDP performance. The classification of the period between the two promotions is ambiguous. The above classification scheme effectively includes all the years between the two promotion in the treatment group, and therefore may create an upward bias of post-promotion performance for the first promoted bureaucrat while a downward bias subsequent to the next promotion. There are 8 cities associated with multiple promotion due to abnormal GDP growth. As a robustness check we keep only the observations associated with the first promotion while excluding all the observations subsequent to the second promotion, and find our results robust to such exclusion. Alternatively, we keep only the observations associated with the second promotion but excluding all the observations prior to the first promotion, and obtain similar results.

There might be time lags before the effects of promoting GDP can be realized. As a robustness check, we estimate all the dependent variables as 2-, and alternatively 3-year moving averages, and rerun the regressions. The results are similar to those when annual data is used.

Overall, the evidence in Table 5 suggests that bureaucrats' incentive to promote local GDP tend to result in subsequent GDP growth and private sector development. However, such an incentive has weaker or even perverse effects on

economic and social welfare. Also, institutional development does not seem to be affected.

5. Interpretations and implications

We first admit that our results are based on a small sample relative to the population of cities in China. The empirical work needs much refinement. We need to collect more data, include more variables (e.g., the formal financial market development as a dependent variable) and examine further the statistical robustness of the results (e.g., the impact equation should control for city level time varying independent variables). The following interpretations and inferences are therefore preliminary. Still, we believe that we have advanced reliable descriptive statistical observations and a way to appreciate the development in China.

A dominant driver of Chinese bureaucrats' behavior is to move up to the next level, given their minimal rewards from salary. The channel for promotion appears to be performance in the sense that political connection does not significantly predict promotion while performance does.

Our evidence suggests a mixed picture of the effects of local bureaucrats' promotion incentives on China's growth and development. Chinese local bureaucrats, through their promotion decisions, are motivated to boost local GDP growth. They are also rewarded for other tangible economic development, including private sector growth and attracting foreign investment. These high power incentives to boost

tangible development have indeed helped long-term GDP growth even subsequent to their departures.

In contrast, our evidence shows that institutional building and social welfare are missing in local bureaucrats' promotion formula. There is little evidence that bureaucrats are promoted for their contributions to hospital beds, green space, and education. Moreover, even though the bureaucrats are successful in propping up local GDP and attracting continuous development of the private sector taken by home firms, social welfare (education, health care, and environment) is sacrificed. There is also evidence that GDP led promotion is associated with subsequent imbalanced citizen's income and consumption between urban and rural areas.

These observations offer a framework to understand China's development. First, China's growth is strong on the "tangible side" but much weaker on institutions and social development. While undeniably intangible social development is more time consuming, the tilted growth pattern could be a consequence of China's style of governing. Agents sent to run local regions are incentivized to deliver tangible performance.

The negative implication is that long range development actions that do not contribution to performance indicators will get less attention. Examples of these under investment include institutional development and financial market development, possible negligence on intellectual property rights and environmental protection, lack of efforts to develop an efficient health care system, public education, and social securities, etc.

We should not readily conclude that the system is working well, even if we just focus on the tangible measures. First, given the system, officers will be tempted to report exaggerated statistics. In subsequent robustness check, we need to identify growth performance indicators that are less susceptible to exaggeration and repeat the statistical exercises on reasons for promotions and the impact of performance based promotion on future performance.

Second, the observation that post promotion the FDI flows are significantly below average while the private sector continues to grow at the expense of the SOEs suggests that, possibly, the growth stems from favors made to connected home firms rather than on general improvements in the private sector's business environment (although this is not the only possible interpretation of the observation). These together with the post promotion set back in social welfare suggests that the system leads to social imbalance – the favored advanced and they pop up total growth and yet the non-favored might get worse.

Another negative implication is regionalism as claimed in Landry (2008). Because of the competition for growth, cities are likely to protect and advance their own growth and reluctant to pay attention to inter-regional collaboration and may even resort to territory behavior, like setting up inter-regional trade barriers.

Yet, we should not conclude that other important dimensions of growth will be forever ignored. The performance indicators can change. For example, social harmony could be incorporated as a performance indicator and in recent years it is

emphasized – some local leaders were demoted for failing to diffuse racial tensions.[4] The Chinese central government can incorporate environment, education, health care, intellectual property rights, judicial capabilities, and many other dimensions in bureaucrats' promotion equation. One way to examine this possibility is to split our sample to earlier and later time period. Allegedly, in the later period promotion is more based on success in containing social unrest and in advancing welfare. Interesting, we do not detect difference in our results between time regimes.

6. Conclusion: How is the Agenda formed?

China is still an economy under much government control. Investigating the Chinese government management is therefore critical important. Our preliminary investigation proves that this avenue is fruitful in understanding the development characteristics of China. The decentralized governing system coupled with promotion incentives seems to be able to provide an explanation for the paradox in China's growth – fast on tangible growth as captured by GDP growth, investment, and the growing economic importance of the private sector and yet slow in institutional development and growth disparity in social well beings of various economic and social groups. Also, the growing disparity in well beings among different income classes could be a consequence of the government management system.

This framework of thinking points to the need to investigate on how politics and its evolution affects the development of national agenda. In the past, during the Great Leap Forward and the Cultural Revolution, the agenda was set in the central

[4] The Washington Post, 'China Fires Head of Western City Hit by Renewed Protests', September 6, 2009,

politburo and was a result of the winner of power and political struggles. China has moved forward since. Apparently, post the Cultural Revolution, there are multiple units created to give the central government inputs for policy formation.

One interesting example is the China National School of Administration (CNSA) which officially opened in September of 1994. While it is a training center for middle and senior civil servants, senior executives and policy research fellows, it also provides policy consultancy to government management and reports directly to the State Council (whose leader is Premier Wen Jia Bao). In particular, it proposes policy advice to the State Council and some relevant ministries and agencies based on various discussion exercises participated by provincial and even lower level officers. Such an example suggests that there is some level of grass root consultation in policy formation. Some items of the policy agenda will be utilized as performance indicators.

Still, national agendas are set at the highest level. Officers at that level are products of the promotion incentive system. One pessimistic speculation is that they are too homogenous in backgrounds and performance. Also, in their process of climbing the hierarchy they have acquired good will liabilities and may become representative of "elites." The national agenda risks favoring established elites. Yet, many of them make career advancements because of their intrinsic capabilities, in spite of being applied to follow old agendas. Still, they would be most concerned of the party's legitimacy and will care to advance national agendas that bring good results to China's continuous development and social stability.

Would the system continue to evolve positively so that the national agenda cater to more comprehensive and inclusive growth and improve in well being? Or, will the system evolution and the national agenda be seized by the established interest? Or, without change in the way national agendas are set and yet it is positively influenced by visionary and benevolent leaders?

References:

Allen, F., Qian J., and Qian M., 2005, "Law, Finance, and Economic Growth in China," *Journal of Financial Economics,* 77, 57-116.

Allen, F., Qian J., Zhang, C., and Zhao, M., "China's Financial System: Opportunities and Challenges," *in this Volume.*

Bertrand, M., and Mullainathan S., 2003, "Enjoying the Quiet Life? Corporate Governance and Managerial Preferences", *Journal of Political Economy*, 111, 1043-1075.

Cai, H., Fang H., and Xu C., 2007, "Eat, Drink, Firms and Government: An Investigation of Corruption from Entertainment Expenditures of Chinese Firms", working paper.

Du, J., and Xu C., "Regional Competition and Regulatory Decentralization: The Case of China," mimeo, the Chinese University and University of Hong Kong, 2008.

Landry, P.F., 2008, *Decentralized Authoritarianism in China*, Cambridge University Press.

Lieberthal, K., 1995, *Governing China: From Revolution Through Reform*, W.W. Norton & Company, Inc.

Li, H., and Zhou L., 2005, "Political Turnover and Economic Performance: The Disciplinary Role of Personnel Control in China", *Journal of Public Economics*, 89, 1743-1762.

Wu, J., 2005, *Understanding and Interpreting Chinese Economic Reform*. OH: South-Western.

Xu, C., 2009, "The Institutional Foundations of China's Reforms and Development," mimeo, University of Hong Kong.

Xu, X., Wang X., and Shu Y., 2007, "Local Officials and Economic Growth", *Economic Research*, 473, 18-31 (In Chinese).

Zhang, J., and Gao Y., 2007, "Term Limits and Rotation of Chinese Governors: Do They Matter to Economic Growth?" *Economic Research*, 475, 91-103 (In Chinese).

Table 1 China's city level bureaucrat turnover and promotion patterns

This table presents the distribution of turnover and promotion of bureaucrats (party secretaries and mayors) of 36 China's major cities by year and province. We define a bureaucrat promoted if it satisfies one of the following conditions: 1) the bureaucrat moves to a higher level government position; 2) the bureaucrat moves to a same level government position with more power; 3) the bureaucrat moves to a same level government position with more resource. "Same level" refers to a bureaucrat being transferred to another comparable position. The rest of turnovers are classified as demotion.

Panel A By year

Year	Turnover	Promotion		Same level		Demotion	
		Obs.	Percent	Obs.	Percent	Obs.	Percent
1994	2	1	50.0%	1	50.0%	0	0.00%
1995	8	4	50.0%	2	25.0%	2	25.0%
1996	10	3	30.0%	4	40.0%	3	30.0%
1997	13	6	46.2%	5	38.5%	2	15.4%
1998	14	5	35.7%	5	35.7%	4	28.6%
1999	16	9	56.3%	4	25.0%	3	18.8%
2000	15	7	46.7%	6	40.0%	2	13.3%
2001	21	5	23.8%	7	33.3%	9	42.9%
2002	16	7	43.8%	2	12.5%	7	43.8%
2003	20	10	50.0%	5	25.0%	5	25.0%
2004	9	3	33.3%	2	22.2%	4	44.4%
2005	18	8	44.4%	4	22.2%	6	33.3%
2006	18	10	55.6%	4	22.2%	4	22.2%
2007	21	10	47.6%	4	19.0%	7	33.3%
2008	6	2	33.3%	1	16.7%	3	50.0%
Total	207	90	43.5%	56	27.1%	61	29.5%

Panel B By region

Province	Turnover	Promotion		Same level		Demotion	
		Obs.	Percent	Obs.	Percent	Obs.	Percent
Beijing	6	3	50.0%	1	16.7%	2	33.3%
Tianjin	5	1	20.0%	2	40.0%	2	40.0%
Hebei	8	1	12.5%	4	50.0%	3	37.5%
Shanxi	7	1	14.3%	5	71.4%	1	14.3%
Neimenggu	4	2	50.0%	1	25.0%	1	25.0%
Liaoning	12	6	50.0%	0	0.0%	6	50.0%
Jilin	8	2	25.0%	3	37.5%	3	37.5%
Heilongjiang	7	0	0.0%	5	71.4%	2	28.6%
Shanghai	4	2	50.0%	0	0.0%	2	50.0%
Jiangsu	5	2	40.0%	1	20.0%	2	40.0%
Zhejiang	10	2	20.0%	5	50.0%	3	30.0%
Anhui	6	2	33.3%	3	50.0%	1	16.7%
Fujian	11	5	45.5%	3	27.3%	3	27.3%
Jiangxi	6	1	16.7%	2	33.3%	3	50.0%
Shandong	9	4	44.4%	1	11.1%	4	44.4%
Henan	6	1	16.7%	2	33.3%	3	50.0%
Hubei	7	2	28.6%	4	57.1%	1	14.3%
Hunan	5	1	20.0%	3	60.0%	1	20.0%
Guangdong	12	7	58.3%	1	8.3%	4	33.3%
Guangxi	6	4	66.7%	1	16.7%	1	16.7%
Hainan	7	5	71.4%	1	14.3%	1	14.3%
Chongqing	7	2	28.6%	2	28.6%	3	42.9%
Sichuan	5	4	80.0%	1	20.0%	0	0.0%
Guizhou	5	4	80.0%	1	20.0%	0	0.0%
Yunnan	5	3	60.0%	1	20.0%	1	20.0%
Tibet	4	4	100%	0	0.0%	0	0.0%
Shannxi	6	4	66.7%	0	0.0%	2	33.3%
Gansu	7	3	42.9%	0	0.0%	4	57.1%
Qinghai	5	4	80.0%	1	20.0%	0	0.0%
Ningxia	6	3	50.0%	2	33.3%	1	16.7%
Xinjiang	6	5	83.3%	0	0.0%	1	16.7%

Table 2 Summary statistics of the variables in city bureaucrat promotion determinant regressions

Promotion dummy is a dummy variable if a bureaucrat is promoted and zero otherwise. Promotion numeric is defined to be 3 if a bureaucrat is promoted, 2 if a bureaucrat moves to a same level position and 1 if a bureaucrat is demoted or penalized. Age denotes bureaucrat age. Education is a dummy variable equal to one if a bureaucrat has at least the bachelor degree, and zero otherwise. University is a dummy variable equal to one if a bureaucrat graduates from Tsinghua or Peking University, and zero otherwise. Tenure is how many years a bureaucrat has been in the position. Connection is a dummy variable equal to one if a bureaucrat has working experience in the central government, and zero otherwise. ETC is a variable measuring institution development, defined as the ratio of firm expenditure on eating, drinking and entertainment to sales (Cai, Fang and Xu, 2007). Investment by SOEs is the ratio of annual investment of fixed assets by SOEs to total GDP. Investment by private sector is the ratio of annual investment of fixed assets by private firms to total GDP. Infrastructure spending is fiscal government expenditure in infrastructure divided by total GDP. Growth of employee in SOEs is the annual growth of SOEs' employees. Growth of employee in private sector is the annual growth of private firms' employees. FDI is the ratio of annual foreign investment to total GDP. Growth of total GDP is the annual growth of total GDP. Growth of per capita GDP is the annual growth of per capita GDP. Education and health spending is fiscal government expenditure in education and health divided by total GDP. Growth of hospital bed is the annual growth of per capital hospital bed. Growth of green space is the annual growth of per capital green space.

Variable	Obs.	Mean	Median	Std.	Min.	Max.
Promotion dummy	207	0.435	0.00	0.497	0.00	1.00
Promotion numeric	207	2.14	2.00	0.845	1.00	3.00
Age	198	50.8	51.0	4.90	37.0	64.0
Education	207	0.870	1.00	0.338	0.00	1.00
University	207	0.111	0.00	0.315	0.00	1.00
Tenure	207	4.24	4.00	1.92	2.00	11.0
Connection	207	0.159	0.00	0.367	0.00	1.00
ETC	201	0.0139	0.0130	0.00581	0.00600	0.0270
Investment by SOEs	178	0.185	0.167	0.0815	0.0597	0.398
Investment by private sector	175	0.198	0.190	0.123	0.0207	0.617
Infrastructure spending	205	0.0106	0.00856	0.00933	0.00115	0.0462
Growth of employee in SOEs	193	-0.0467	-0.0375	0.0721	-0.366	0.0929
Growth of employee in private sector	193	0.0380	0.0233	0.127	-0.369	0.549
FDI	201	0.0504	0.0412	0.0451	0.00346	0.285
Growth of total GDP	197	0.138	0.136	0.0406	0.0648	0.259
Growth of per capita GDP	197	0.119	0.115	0.0419	0.0222	0.265
Education and health spending	191	0.0178	0.0160	0.00700	0.00705	0.0500
Growth of hospital bed	200	0.00174	0.000389	0.0374	-0.126	0.112
Growth of green space	193	0.0484	0.0494	0.0748	-0.181	0.318

Table 3 Determinants of city bureaucrat promotion

This table presents the regression result of bureaucrat promotion determinant. The dependent variable is the promotion dummy variable for probit model, defined to one if a bureaucrat is promoted and zero otherwise; and the promotion numeric variable for ordered probit model, defined to be 3 if a bureaucrat is promoted, 2 if a bureaucrat moves to a same level position and 1 if a bureaucrat is demoted or penalized. Age denotes bureaucrat age. Education is a dummy variable equal to one if a bureaucrat has at least the bachelor degree, and zero otherwise. University is a dummy variable equal to one if a bureaucrat graduates from Tsinghua or Peking University, and zero otherwise. Tenure is how many years a bureaucrat has been in the position. Connection is a dummy variable equal to one if a bureaucrat has working experience in the central government, and zero otherwise. ETC is a variable measuring institution development, defined as the ratio of firm expenditure on eating, drinking and entertainment to sales (Cai, Fang and Xu, 2007). Investment by SOEs is the ratio of annual investment of fixed assets by SOEs to total GDP. Investment by private sector is the ratio of annual investment of fixed assets by private firms to total GDP. Infrastructure spending is fiscal government expenditure in infrastructure divided by total GDP. Growth of employee in SOEs is the annual growth of SOEs' employees. Growth of employee in private sector is the annual growth of private firms' employees. FDI is the ratio of annual foreign investment to total GDP. Growth of total GDP is the annual growth of total GDP. Growth of per capita GDP is the annual growth of per capita GDP. Education and health spending is fiscal government expenditure in education and health divided by total GDP. Growth of hospital bed is the annual growth of per capital hospital bed. Growth of green space is the annual growth of per capital green space. Variables except age, education, university, tenure, connection and ETC are calculated as pre-promotion three-year averages. T-values are provided in parentheses, and *, **, or *** denote significance at 10%, 5% and 1% levels, respectively.

Panel A Total GDP growth

	Probit model			Ordered probit model		
	(1)	(2)	(3)	(4)	(5)	(6)
Age	-0.123***	-0.128***	-0.128***	-0.134***	-0.136***	-0.136***
	(4.50)	(4.76)	(4.74)	(4.94)	(5.11)	(5.10)
Education	1.14**	0.982**	0.981**	0.444	0.394	0.407
	(2.43)	(2.43)	(2.42)	(1.42)	(1.33)	(1.38)
University	-0.0228	0.0208	0.0243	0.101	0.123	0.116
	(0.07)	(0.06)	(0.07)	(0.35)	(0.43)	(0.40)
Tenure	-0.173**	-0.191***	-0.199***	-0.162***	-0.165***	-0.168***
	(2.57)	(2.92)	(3.01)	(2.88)	(3.13)	(3.17)
Connection	0.466	0.483	0.456	0.456	0.504	0.492
	(1.49)	(1.55)	(1.46)	(1.49)	(1.62)	(1.59)
ETC	8.48	15.6	15.8	11.4	16.9	17.4
	(0.38)	(0.74)	(0.75)	(0.64)	(0.97)	(1.00)
Investment by SOEs	0.707			0.956		
	(0.41)			(0.59)		
Investment by private sector	1.12*			0.937*		
	(1.88)			(1.80)		
Infrastructure spending	9.69	6.88	7.02	5.44	2.78	2.65
	(0.64)	(0.44)	(0.45)	(0.43)	(0.21)	(0.20)
Growth of employee in SOEs		0.120			0.180	
		(0.53)			(0.80)	
Growth of employee in private sector			-0.0853			0.0949
			(0.40)			(0.37)
FDI	5.00**	4.35*	4.57*	4.43*	3.84*	3.89*
	(1.97)	(1.79)	(1.88)	(1.94)	(1.76)	(1.78)
Growth of total GDP	1.65*	1.84**	1.83**	1.48*	1.70**	1.66*
	(1.91)	(1.99)	(2.04)	(1.76)	(1.97)	(1.90)
Education and health spending	-19.4	-0.0534	-1.63	-20.7	-3.42	-4.99
	(0.72)	(0.00)	(0.07)	(0.86)	(0.17)	(0.24)
Growth of hospital bed	-1.56	-1.06	-1.11	-2.17	-1.39	-1.45
	(0.56)	(0.39)	(0.42)	(0.78)	(0.52)	(0.54)
Growth of green space	0.147	0.230	0.299	0.0350	0.112	0.135
	(0.09)	(0.14)	(0.19)	(0.02)	(0.07)	(0.09)
Constant	5.00***	5.45***	5.51***			
	(3.08)	(3.45)	(3.45)			
Obs.	158	158	158	158	158	158
Pseudo R^2	0.22	0.22	0.21	0.16	0.16	0.16

Panel B Per capital GDP growth

	Probit model			Ordered probit model		
	(1)	(2)	(3)	(4)	(5)	(6)
Age	-0.129***	-0.132***	-0.133***	-0.140***	-0.142***	-0.141***
	(4.55)	(4.79)	(4.74)	(4.90)	(5.07)	(5.03)
Education	1.03**	0.923**	0.921**	0.370	0.348	0.358
	(2.20)	(2.32)	(2.31)	(1.21)	(1.23)	(1.26)
University	-0.0574	-0.0194	-0.0177	0.0883	0.104	0.0994
	(0.17)	(0.06)	(0.05)	(0.31)	(0.36)	(0.35)
Tenure	-0.166**	-0.187***	-0.192***	-0.159***	-0.163***	-0.165***
	(2.50)	(2.89)	(2.95)	(2.87)	(3.15)	(3.16)
Connection	0.492	0.487	0.467	0.477	0.510	0.501
	(1.56)	(1.56)	(1.50)	(1.54)	(1.62)	(1.60)
ETC	2.72	11.5	11.6	6.66	13.5	13.9
	(0.13)	(0.55)	(0.55)	(0.38)	(0.78)	(0.81)
Investment by SOEs	0.675			1.04		
	(0.39)			(0.64)		
Investment by private sector	1.52**			1.27**		
	(2.13)			(2.22)		
Infrastructure spending	11.4	8.72	8.84	7.28	4.48	4.32
	(0.78)	(0.57)	(0.58)	(0.59)	(0.35)	(0.34)
Growth of employee in SOEs		0.0885			0.147	
		(0.37)			(0.63)	
Growth of employee in private sector			-0.0548			0.0841
			(0.27)			(0.35)
FDI	4.97*	4.42*	4.56*	4.42*	3.91*	3.94*
	(1.93)	(1.79)	(1.85)	(1.92)	(1.77)	(1.79)
Growth of total GDP	-3.09	-2.31	-2.42	-2.96	-2.18	-2.20
	(1.06)	(0.81)	(0.84)	(1.27)	(0.97)	(0.97)
Education and health spending	-23. 3	-2.75	-4.00	-24.4	-5.70	-6.75
	(0.87)	(0.11)	(0.17)	(1.02)	(0.28)	(0.34)
Growth of hospital bed	-1.57	-0.746	-0.812	-2.35	-1.25	-1.26
	(0.58)	(0.29)	(0.31)	(0.86)	(0.48)	(0.48)
Growth of green space	0.350	0.435	0.489	0.221	0.299	0.321
	(0.21)	(0.27)	(0.30)	(0.14)	(0.19)	(0.20)
Constant	6.03***	6.34***	6.40***			
	(3.44)	(3.78)	(3.72)			
Obs.	158	158	158	158	158	158
Pseudo R^2	0.22	0.21	0.21	0.16	0.15	0.15

Table 4 Summary statistics of the variables in post-promotion regional performance regressions

Growth of total GDP is the annual growth of total GDP. Growth of per capita GDP is the annual growth of per capita GDP. Private sale is the ratio of private firms' sales to SOEs' sales. Private investment is the ratio of private firms' investment in fixed assets to SOEs' investment in fixed assets. Private employee is the ratio of private firms' employees to SOEs' employees. FDI is the ratio of annual foreign investment to total GDP. Income (rural) is the per capita income in the rural region. Income (urban) is the per capita income in the urban region. Consumption (rural) is the per capita consumption in the rural region. Consumption (urban) is the per capita consumption in the urban region. Hospital bed is the per capital bed. Green space is the per capital green space. Education development is the ratio of student number to total population. Promoted is a dummy variable, equal to one if it is after the year when a city's party secretary has been promoted due to total GDP growth (the average total GDP growth is above the mean value of the province during his tenure), and zero otherwise. Education is the ratio of higher education students to total population. While the subsequent regressions employ province adjusted dependent variables, the statistics reported in this table are before the adjustment.

Variable	Obs.	Mean	Median	Std.	Min.	Max.
Growth of total GDP	431	0.140	0.138	0.0470	0.0128	0.309
Growth of per capita GDP	430	0.123	0.119	0.0491	-0.0155	0.283
Private sale	389	4.49	2.45	5.42	0.350	19.7
Private investment	357	1.28	1.00	1.02	0.136	5.26
Private employee	414	1.75	0.976	1.88	0.193	9.15
FDI	418	0.0511	0.0376	0.0513	0.00106	0.374
Income (rural)	420	3940	3423	1913	1075	11346
Income (urban)	427	9560	8465	4350	2849	27596
Consumption (rural)	392	2792	2419	1351	1056	8006
Consumption (urban)	426	7555	6847	3143	3171	19960
Hospital bed	423	0.00411	0.00396	0.00127	0.000482	0.00874
Green space	278	7.29	7.29	2.98	1.40	16.1
Education development	376	0.185	0.189	0.0591	0.00936	0.339
Promoted	447	0.215	0.00	0.411	0.00	1.00
Education	440	0.0287	0.0184	0.0294	0.00118	0.178

Table 5 Effects of bureaucrat promotion on subsequent regional development

This table presents the regression results of how bureaucrat (party secretary) promotion due to abnormal total GDP growth influences a city's subsequent economic, social, and institutional development. All dependent variables are province adjusted, by subtracting the corresponding provincial data from the city level data.

Panel A GDP growth

The dependent variable is annual growth of total GDP and per capita GDP. Promoted is a dummy variable, equal to one if it is after the year when a city's party secretary has been promoted due to abnormal total GDP growth (the average total GDP growth is above the mean value of the province during his tenure), and zero otherwise. Education is the ratio of higher education students to total population. Initial GDP is the natural logarithm of total GDP or per capita GDP at the beginning of year. T-values are provided in parentheses, and *, **, or *** denote significance at 10%, 5% and 1% levels, respectively.

	Total GDP growth	Per capita GDP growth
	(1)	(2)
Promoted	0.0774**	0.00453
	(2.03)	(0.64)
Education	0.343	0.0551
	(0.25)	(0.21)
Initial level	-0.893***	-0.111***
	(12.66)	(3.85)
Constant	6.83***	1.31***
	(12.71)	(4.21)
City fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
Obs.	426	424
R^2	0.33	0.53

Panel B Private sector development and FDI

The dependent variables are the sales, investment and employee ratio of private firms to SOEs and FDI, respectively. FDI is the ratio of annual foreign investment to total GDP. Promoted is a dummy variable, equal to one if it is after the year when a city's party secretary has been promoted due to total GDP growth (the average total GDP growth is above the mean value of the province during his tenure), and zero otherwise. per capita GDP is the natural logarithm of per capita GDP. T-values are provided in parentheses, and *, **, or *** denote significance at 10%, 5% and 1% levels, respectively.

	Private sector development			FDI
	Sale	Investment	Employee	
	(1)	(2)	(3)	(4)
Promoted	2.56***	1.05**	0.279	-0.0165*
	(3.17)	(2.36)	(1.25)	(1.71)
per capita GDP	-1.26	-6.02***	-1.64*	0.0531
	(0.39)	(3.15)	(1.87)	(1.37)
Constant	8.19	59.3***	19.3**	-0.519
	(0.26)	(3.26)	(2.31)	(1.24)
City fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Obs.	389	357	414	418
R^2	0.69	0.24	0.89	0.33

Panel C Income and consumption

The dependent variables are per capita income and consumption, respectively. Since China Statistics Bureau reports the income and consumption information by rural and urban region, we run the separate regressions. Promoted is a dummy variable, equal to one if it is after the year when a city's party secretary has been promoted due to total GDP growth (the average total GDP growth is above the mean value of the province during his tenure), and zero otherwise. Education is the ratio of higher education students to total population. per capita GDP is the natural logarithm of per capita GDP. T-values are provided in parentheses, and *, **, or *** denote significance at 10%, 5% and 1% levels, respectively.

	Income		Consumption	
	Rural	Urban	Rural	Urban
	(1)	(2)	(1)	(2)
Promoted	0.00681	0.0500**	0.0147*	0.0361**
	(0.81)	(2.35)	(1.75)	(2.17)
Education	-1.34***	-2.54***	-1.24***	-1.79***
	(4.32)	(3.27)	(3.98)	(2.93)
per capita GDP	0.150***	0.329***	0.0253	0.182***
	(4.45)	(3.79)	(0.77)	(2.67)
Constant	-0.889***	-1.95**	0.251	-0.805
	(2.78)	(2.37)	(0.71)	(1.10)
City fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Obs.	417	422	390	421
R^2	0.92	0.89	0.88	0.88

Panel D Other social welfare

The dependent variables are per capita hospital bed, green space and education development, respectively. Education is measured as the number of students divided by total population. Promoted is a dummy variable, equal to one if it is after the year when a city's party secretary has been promoted due to total GDP growth (the average total GDP growth is above the mean value of the province during his tenure), and zero otherwise. per capita GDP is the natural logarithm of per capita GDP. T-values are provided in parentheses, and *, **, or *** denote significance at 10%, 5% and 1% levels, respectively.

	Hospital bed	Green space	Education development
	(1)	(2)	(3)
Promoted	-1.24**	-0.602*	0.00361
	(2.05)	(1.88)	(0.95)
per capita GDP	1.51	1.61	-0.0597***
	(0.63)	(1.12)	(3.28)
Constant	38.5	-5.67	0.731***
	(1.47)	(0.41)	(4.21)
City fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Obs.	423	278	376
R^2	0.93	0.82	0.91

Appendix 1 Number of bureaucrat (party secretary and mayor) turnovers by city and year

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Beijing		1	1	1					1	1				1		6
Tianjin				2					1					2		5
Shijiazhuang				1		1		2				1	1		2	8
Taiyuan		1	1				2	1					2			7
Hohhot						1	1			1		1				4
Shenyang				2			1	1				2				6
Dalian						2		1		1		1				5
Changchun		2			1			1	1		1			2		8
Harbin	1			2		1	1		1					1		7
Shanghai	1							1	1				1			4
Nanjing		1						2		2						5
Hangzhou						1	1	1			1			1		5
Ningbo					2					2				1		5
Hefei						2		2				2				6
Fuzhou		1	1				1	1				2				6
Xiamen									1				1			2
Nanchang			1	1				2		1			1			6
Jinan										1	1			2		4
Qingdao				1			1		1	1			1			5
Zhengzhou			2					1		1			2			6
Wuhan				1	1			1	1	1		1			1	7
Changsha					2			1					1	1		5
Guangzhou			1		1				2				1			5
Shenzhen					1		1	1		1		2		1	1	8

Nanning				2			1					1		2			6	
Haikou				1				1	1	1	1		2			7		
Chongqing		1			2			1	1		1		1			7		
Chengdu			1			2			2							5		
Guiyang		1		1		1				1			1			5		
Kunming						1			1	1			2			5		
Lhasa									2			2				4		
Xi'an	2				2			2			1	2				9		
Lanzhou		1			1	1		1		2				1		7		
Xining			1		2						1	1				5		
Yinchuan				1			1	1		1	1		1			6		
Urumqi				1	1	1						2		1		6		

Appendix 2 Variable definitions

Variable	Definition	Resource
Promotion dummy	A dummy variable equal to one if a bureaucrat is promoted, and zero otherwise.	China Directory, Xinhua News, People Net and various local government websites
Promotion numeric	A numeric variable, defined to be 3 if a bureaucrat is promoted, 2 if a bureaucrat moves to a same level position and 1 if a bureaucrat is demoted or penalized.	Same as above
Age	The bureaucrat age	Same as above
Education	A dummy variable equal to one if a bureaucrat has at least the bachelor degree, and zero otherwise.	Same as above
University	A dummy variable equal to one if a bureaucrat graduates from Tsinghua or Peking University, and zero otherwise.	Same as above
Tenure	How many years a bureaucrat has been in the position.	Same as above
Connection	A dummy variable equal to one if a bureaucrat has working experience in the central government, and zero otherwise.	Same as above
ETC	A variable measuring institution development, defined as the firm expenditure on eating, drinking and entertainment.	Cai, Fang and Xu (2007)
Investment by SOEs	The ratio of annual investment of fixed assets by SOEs to total GDP.	City Annual Statistical Almanac
Investment by private sector	The ratio of annual investment of fixed assets by private firms to total GDP.	City Annual Statistical Almanac
Infrastructure spending	The ratio of fiscal government expenditure in infrastructure to total GDP.	China City Statistical Yearbook
Growth of employee in SOEs	The annual growth of SOEs' employees, defined as ln(SOEs' $employee_t$/ SOEs' $employee_{t-1}$).	City Annual Statistical Almanac
Growth of employee in private sector	The annual growth of private firms' employees, defined as ln(private firms' $employee_t$/ private frims' $employee_{t-1}$).	City Annual Statistical Almanac
FDI	The ratio of annual foreign investment to total GDP.	China City Statistical Yearbook
Growth of total GDP	The annual growth of total GDP, defined as ln(total GDP_t/ total GDP_{t-1}).	China City Statistical Yearbook
Growth of per capita GDP	The annual growth of per capita GDP, defined as ln(per capita GDP_t/ per capita GDP_{t-1}).	China City Statistical Yearbook
Education and health spending	The ratio of fiscal government expenditure in education and health to total GDP.	City Annual Statistical Almanac
Growth of hospital bed	The annual growth of per capital hospital bed, defined as ln(per capita hospital bed_t/ per capita hospital bed_{t-1}).	City Annual Statistical Almanac
Growth of green space	The annual growth of per capital green space, defined as ln(per capita green $space_t$/ per capita green $space_{t-1}$).	City Annual Statistical Almanac
Promoted	A dummy variable, equal to one if it is after the year when a city's bureaucrat has been promoted due to total GDP growth (the average total GDP growth is above the mean value of the province during his tenure), and zero otherwise.	China Directory, Xinhua News, People Net and various local government websites
Education	The ratio of higher education students to total population.	China City Statistical Yearbook
Private sale	The sale ratio of private firms to SOEs.	City Annual Statistical

		Almanac
Private investment	The investment ratio of private firms to SOEs.	City Annual Statistical Almanac
Private employee	The employee ratio of private firms to SOEs.	City Annual Statistical Almanac
Fiscal deficit	The ratio of fiscal government expenditure to government revenue.	China City Statistical Yearbook
Income	The per capita income (unit:yuan).	China City Statistical Yearbook
Consumption	The per capita consumption (unit:yuan).	China City Statistical Yearbook
Hospital bed	The per capita hospital bed.	City Annual Statistical Almanac
Green space	The per capita green space (square meter).	City Annual Statistical Almanac
Education development	The ratio of student number to total population.	China City Statistical Yearbook