Capability and Opportunism: Evidence from City Officials in China

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Abstract

Opportunism is prevalent in political competition and public policy making. This paper investigates how opportunism is mitigated by capabilities among city leaders in China. Taking advantage of China's institutional setup with ample bureaucratic transfers, the paper estimates leaders' capabilities as their personal contributions to local economic growth. The paper finds strong evidence of political business cycles — a typical form of political opportunism — as manifested by a significant boost in the growth rate preceding the Communist Party's national congress. However, more capable leaders are found to generate more modest political business cycles than less capable ones do. The findings suggest that, to the extent that political selections are associated with the long term reputation of officials, career-concerned opportunism is at least partially moderated by the selection of capable officials in China. The paper provides supportive evidence for the reputation model of political business cycles as well as enriches the study of government officials in weak institutional environments.

Keywords: Political business cycles, opportunism, capability versus incentive

JEL: H11, O47, P26

Highlights

- We study how capability affects opportunism among city officials in China.
- Capability is estimated as the personal contribution to economic growth.
- Opportunism is estimated by the political business cycle effect.
- We found evidence of opportunism among city officials.
- More capable officials are found to be less opportunistic.

1 Introduction

Opportunism is prevalent in political competition and public policy making. In the literature of political economy, opportunistic behaviors of politicians and government officials are often investigated through the lens of political business cycle (PBC) — the pre-election monetary or fiscal expansions along with the cycle of political turnovers (Aidt et al., 2011; Alt and Lassen, 2006; Bove et al., 2016; Drazen and Eslava, 2010; Kayser, 2005). Moreover, a rich body of literature finds that opportunistic policies out of career-concerns are more widely pursued in developing countries where institutional checks on executive powers are weak (Brender and Drazen, 2005; Drazen and Eslava, 2010; Shi and Svensson, 2006; Akhmedov and Zhuravskaya, 2004). In turn, strengthening institutional constraints is often proposed as a key solution to prevent opportunism and improve the quality of governance (Chang, 2008; Fatás and Mihov, 2003; Persson and Tabellini, 2005).

Politicians, on the other hand, differ in their inherent capabilities of serving their jobs. And a fundamental purpose of political selection, in addition to incentivizing agents, is to pick out candidates who are endowed with good qualities to be able to produce satisfactory performance, including attending to the society's long-term well-beings (Fearon, 1999; Maskin and Tirole, 2004). Hence, the effectiveness of political system in identifying and selecting highly capable officials is important for reducing opportunism. However, it has not been empirically studied whether more capable officials are less opportunistic or not.

Using a rich dataset of city officials from 308 prefecture-level cities for the period between 1994 and 2011, this paper provides an estimation of individual capabilities and political opportunism, as manifested by the PBC preceding the ruling Communist Party of China (CPC)'s national congress, and studies whether the capability of city officials helps reduce their political opportunism. Consistent with previous findings in the literature of the PBC, the present paper documents significant boosts in economic indicators, including growth in per capita GDP and fiscal expenditure, when time moves closer to the CPC's national congress. But apart from the existing researches, which mostly focus on formal institutions, such as political democracy and constitutional checks-and-balances, as a mitigating channel for the PBC, the present paper shows that individual heterogeneity in capability plays an important role in reducing opportunistic behaviors of officials.

China provides a suitable institutional setup to examine the relationship between individual capability and political opportunism. The political-economic institutions of the

contemporary China render a wide range of policy autonomy and strong career-concern incentives of government officials. Local leaders have large personal influences over local economic development, and they are incentivized to exert efforts to promote growth due to the revenue-sharing under a decentralized fiscal system (Li et al., 2016; Qian and Weingast, 1997; Oi, 1992). The CPC manages to align the incentives of local officials with that of the party through centralized personnel control (Xu, 2011). Political centralization and the consequent subordination of local governments to the central government are deemed to be an important institutional foundation for the success of economic reforms in China compared with those in other transition economies (Blanchard and Shleifer, 2001; Enikolopov and Zhuravskaya, 2007).

Among many tasks faced by local leaders, the performance of GDP growth is arguably the most important, and readily measurable one for the evaluation and promotion of local officials (Li and Zhou, 2005; Lü et al., 2017; Yao and Zhang, 2015). Thus, GDP growth is a measure of key incentives of local leaders. Strong promotion incentives, however, are likely to induce opportunistic behaviors. Local leaders who compete for offices at upper levels may adopt manipulative policies to inflate local GDP growth when there is a high probability of political turnovers, creating a political business cycle effect. Specifically, local leaders may rely on political resources and personal networks to push for economic booms through credit expansion, land development projects, debt-financed infrastructures, and inter-region investments (Ansar et al., 2016; Bai et al., 2016; Brandt and Zhu, 2001; Han and Kung, 2015; Shi et al., 2017). Because such expansionary policies by local governments are politically driven, they are likely to engender systemic financial risks and undermine the long term growth prospect by causing capital misallocation.[1]

The main methodological hurdle for this research lies in how to estimate capabilities of local leaders. We borrow from the methodology developing mainly in the labor economics literature on performance decomposition with the use of employer-employee matched data (Abowd et al., 1999; Bertrand and Schoar, 2003), and empirically disentangle city leaders' relative contributions to economic growth (hereafter, the "leader effects") from unobserved city fixed effects. The identification strategy we use to estimate capability is infeasible for studying politicians in democratic settings, as politicians normally serves only one locality for the same positions (such as a mayor). As a result, leader effects are nested within

[1] According to the latest data released by the National Audit Office, local governments' commercial debt liabilities were 11.9 trillion RMB by June 2013 (National Audit Office, 2013).

region fixed effects. So the literature on political selection in democracies often relies on performance comparison between first-termed and reelected politicians to account for the capability difference among politicians (Alt et al., 2011; Gagliarducci and Nannicini, 2013), but cannot directly measure individual-specific capabilities. The political system of China provides a unique setting in this regard because city leaders are frequently shuffled among different jurisdictions (Kou and Tsai, 2014). This feature allows us to construct samples of cities that are connected to each other through transferred leaders and identify capabilities as leader fixed effects of all city leaders, regardless of whether they were transferred or not.

We estimate the PBC by the time profile of the economic growth rate along the cycle of the national congress. A positive slope of the time profile means the existence of the PBC. We find significant evidence for the PBC. The annual growth rate in per capita GDP increases by 0.5 percentage points when it moves one year closer to the next national party congress. Taking the leader effects estimated from the largest connected sample as a measure of capability, our empirical analyses show that the PBC is nuanced by capability. Officials who are able to produce more robust growth throughout the sample period appear to rely less on the short term boom right before the party congress. The time profiles of the PBC for the two least capable quarters are highly significant and very steep whereas the time profiles for the two most capable quarters are insignificant. We test several factors that may confound our estimation, particularly officials' age and their political connections. We also find similar results when we substitute the growth in GDP with the growth rate of fiscal expenditure to define the PBC.

The organization of this paper proceeds as the following. In the next section we discuss the institutional background of China's political selection and its implications for political opportunism, as well as the related literature. Section 3 introduces our method to estimate the PBC effect and capability. In Section 4 we introduce data and present descriptive results. The benchmark results and robustness checks are presented in Sections 5 and 6, respectively. Section 7 concludes.

2 Institutional Backgrounds and the Literature

In this section, we first discuss two important institutional features of China that allow us to form a credible empirical strategy to identify the PBC and officials' capabilities at

the same time. We then examine the concepts of opportunism and capability in China's institutional background and discuss their relationship to the existing literature.

2.1 The CPC National Congress and the PBC

First, in China, local economic growth assumes a political cycle preceding the CPC's National Congress, which is held every five years. Around the time when the National Party Congress convenes, the party committees at the subnational levels hold their own congresses. The two main functions of these meetings are to set new agendas of economic policies and prepare for personnel appointments by electing new party committees. In turn, the average chance of promotion for a city official at the end year of a political cycle is nearly three times that in the beginning year of a cycle.[2] Because the rate of political turnover becomes higher toward the end year of the political cycle, officials are increasingly incentivized to employ manipulative policies to boost economic growth throughout a political cycle. In the spirit of the PBC model developed by Rogoff (1990) and Martinez (2009), agents tend to exert higher efforts to inflate their reputations of capability when elections approach.[3]

In China, economic and spending policies are highly decentralized (Jin et al., 2005; Xu, 2011). Mayors and party secretaries have a wide span of controls over policies that help boost the short term economic growth. They may use personal connections to lobby for pork-barrel projects and solicit private investments. They may also allocate budgets in favor of infrastructure and fixed assets investments that are more tangible for the short term GDP numbers (Chen and Kung, 2016; Pan, 2016). In addition, more efforts are exerted to assure social stability and public safety in election years (Nie et al., 2013; Shi and Xi, 2018). The politically motivated policies as such often impede with long term, non-political business cycles, perpetuating various problems of resource misallocation. For example, Bai et al. (2016) find that the fiscal stimulus implemented by the Chinese

[2]For all city officials in our sample, the average chance of promotion throughout a political cycle, from the beginning to the end, is 8.77, 9.78, 16.35, 23.68, and 25.14 percent for the first through fifth year, respectively. Half the turnovers of party secretaries happen shortly after the CPC's national congress.

[3]In the literature, scholars follow different notions to capture China's political cycles. Guo (2009) measures the cycle effect by the third year for an official in the current tenure, relying on the empirical observation that officials are often transferred or promoted after serving the same jurisdiction for three to four years. We do not adopt this definition for the political cycle, because the length of tenure may be endogenous to officials' performance and capability. In comparison, the timing of National Party Congress is exogenous with regard to individual incentives. Our understanding is that the National Party Congress is a more conventional measure for political cycles in the literature on the political economy of China (Nie et al., 2013; Tao, 2006).

government affords capital misallocation, which may have led to a long term decline of TFP and GDP growth.

Moreover, the PBC is complicated by the rule of mandatory retirement. Mayors and party secretaries of prefecture level cities are required to retire at age 60. In addition, city officials are supposed to serve for a certain length of time, normally three years or more, before being promoted.[4] As a result, city leaders who do not get promotion before reaching age 57 are exposed to significantly higher likelihood of retirement or being transferred to ceremonial positions. In the robustness checks, we use 57 as the age cutoff to define another dimension of an official's promotion incentive, which can have an independent role in shaping an official's opportunism.

2.2 Interjurisdictional Transfers of Officials

The second institutional feature that allows us to identify officials' capabilities to promote economic growth is that officials are frequently reshuffled among different cities by the CPC's organization departments at the upper level. Although there are many reasons why the CPC shuffles its cadres, the following three are the most important. One purpose is to prevent the formation of local factions that have the potential to challenge the rule of the center. The second purpose is to prevent local officials from forming alliances with local businesses. The recently revealed high-profile corruption cases are common in revealing the collusion between business interests and corrupt officials. Thirdly, transferring officials among localities helps promising local officials to obtain governance experience from quite different economic and social environments.

The pattern of ubiquitous bureaucratic transfers in China contrasts the case in most democratic countries, in which local officials rarely hold the same type of offices in different jurisdictions. Voters in democracies evaluate the performance of incumbent politicians retrospectively and need not make comparisons across jurisdictions when casting their votes.[5] Cross-jurisdictional comparison is difficult even if voters want to do so, because politicians' performance tends to be confounded by unobservable regional fixed effects.

[4] According to the *Regulations for the Selection and Appointment of Party Cadres* announced by the central organizational department of the CPC in 2002 and its revision in 2006, an official being promoted should have served in a position one level lower than the current position for *at least* three years. In the sample of city officials we investigate, the average term length of city officials for the cycle 2002-06 was 4.07 years, and that for 2007-11 was 2.95 years.

[5] For notable exceptions, Besley and Case (1995) find that fiscal performances are positively correlated across states in the United States. Kayser and Peress (2012) argue that European voters compare the rate of economic growth with the international benchmark.

Mass reshuffles of officials in China allows for estimation of their capabilities. Tracking the moves of city officials, we are able to construct "connected samples" of cities in which a city had at least one official being ever moved to at least one other city in the sample. Fortunately, one of those samples is fairly large. The analysis uses all the officials that have worked in the cities of this largest connected sample (or simply "the connected sample" hereafter), regardless whether the officials have been shuffled or not. We apply the econometric technique developing from the literature on employer–employee matched data to disentangle the relative contributions of mayors and party secretaries to economic growth (the leader effects) from the contribution of local conditions. The leader effect thus measured is taken as a fixed term of officials' capability.

2.3 Relation to the Literature

The paper is closely related to several strands of political-economic literature. First, the argument that the existence of political business cycle indicates political opportunism is attributed to the signaling and reputation models on political cycles. In the model assuming rationally prospective voters proposed by Rogoff (1990), a political business cycle ensues under information asymmetry when the incumbent politician uses tax and spending as a costly signal to persuade voters that she is of high capability. In turn, in a separating equilibrium the politician of high capability opts for more expansionary policies than does the low type in the face of an election. Following Rogoff's logic, we should expect a positive correlation between the magnitude of the PBC and the capability of politicians.

The capability and incentive of politicians may not be positively correlated, however, when reelection or promotion depends on agents' reputation that is updated over time rather than simply based on the performance prior to the election. Taking this concern into consideration, Martinez (2009) studies the PBC in a reputation model in which the agent optimally distributes her effort throughout the whole political cycle to build up reputation. Similar to the conclusion of the signaling model, the agent increases her efforts when the election draws closer. However, when the principal already has a higher initial reputation about the agent and that reputation increases through observing successful performance over time, the increase in efforts right before the election is smaller. In this case, we should expect a negative correlation between the magnitude of the PBC and the real capabilities of politicians. Individual capability moderates political opportunism.

Both the signaling and reputation models are relevant for understanding the PBC in China. The signaling effect is likely to be a driver of opportunism. As several political science papers argue, subnational officials may strategically distort policies so as to make their loyalty visible to the principals (Kung and Chen, 2011; Shih, 2008). Similar strategies can be employed to signal capability of running economy, as Rogoff (1990) argues. At the same time, there are reasons to believe that capability moderates opportunism. In China, city leaders are not "new faces" in the bureaucratic faces. Most officials are in their early 50s, so their capabilities are likely to be invariant during the tenure as mayor or party secretary.[6] Moreover, most city officials have already had extensive work experiences at lower levels.[7] As a result, the party's organization department may already have a good amount of information about officials' capabilities. Hence, Martinez's (2009) result applies and this alludes to a moderating role of capability for opportunism. In the end, it is an empirical question whether more capable officials are more or less opportunistic than less capable ones. To our best knowledge, this study provides the first empirical test for the question whether capability mitigates or increases officials' opportunism.

Our paper is related to a large literature of empirical research on the PBC effects driven by opportunistic activities. Cross-country studies on the political business cycle agree on that pre-electoral manipulation is more prevalent in the presence of weak institutions, while established democracies are more likely to witness expenditure composition changes in election years (Block, 2002; Bove et al., 2016; Brender and Drazen, 2005, 2013; Shi and Svensson, 2006). For country studies, evidence of pre-electoral fiscal manipulations, such as budget increase, pork-barrel spending, or tax cut, are documented in the case of Brazil (Sakurai and Menezes-Filho, 2011), Colombia (Drazen and Eslava, 2010), Germany (Foremny and Riedel, 2014), India (Khemani, 2004), Portugal (Aidt et al., 2011), and Russia (Akhmedov and Zhuravskaya, 2004). Scholars also find that politicians manipulate banking sectors for electoral considerations (Carvalho, 2014; Micco et al., 2007). These researches mainly look at the quality of governance or the competitiveness of elections as a mediating mechanism of the PBC. Our paper introduces capability heterogeneity as a new channel of affecting PBC. One paper that is closer to our focus is perhaps Hanusch and Keefer (2014), who explore the heterogeneity in the age of political parties in affecting

[6]Reputation models often assume that change in an agent's capability over time is random and has zero mean. Martinez (2009) maintains this assumption.

[7]Most have served as county or district governor or party secretary, or the head of an administrative bureau in the city. Most have also served as vice mayor or vice party secretary in a city, and most party secretaries have served as mayor.

the PBC.

3 Identification Strategy

3.1 Measuring the PBC

We estimate the time profile of the PBC by a linear time trend of the economic growth rate within each cycle of the CPC's national congress. We define the variable PBC by

- $PBC =$ the current calendar year $-$ the calendar year of the immediate last National Party Congress

The variable takes values between 1 and 5, with a larger value meaning that the time moves closer to the next party congress.[8] Following the theoretical works on the PBC (Martinez, 2009; Rogoff, 1990), we expect that the variable PBC has a positive coefficient in the following regression.

$$y_{i(jt)} = \delta PBC + Z_{i(jt)}\beta + \psi_j + \epsilon_{i(jt)} \tag{1}$$

In the equation, $y_{i(jt)}$ is the growth rate of per capita GDP (in percentage) of city j during leader i's term in year t; $Z_{i(jt)}$ is a set of variables describing leader i's personal characteristics; ψ_j is the fixed effect of city j; $\epsilon_{i(jt)}$ is an i.i.d. error term; and δ and β are parameters to be estimated. A significant and positive δ indicates the existence of the PBC. Year fixed effects are not included in Equation (1) because they are collinear with PBC.

3.2 Measuring Capabilities

We first explain what we mean by capability. Capability can include many dimensions, such as an individual's inherent skills to gather and process information, make judgments, persuade people to follow, organize large endeavors, manage crises, and so on. None of these attributes is directly measurable, but it is possible to measure them indirectly by observing outcomes. In the Chinese context, the most salient outcome indicative of an official's capability is economic development, which is best summarized by the growth

[8] The national party congress is always held in October or November. So the fifth year of a cycle can be counted as a full year.

rate of GDP. This is true even when in reality government officials have to take up many tasks assigned by their superiors. The multi-task theorem developed by Holmstrom and Milgrom (1991) indicates that, when faced by multiple tasks, agents tend to put more efforts in the tasks that are the easily measurable. Economic growth is arguably the most easily measurable task and thus can serve as the best indicator for an official's capability. In addition, the growth measure is likely to reflect a bundle of other personal traits that the party superiors look for, such as visions and skills to form coherent policies, to attract and negotiate with potential investors, and to implement short and long-term plans. Therefore, officials' ability is measured in this paper mainly by the growth rates of per capita GDP in the cities during local leaders' tenure.

Using the growth rate to measure officials' capability, however, has to face the challenge of disentangling officials' contribution and the local conditions of the cities they have served. In addition, two major types of local leaders, the party secretary and the mayor, always work together at the any point in time. Following the recent empirical work of Yao and Zhang (2015), we adopt the simple assumption that the party secretary and the mayor make independent contributions to economic growth. To proceed, we study the following specification for the economic performance of an official i serving city j during year t.

$$y_{i(jt)} = Z_{i(jt)}\beta + \theta_i + \psi_j + \gamma_t + \epsilon_{i(jt)}, \tag{2}$$

Again, $y_{i(jt)}$ is the real growth rate of per capita GDP (in percentage) of city j in year t under official i's tenure, $Z_{i(jt)}$ is a set of controls of personal and city characteristics, and ψ_j is city j's fixed effect. In addition, θ_i is the fixed effect of official i (either a party secretary or a mayor); γ_t is the fixed effect of year t; and $\epsilon_{i(jt)}$ is the random disturbance for city j's growth in year t.

Following the labor economics literature using employer-employee matched data, the personal fixed effect $\hat{\theta}_i$ estimated from Equation (2) can be interpreted as a measure of official i's capability, the so-called "leader effect." The leader effect is the average contribution of an official to growth during his tenure as a city leader. Therefore, it may include his responses to the PBC. However, because the variable PBC is a linear combination of the year fixed effects, the average effects of the PBC are controlled in

equation (2). In Section 6.4, we perform a nested regression to estimate the time profiles of individual PBCs as well as the personal leader effects to study whether they are interwoven together.[9]

In the empirical estimation of Equation (2), we treat party secretaries and mayors equally. So in effect we are stacking together the data of two separate regressions for party secretaries and mayors. The main gain of stacking the data is that it substantially increases the size of the largest connected sample. The size of a connected sample is a convex function of the number of leaders moving between cities. If we estimate mayors and party secretaries separately, the number of officials who were moved between cities in each sample is about half the number of movers in the combined sample, but the size of each sample is reduced to less than one-half the size of the combined sample.[10]

In most cases around the world, politicians serve in only one locality for one type of political office. This renders a difficulty in estimating capability θ_i, because the leader effect θ_i and the city fixed effect ψ_j tend to share the same dimension of the data. In the case in which officials are transferred between two cities, however, we can estimate the relative leader effects of *all the officials* who have served in the two cities. The following heuristic example helps explain the intuition of the identification strategy.

Suppose there are two cities, A and B, and three officials, numbered 1, 2, and 3. Official 1 worked in both cities, Official 2 worked only in City A, and Official 3 worked only in City B. Net of the year fixed effects γ_t and other controls, the variations in local growth during each official's tenure are observed as:

- Official 1: $\omega_{1A} = \theta_1 + \psi_A$, $\omega_{1B} = \theta_1 + \psi_B$,
- Official 2: $\omega_{2A} = \theta_2 + \psi_A$,
- Official 3: $\omega_{3B} = \theta_3 + \psi_B$.

Subtracting ω_{2A} from ω_{1A}, we can obtain the differential of capability between Official 1 and Official 2, $\theta_{12} = \theta_1 - \theta_2$. To compare officials across the two cities, 2 and 3, we

[9]Note that there is no mechanical relationship between a leader's personal effect and his or her time profile of PBC. It is perfectly possible that a leader with a larger leader effect – a higher average growth rate in his career – has a flatter time profile than a leader with a smaller leader effect; and vice versa. So the nested regression is meaningful.

[10]Yao and Zhang (2015), working on the same sample, have tried a different approach to model the roles played by party secretaries and mayors, in addition to the stacking. In that approach, each type of officials is modeled by a separate equation and a system of equations is estimated to allow interactions between the two types of officials through the error terms of the two equations. The results are similar to those obtained in the stacking.

can first take the difference between the two parameters estimated for Official 1 to obtain the difference between the two cities' fixed effects: $\psi_A - \psi_B$. Substituting it into the difference between ω_{2A} and ω_{3B} obtains the differential of capability between Official 2 and Official 3, $\theta_{23} = \theta_2 - \theta_3$. Finally, adding up θ_{23} and θ_{12}, we get the differential of capability between Official 1 and Official 3, $\theta_{13} = \theta_1 - \theta_3$. Reiterating this process, we obtain a complete ordering for the capabilities of the three officials that are independent of the city fixed effects. In the estimation, we set the mean of leader effects to zero. So the capability we estimate for each official is his or her contribution to economic growth *relative to* the sample mean.

4 Data and Samples

The data set used here extends the one in Yao and Zhang (2015) by including more detailed information on the characteristics as well as the career paths of city leaders. The control variables include officials' sex, effective highest education,[11] number of cities served since the deputy positions at the city level, and membership in the provincial party standing committee. Information on the party secretaries and mayors was collected from the China Yearbook of Municipalities, provincial yearbooks, and reports from the media, especially the Internet. We match local leaders to annual macroeconomic data collected from provincial yearbooks by the following rules:

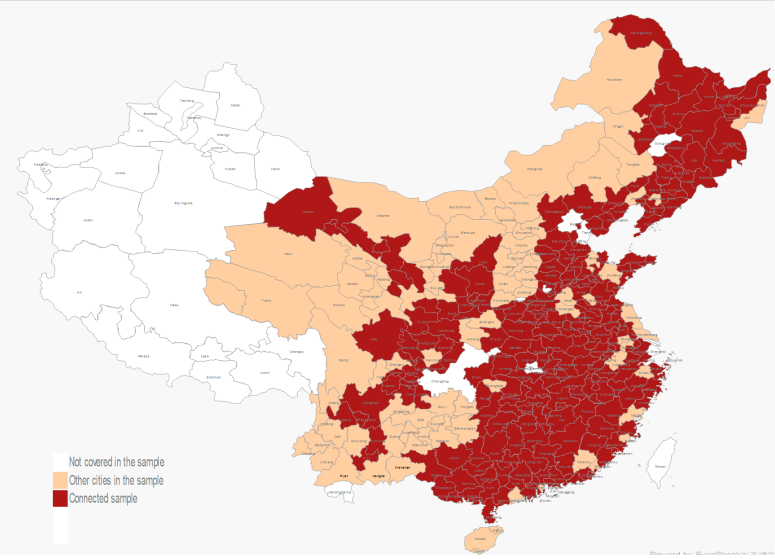
1. Each city–year observation is matched with one secretary and one mayor.
2. If one turnover occurred within a year, we take the leader who stayed for more than six months in that year.
3. If multiple turnovers occurred in a year and no leader stayed for more than six months, we take the leader with the longest stay in that year.

We have data that match officials with cities in 308 of the 333 qualified cities for the period from 1994 to 2011. For years before 2003, however, we do not have substantial biographical information for officials (including age, which is crucial for our study). For the purpose of estimating capabilities, we construct the largest connected sample using all cities from 1994 and 2011, altogether containing 221 cities and 1,600 officials regardless of whether they were transferred (subsequently, we will simply call this sample "the

[11] "Effective highest education" excludes degrees offered by party schools.

connected sample"). Figure 1 presents a map of the 308 sample cities covered by our study (lightly colored) and the 221 cities in the connected sample (heavily colored).

Figure 1: The full sample (308 cities) and the connected sample (221 cities)



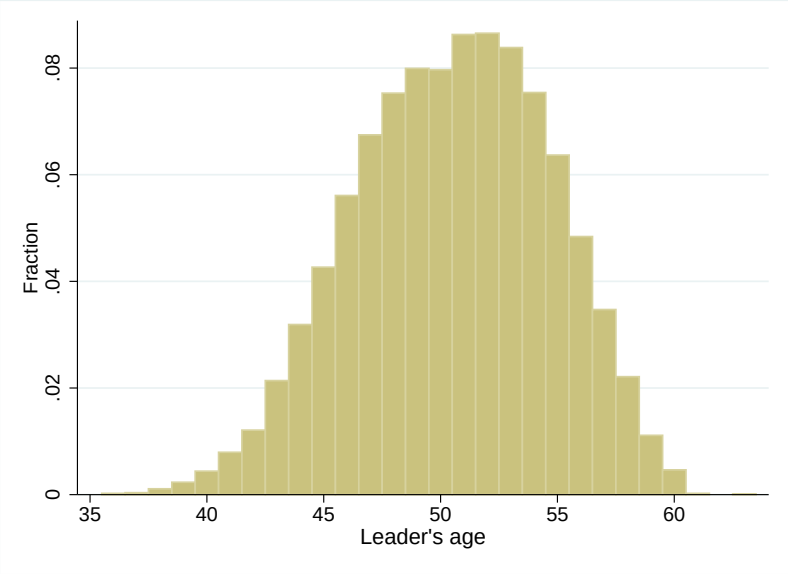
Notes: The light-colored region shows the sample for which we have city-official matched data from 1994 to 2011. The heavy-colored region shows the sample of cities that are "connected" by transferred officials between 1994 and 2011.

As a second step, we use a shorter sample covering all 308 sample cities for the period from 2003 to 2011, for which we have biographical information of local leaders. Subsequently, this sample will be called the "2003–11 sample."[12] From this sample we construct the "2003–11 connected sample," which includes all the 221 cities in the connected sample and the 1,329 officials who served only after 2003 in the connected sample. Table A1 in the appendix provides respective summary statistics for the connected sample, the 2003-11 sample, and the 2003-11 connected sample.

In Section 6.2, we account for the influence of city officials' age on their opportunism. As Figure 2 shows, the distribution of officials' age is quite dispersed in the sample. Most city officials were in their late 40s or early 50s. The age distribution has a mean of 50.5 and a median of 51, and the distribution is almost symmetric with respect to the median age. Except for only one leader who retired two months after his 60th birthday, all officials

[12] We choose 2003 as the staring year of analyzing opportunism, also because the CPC held its 16th National Party Congress in November 2002, and Hu Jintao became the general party secretary. That regime switch marked a new era in China's political arena, and we can focus on the political players at the city level throughout the Hu period, so we can avoid potential confounding impacts from the regime change at the central level.

Figure 2: Age distribution of officials



Notes: This figure presents a histogram of ages for all city officials in the full sample between 1994 and 2011.

retired at or before age 60, and fewer than 10 percent of the leaders were older than 55. On the lower end, the youngest leader was 36; those younger than 45 accounted for about 12 percent of the sample. Table A1 in the appendix provides a brief summary of key variables from different samples to be used for analysis.

5 Main Empirical Results

5.1 Estimating the PBC

Because officials' personal data, including their ages, are only available after 2003, Equation (1) can only be estimated with the 2003-2011 full sample. It is tempting to think that the leader effects, to be estimated from Equation (2), should be controlled when Equation (1) is estimated. However, the variable PBC is orthogonal to the estimated leader effects because PBC is defined on the calendar year and the estimated leader effects do not vary over time. So omitting the leader effects will not affect the estimate for PBC from the full sample.[13]

Table 1 presents the results. In Column (1), we study the average PBC effect, con-

[13]The orthogonality does not prohibit us from studying the PBC of officials with different levels of capability. The leader effect acts as if it were a "random treatment" that assigns officials into different treatment groups, which then may behave differently.

Table 1: Testing the PBC (the 2003–2011 full sample)

Dependent variable: growth in per capita GDP		
	(1)	(2)
PBC	0.352***	0.501***
	(0.112)	(0.120)
Age	-0.0120	0.0408
	(0.0322)	(0.0360)
Tenure	0.112*	0.026
	(0.059)	(0.065)
High School		0.267
		(4.870)
Community college		-0.143
		(4.924)
Four-year college		0.386
		(4.915)
Master		0.169
		(4.928)
Ph.D.		0.0791
		(5.147)
Provincial Standing Committee Member		0.113
		(0.283)
Female		0.325
		(0.876)
# of cities served		0.0332
		(0.151)
Log Initial GDP per capita		0.0332
		(0.151)
Log total population		-14.51*
		(7.831)
GDP deflator		-21.31***
		(4.647)
Constant	11.75***	93.41**
	(1.568)	(44.54)
City FE	Yes	Yes
Observations	5,497	5,311
R-squared	0.180	0.193

Notes: The sample covers 308 sample cities and 1329 officials for the period from 2003 to 2011. Within-city standard errors reported in parentheses are clustered at the city level. * Significant at 10%, ** 5%, *** 1%.

trolling for the age and tenure of officials. As discussed in Section 2, local officials face a binding retirement age limit. Hence, their promotion incentive and efforts are likely to differ at various ages. The tenure of an official in a specific jurisdiction may be correlated with growth for a number of reasons. First, officials may be able to acquire political skills and improve governing capability over time in a "learning-by-doing" process. This channel leads to a positive correlation between tenure and growth. Second, it is possible that some officials tend to have shorter tenure in each jurisdiction he or she serves because they are forerunners in the horse race to upper level positions. If these officials are genuinely high-capability type, the correlation between tenure and growth should be negative.

Because the dependent variable is the growth rate measured in percentage points, the coefficient of PBC is interpreted as the extra increase in growth rate when time moves one year closer to the next party congress. The coefficient for PBC in Column (1) indicates that the annual growth rate is increased by 0.352 percentage points for each year closer to the next party congress. This is a modest effect compared with the average annual growth rate registered for the study period, which was 12.4%. At the same time, officials' age *per se* does not seem to have a significant effect on growth. Tenure is positively associated with growth, attesting to our argument that bureaucratic transfers are not systematically correlated with capabilities.

One potential rejection for the result, though, is that the PBC measured here reflects the business cycles rather than fluctuations caused by political turnovers. The period covered by Equation (1) includes a complete booming cycle from 2003 to 2010 during which one party congress was held (in 2007). It is then possible that the PBC effect found out in Table 1 only picks up accelerated growth in this booming cycle. To obtain a more robust result, we expand the sample to the whole sample period 1994-2011 and rerun the regression in Column 1.[14] Notably, this period includes a recession period 1998-2002, which was also a period between two party congresses (held in 1997 and 2002, respectively). The coefficient for PBC is still significant at 5% significant level and its magnitude is 0.362, not much different from the coefficient shown in Column 1. Therefore, the PBC effect found here is unlikely to be due to a booming cycle of the Chinese economy.

Column (2) of Table 1 additionally includes a set of variables to control personal and city characteristics. None of the personal characteristics is significant whereas a larger

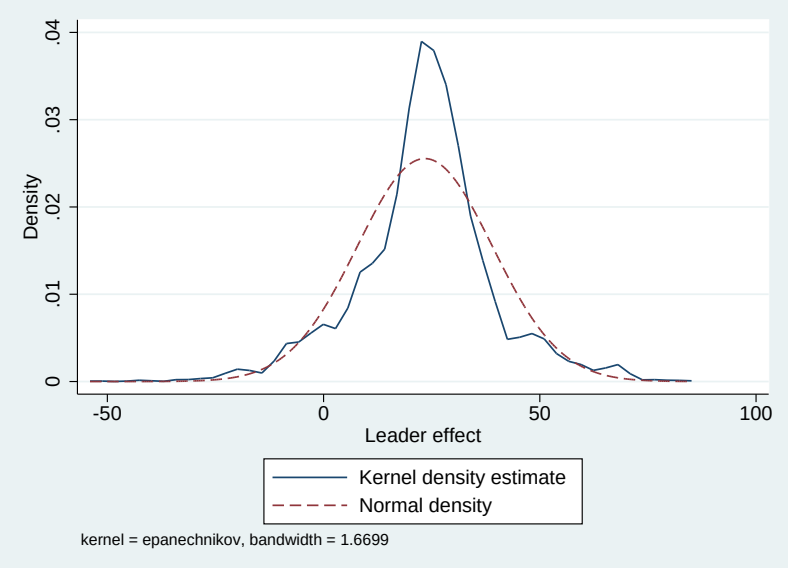
[14]Because the regression does not include any control variables, we can run it on the whole sample from 1994 to 2011. To save space, we do not report the regression results in Table 1.

city and a city with higher inflation rates tend to grow more slowly. The PBC is shown to become stronger — the growth rate increases by 0.5 percentage points when time moves one year closer to the next party congress. Comparing this result with the result shown by Column 1, it is evident that the omitted personal and city characteristics tend to be negatively correlated with growth. Hence, the PBC are moderated by personal and city characteristics.

5.2 Interaction between capability and PBC

We estimate the leader effects (capabilities) based on Equation (2) using the 1994-2011 connected sample. Figure 3 shows the kernel density of the estimated leader effects and compares it with the normal distribution. The kernel density function has a positive mode and is more compact than the normal distribution.

Figure 3: The kernel density of estimated leader effects ($\hat{\theta}_i$)



Notes: Leader effects are estimated according to Equation (2), based on 221 cities and 1,600 officials in the 1994-2011 connected sample. Control variables include log initial GDP per capita at city level, log city population, the inflation rate, the city and year fixed effects.

With the estimated leader effects, we explore heterogeneous responses to the PBC among officials due to different capabilities. We use the 2003-11 connected sample because both leader effects and officials' personal information, particularly age, are needed. We first replicate Column (2) in Table 1 by adding an interaction term between each covariate

and $\widehat{\theta}_i$. This is a continuous version of the regressions run on capability quarters that we will present next. The interaction term between PBC and $\widehat{\theta}_i$ yields a coefficient of -0.012, which is significant at the 10% significance level. That is, a more capable official is less opportunistic. This effect is economically meaningful. For one standard deviation of $\widehat{\theta}_i$, the PBC effect is reduced by 0.16 percentage points. To highlight the result, we divide the sample of officials in the 2003-11 connected sample into four equal-sized groups according to $\widehat{\theta}_i$, and separately estimate Equation (1) for the four groups to obtain their respective PBC effects.[15] Table 2 presents the results obtained by replicating Column 2 in Table 1.

Table 2: Heterogeneous responses to the PBC by capability

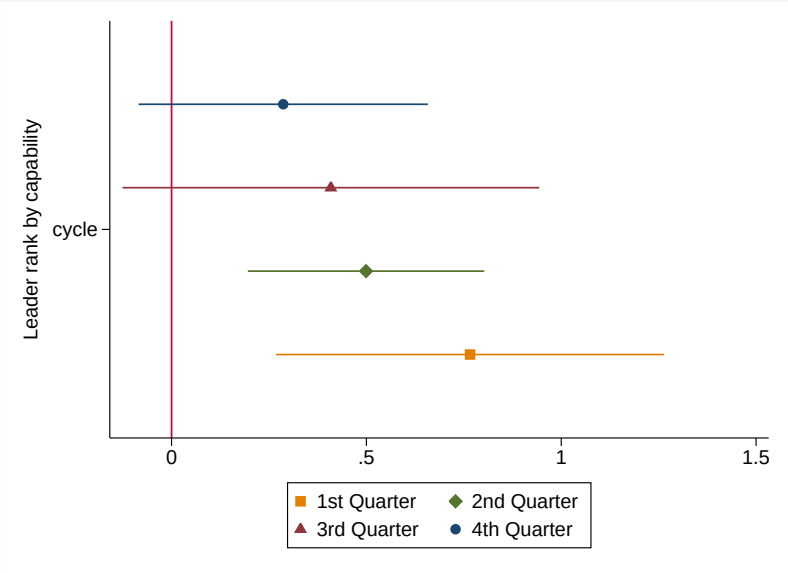
Dependent variable: growth in per capita GDP				
	(1) 1st quarter	(2) 2nd quarter	(3) 3rd quarter	(4) 4th quarter
PBC	0.761***	0.496***	0.409	0.280
	(0.250)	(0.153)	(0.270)	(0.187)
Age	0.173*	0.00980	0.0754	-0.0146
	(0.0878)	(0.0701)	(0.0715)	(0.0714)
Tenure	0.085	-0.128	-0.052	0.134
	(0.154)	(0.152)	(0.103)	(0.142)
Constant	221.1**	136.4***	331.3*	-137.3***
	(93.84)	(51.49)	(172.5)	(45.46)
Controls	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes
Observations	939	962	964	945
R-squared	0.213	0.438	0.298	0.386

Notes: The sample covers 219 connected cities and 964 officials between 2003 and 2011. The unreported control variables are the same as in Column (2) of Table 1: High School, Community college, Four-year college, Master, Ph.D, Provincial Standing Committee Members, Female, # of cities served, Log Initial GDP per capita, Log total population, and GDP deflator. Within-city standard errors reported in parentheses are clustered at the city level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

In Table 2, higher-order quarters present local leaders with higher levels of capability. Positive PBC exists for city leaders in all the four quarters, but its magnitude declines from lower quarters to higher quarters. Moreover, the PBC is only significant for leaders in the two least capable quarters. Figure 4 provides a graphical representation of the

[15] Because tenure varies among leaders, the number of observations in the four groups does not equal.

Figure 4: PBC by capability quarters (growth in GDP)



Notes: The graph is obtained based on the results reported in Table 2.

results. Clearly, capability mitigates political opportunism. The finding lends supports to the reputation models (such as Martinez (2009)) and against the signaling models (such as Rogoff (1990)). One of the key differences between the reputation models and the signaling models is that the former assumes that the principal has some knowledge about the agent's initial reputation, whereas the latter assumes that the principal does not. In the Chinese case, the CPC's organization department in provinces probably already has a good knowledge about city officials' capabilities before they are considered for promotion. Thus, the GDP competition among city leaders reveals only incremental information about officials' capabilities and enables provincial organization departments to have a better judgment. This is probably why our results support the reputation models. It awaits further studies to assess the situation in other countries.

6 Robustness Checks

6.1 PBC by Fiscal Expenditure

Local officials have various policy tools to stimulate growth. The recent literature on the PBC also found cyclical expansions in fiscal expenditure (Bove et al., 2016). The findings of significant PBC effects on growth contrast the studies on the PBC in democracies

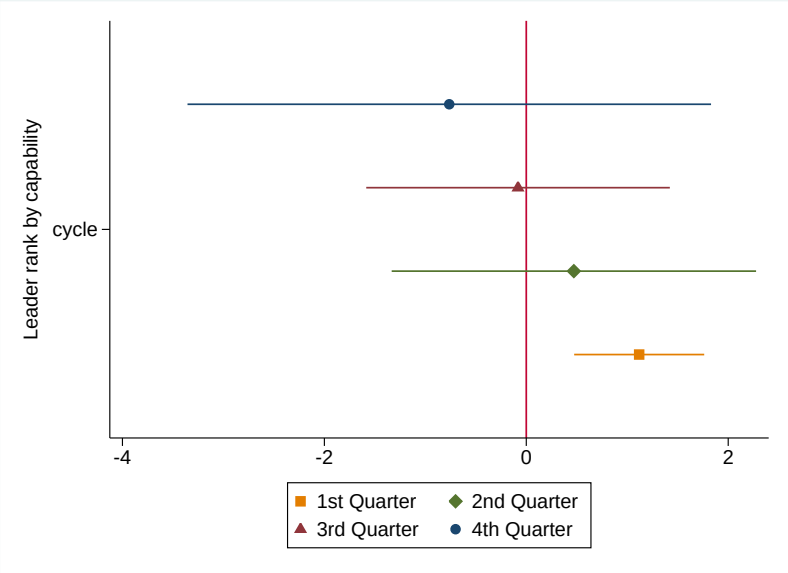
(Drazen, 2001). The results established by the benchmark regressions can be explained by the salience of tournament on GDP growth in China's political selection, particularly in the years close to the CPC's national congress. Because the promotion criteria are centered on growth, officials do not need to engage in welfare and redistribution to please citizens. Instead, they may expand fiscal expenditure on productive activities to boost growth. Hence, fiscal expansion and growth are unified.

Following this line of reasoning, we study the PBC effect as manifested by fiscal expenditure. Fiscal expenditure is defined as *general budget expenditure* in each city, and the information is obtained from the *Materials of Fiscal Statistics for Prefectures, Cities, and Counties*. We substitute the growth rate of per capita GDP with that of fiscal expenditure, and repeat the two regressions presented by Table 1. The coefficients for PBC are, respectively, 0.165 and 0.108 in the two regressions. Neither is statistically significant. To save space, we do not report the full results here.

There are a couple of reasons why we do not find such strong PBC effects in fiscal expenditure as in the case of GDP growth. First, fiscal expenditure is arguably less salient than GDP growth in the performance evaluation for local officials. Although fiscal performance may eventually matter for the promotion of local officials by contributing to economic growth, officials often resort to other more direct approaches, such as fueling the real estate market, which does not have direct fiscal implications, to boost GDP growth. Also, the measure of fiscal expenditure we adopt only includes general budget expenditure, but not items of extra-budgetary spending, which can be as large as the general budget in some cities. Thus, the general budget expenditure may be only imperfectly correlated with local officials' efforts. The pity is that the precise data of extra-budgetary spending are not as widely available as the GDP data, so we have to rest with an imperfect measure of fiscal spending.

However, we do find differences among officials of different levels of capability when general fiscal spending is concerned with. We replicate the four regressions for the PBC effects reported by Table 2, using general fiscal expenditure as the dependent variable. Instead of presenting all the results in a table, we present the key results in Figure 5. It is evident that the estimated coefficients of the PBC effect in fiscal spending decrease with the capability of local officials. Moreover, only the least-capable quarter of officials appear to have a positive and significant slope for the PBC in spending, the responses of more capable groups are not statistically different from zero. These findings lend further

Figure 5: PBC by capability quarters (growth in fiscal spending)



Notes: The graph is based on the estimations of the PBC effects using the same specification as in Table 2 and fiscal spending as the dependent variable. The sample covers 219 cities and 964 officials for the period between 2003 and 2011.

supports to the premise that capability moderates opportunism as manifested by the PBC.

An alternative explanation for the discrepancy between high and low capability groups on fiscal expansion is that more capable officials may have better skills, hence they can boost growth less expensively — say, by stimulating more private investments instead of increasing public expenditures. While this may be the case for local officials, it does not invalidate the interpretation that more capable ones are less opportunistic. Note that the dependent variable producing Figure 6 is the growth rate of fiscal spending relative to the spending in the previous year. Hence, the difference in the scale of fiscal spending among individual officials is controlled. As a robustness check, we use the ratio of fiscal spending to GDP as an alternative dependent variable to capture the PBC effect as in Table (2). We obtained similar results. The PBC effect on the ratio of fiscal spending to GDP is positive and significant only for the group of lowest capability, but insignificant for the other more capable officials. The results are relegated to Table A2 in the appendix.

6.2 The Role of Age Limits

As discussed in Section 2, age is a critical condition for promotion. City officials over 57 in principle cannot get promoted. This may create two effects. First, age has an independent and nonlinear effect on officials' incentive. Before reaching 57, officials may increasingly exert efforts as they become older and the time window of promotion becomes shorter. After turning 57, their incentive to work hard declines because chances of promotion become very small for them. Second, age may also confound the PBC. In particular, the PBC may only exist for officials of 57 or younger and lose its bite for officials whose age is over 57. To account for these two effects, we divide the sample into two groups, one containing officials of 57 or younger and the other containing officials who are older than 57. They are labeled Group A (age ≤ 57) and Group B (age > 57). For the independent and nonlinear role of age, we also define

- $DAGE = |57 - age|$

The nonlinearity of age's role is captured by two interaction terms added to Equation (1): $DAGE \times GroupA(age \leq 57)$ and $DAGE \times GroupB(age > 57)$. If our conjecture is correct, the coefficient of the first interaction term should be significantly negative and the coefficient of the second interaction term should be insignificant. To capture the age's confounding effects on the PBC, we create two more interaction terms: $PBC \times GroupA$ $(age \leq 57)$ and $PBC \times GroupB$ $(age > 57)$, and add them to Equation (1). We expect that the coefficient of the first interaction term is significantly positive, and the coefficient of the second interaction term should not be significant. Table 3 presents the estimates of the PBC effects in GDP growth with the age variables.

Table 3 extends Column 2 of Table 1 to consider the above effects of age limits. Column 1 reports the estimates when the independent effects of age are considered. The coefficient of PBC is virtually unchanged compared with that reported by Column 2 of Table 1. The coefficient of $DAGE \times GroupA(age \leq 57)$ is indeed negative and statistically significant, and the coefficient of $DAGE \times GroupB(age > 57)$ is negative, but statistically insignificant, both consistent with our expectation. Note that the age effect for officials in Group A is relatively small. According to the estimate in Column 1, an official of age 57 (the oldest who is possible to get promotion) produces a growth rate 1.4 percentage points higher than does the youngest official, who was 36 in our sample. This seems to be a small effect as it is only equivalent to about 2.6 years on the time profile of the PBC.

Table 3: The Effects of Age Limits

Dependent variable: annual growth of per capita GDP		
	(1)	(2)
PBC	0.501***	
	(0.120)	
DAGE× Group A (age≤57)	-0.0634**	
	(0.0278)	
DAGE× Group B (age>57)	-0.0428	
	(0.0328)	
PBC × Group A (age≤57)		0.520***
		(0.123)
PBC × Group B (age>57)		0.243
		(0.283)
Group B (age>57)		1.043
		(0.942)
Provincial standing committee member	0.117	0.125
	(0.282)	(0.283)
City F.E. (ψ_j)	Y	Y
Observations	3,810	3,829
R-squared	0.791	0.791

Notes: The regressions are estimated on Equation (1) based on the full 2003-11 sample with 308 cities. The unreported control variables are the same as in Column (2) of Table 1: High School, Community college, Four-year college, Master, Ph.D, Female, # of cities served, Log Initial GDP per capita, Log total population, and GDP deflator. Within-city standard errors clustered at cities are in the parentheses. *** $p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Column 2 presents the confounding effects of age on the PBC. In addition to the two interaction terms defined above, we control for whether the official belongs to the *Group B*. As the result shows, the standing-alone age group dummy *Group B* is statistically insignificant, indicating that the incentive effect due to age *per se* is relatively weak. But the two groups of officials do show different rates of response to the PBC. For the group of officials of 57 or younger, one year closer to the CPC's next national congress increases their growth rate by 0.52 percentage points, very close to the benchmark result. However, promotion incentives do not produce significant PBCs for officials who are over 57, which is understandable because those officials were normally ineligible for promotions. Therefore, we conclude that the PBC only exists for officials of 57 or younger. This is a strong piece of evidence supporting that the PBC we have measured is not an artifact of business cycles because the latter should have equal impacts on the older as well as the younger officials.

This assessment is reinforced by the results of Table 4 which replicates Table 2 for the younger group and the older group of officials, respectively. For the younger group, capability impacts on PBCs in the same pattern as it was shown by Table 2. However, the four quarters of the older group are undistinguishable in terms of their PBCs. None of them reveals a significant PBC. Capability makes a difference only when promotion is at stake, and loses its bite when promotion is no longer a concern. This lends a strong support to our main hypothesis that capability mitigates opportunism when promotion incentives are present.

6.3 Political Connections

A concern may arise that political connections help an official's economic performance. Given previous findings in the literature about the importance of political connections in determining the promotion of provincial leaders (Jia et al., 2015; Jiang and Zhang, 2015; Shih et al., 2012), it is a legitimate question how the omission of political connections can bias our results on the relationship between capability categories and the PBC.

There may be two kinds of biases due to political connections. First, to the extent that political connections help an official obtain higher growth rates, the estimate for that official's capability is biased upward. Second, a well-connected officials may be either less or more responsive to the PBC depending on his judgment of the strength of his connections. The case that he or she is more responsive will only reinforce our main result

Table 4: Heterogenous Effects of Age Limits by Capability

Dependent variable: growth in per capita GDP				
	(1) 1st quarter	(2) 2nd quarter	(3) 3rd quarter	(4) 4th quarter
PBC * Group A (age<57)	0.834***	0.494***	0.427	0.303*
	(0.259)	(0.152)	(0.276)	(0.182)
PBC * Group B (age≥57)	0.705	0.700	0.00635	-0.952
	(0.713)	(0.768)	(0.461)	(1.403)
Group B (age≥57)	0.312	-0.888	2.767	4.772
	(1.996)	(1.958)	(1.965)	(3.749)
Constant	222.0**	137.5**	333.5*	-134.0***
	(97.27)	(52.93)	(171.6)	(45.39)
Controls	Y	Y	Y	Y
City FE	Y	Y	Y	Y
Observations	947	965	968	949
R-squared	0.205	0.437	0.301	0.386

Notes: The sample covers 219 connected cities and 964 officials between 2003 and 2011. The unreported control variables are the same as in Column (2) of Table 1: High School, Community college, Four-year college, Master, Ph.D, Provincial Standing Committee Member, Female, # of cities served, Log Initial GDP per capita, Log total population, and GDP deflator. Within-city standard errors reported in parentheses are clustered at the city level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

because we have found that more capable leaders — who are supposedly better connected — are less opportunistic. The case that better-connected officials are less responsive, however, will create a problem for us because our finding that less capable leaders are more opportunistic may only reflects the fact that these leaders have less political connections.[16] Realizing these complexities, we try to control political connections in two ways. In this subsection we introduce a measure of political connections into Equation (2) to obtain more accurate estimates of the leader effects. In the next subsection, we nest the estimation of the PBC and the leader effects in one equation, so we can examine the relationship of PBC and capability at the individual level.

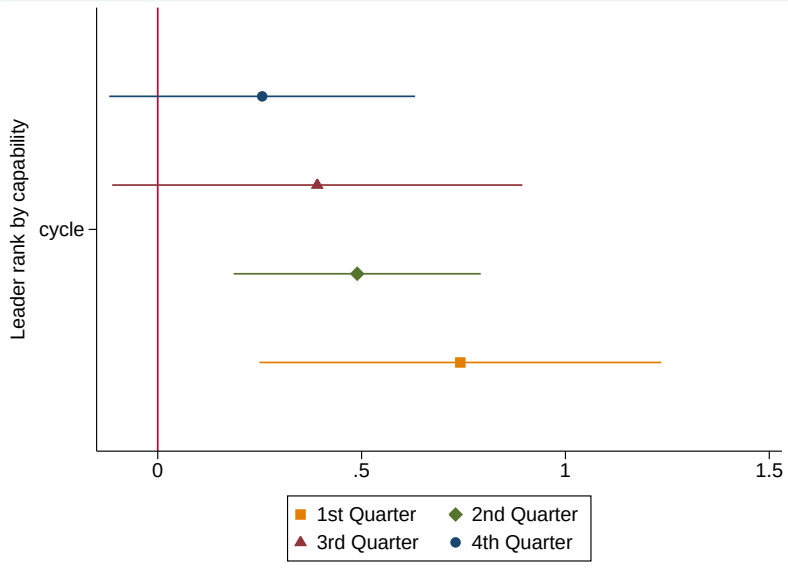
We deal with political connections by controlling for individual-specific shocks due to the turnover of provincial party secretaries. The most important connection a city official relies on is the one with the provincial party secretary, who has a large say on the promotion and appointment of city officials. Thus, it is natural to believe that a city official should be better connected to the provincial party secretary who was an incumbent at the time when that city official was first appointed to this position. When the provincial secretary leaves the office, being either retired or moved to another position outside the province, such connections tend to vanish. Thus, we construct a dummy variable CP_{ijt}, which takes value 1 for the years when the provincial party secretary who appointed leader i was in office, to capture the growth effect of political connections.[17] Controlling for CP_{ijt} in estimating Equation (2), we obtain a set of new estimates for individual capabilities net of the effect of political connection.

We then replicate the regressions in Tables 2 with the new estimates of leader effects. The results are qualitatively identical to the previous results. To save space, we do not report them here. Instead, we only present the heterogeneous PBC effects of the four quarters of officials in Figure 6. The pattern shown in Figure 6 is largely in line with the pattern shown by Figure 4. The results give us prudent confidence that the main conclusion that capability moderates officials' opportunistic behaviors holds even when the influence of political connections is taken into account.

[16] We owe a referee to point out this to us.

[17] In the literature (e.g., Jia et al. (2015)), a commonly used measure for political connections is built on the common hometown, alumi, and colleagueship shared by lower-level officials and their superiors. Although this definition has its merits, it is currently infeasible for city officials because of the lack of data, particularly for a large data set that stretches back to the 1990s.

Figure 6: PBC by capability quarters (accounting for political connections)



Notes: The data are drawn from the regressions reported in columns 1–4 in Table 2, with capability estimated with the additional control of CP_{ijt}.

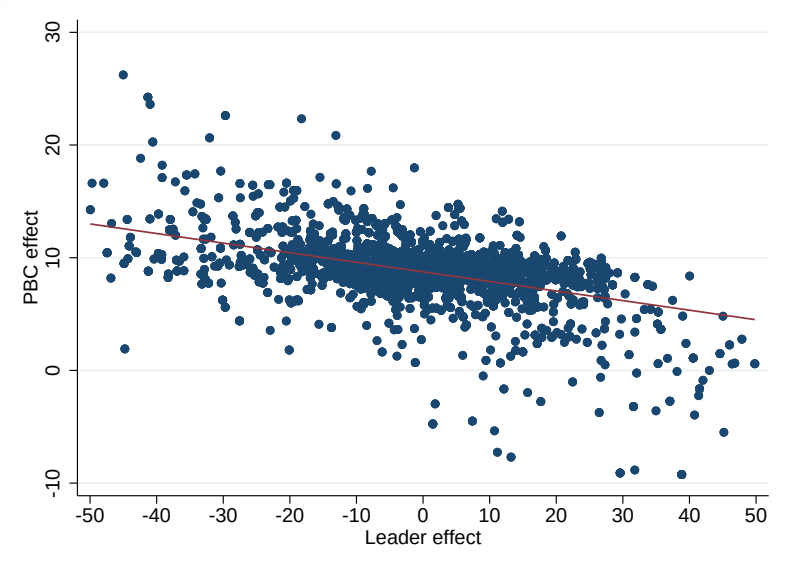
6.4 A Nested Estimation

We have shown that the PBC effects are more moderate for high-capability quarters. It is likely that the heterogenous responses to the PBC stem from a more general regularity of negative relationship between capability and the PBC effect, as we indicated earlier. To further check the robustness of our main findings, we present the results of a nested estimation in this subsection. We use the 1994-2011 connected sample to estimate the leader effects and officials' heterogeneous responses to the PBC together. In the meantime, we also control officials' political connections. Because each official stayed in the sample for several years, it is possible to estimate a time profile of the PBC for each official. However, the estimates may contain noises because the average tenure of the officials is short. In addition, we are unable to take care of the age effects in the nested estimation, because there are not enough data for officials' age before 2003. Because we do not find that age has a strong and independent effect on growth, our omission of age may not be very problematic.

Our nested estimation takes up a revised version of Equation (2):

$$y_{i(jt)} = Z_{i(jt)}\beta + (\theta_i + \phi_i PBC) + \tau CP_{ijt} + \psi_j + \gamma_t + \epsilon_{i(jt)}. \tag{3}$$

Figure 7: Capability and the rate of response to political cycles



Notes: The estimation is based on the connected sample for the period between 1994 and 2011. Control variables include log initial GDP per capita at the city level, log city population, and the inflation rate. The horizontal axis is $\hat{\theta}_i$ estimated from Equation (3) for each official i, the vertical axis is the estimated $\hat{\phi}_i$ from Equation (3). The coefficient obtained from regressing $\hat{\phi}_i$ on $\hat{\theta}_i$ is -0.138 ($p = 0.000$, $R^2 = 0.454$).

In this equation, we allow leaders to have their own rates of response to political cycles, which are measured by the ϕ_i's. The θ_i's are now the leader effects net of leaders' responses to political cycles, so they are closer to leaders' true capability. The correlation between ϕ_i and θ_i informs us about whether capability mitigates the PBC. The estimate of τ is 0.681, and the p-value is 0.151. That is, political connections do somewhat help an official's performance, but the effect is not statistically significant.

We plot in Figure 7 the estimates of ϕ_i and θ_i for each individual official obtained from Equation (3) to validate the negative correlation between capability and the PBC. The estimates of ϕ_i are quite dispersed and some of them have quite large magnitudes. This is created by the short tenure that officials had. As a result, the findings of this subsection are more indicative than definitive. Nevertheless, the estimated result suggests that leaders' short term responses to the PBC and their personal effects are negatively correlated, as Figure 7 shows. This reinforces the previous result that capability mitigates opportunism.

6.5 Issues Concerning the Estimates of Leader Effects

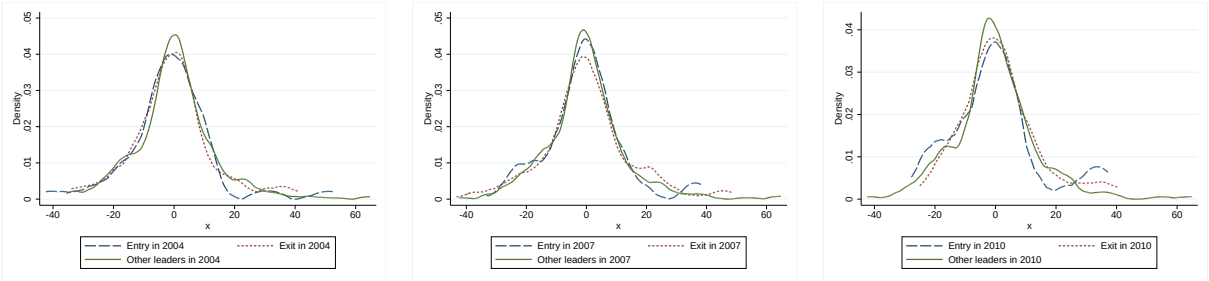
Our empirical work depends on the accuracy of our estimates of the leader effects. Those estimates may be compromised if entry and attrition are not random. Nonrandom entry and attrition have been studied in the literature on employer-employee matched data. In Abowd et al. (1999), labor force mobility is assumed as exogenous. It was not until recently that researchers started to address the issue in this strand of the literature. Although Abowd et al. (2010) propose two new tests for the validity of the assumption of exogenous mobility, the actual magnitude of the bias is not yet known, and the correction algorithm is still under development.

Entry into our sample may be nonrandom because city officials are selected from lower levels of the government by the officials' qualifications. Attrition involves three types of exit: retirement, moving to other jurisdictions or cities that are not covered by our sample, and promotion. To see whether entry and attrition affect our sample composition, we test whether the distributions of the estimated leader effects of newly appointed officials and leaving officials are significantly different from the distribution of the leader effects of the other officials in the sample. Because our analysis has mostly relied on the 2003–2011 connected sample, our test also focuses on this sample.

Figure 8 compares the distributions of three types of officials, newly appointed (dashed

line), leaving (dotted line), and others (solid line) in three years, 2004, 2007, and 2010.[18] It is clear that the three distributions are quite similar to each other and all are close to the normal distribution. We then conduct pair-wise t-tests between the means and standard errors of the three distributions for each year, and do not find any significant difference in any case. Therefore, it is safe to conclude that entry and attribution do not affect the composition of our sample.

Figure 8: Distribution of capabilities: Entries, exits, and the rest of the sample



Note: The figure shows the kernel density estimation of capabilities for all officials who newly entered the sample, permanently exited from the sample, and others in a given year. The three panels respectively plot the distributions for 2004, 2007, and 2010.

7 Conclusion

In this paper, we investigate the pattern of political business cycles in China at the prefecture level and study how capability of city leaders affects the PBC effects. The contributions of the paper are two-fold. First, in contrast to the previous literature on the PBC, our analysis documents a novel finding that the heterogeneity in capability gives rise to large variations in the PBC effects at the individual level. Due to the reason that city leaders in China are frequently transferred among different jurisdictions and they face the same yardstick criteria in competition for promotion, it renders a meaningful exercise to identify officials' personal contributions to local economic growth and empirically examine how capabilities affect the PBC. Secondly, we find that officials do respond to political cycles opportunistically, but at the same time, opportunism is nuanced by capability. More capable officials are less responsive to political cycles. Age also matters, but only to the extent that it manifests the officials' cumulative responses to political cycles. These

[18] We pick these three years randomly. The distributions in the other years are just similar.

results enrich the existing literature on the PBC that emphasizes the role of high-quality institutions to reduce the cost engendered by opportunistic behaviors of political agents.

The second contribution is of particular interest for China, a transition society featured with relatively weak institutional environment. If our interpretation of the PBC effect is correct, an important solution to contain political opportunism, in substitution for reform on formal institutions, should be to focus on personnel selection and assure that more capable and less opportunistic officials are appointed and promoted at a higher rate. Extending the implication to a broader context of developing countries, where a holistic improvement of political institutions is often beyond reach, the finding of the mitigation role of capability for opportunism would suggest that enhancing the selection mechanism is as important as, if not more important than, constraining officials who have already taken office.

Finally, we are aware that the discussion in this paper is narrowly focused on the capability for boosting growth. Thus, the empirical findings on the mitigating role of capabilities do not readily travel to the broader literature on political meritocracy (Bell, 2015). Economic growth has been the first and foremost policy issue for performance evaluation during the past several decades in China. This political-economic context warrants a credible strategy of estimating capabilities based on GDP growth. In reality, officials' governing capability is often multifaceted, and the exclusive focus on growth as the basis of performance evaluation and promotion may further aggravate political opportunism and engender large social welfare loss. Mounting problems on workplace safety, environmental degradation, and food safety in the recent years show the detrimental effects of political opportunism. A policy implication of this paper is probably to digress from using economic growth as the primary criteria of performance evaluation, and to assign more weights to policy issues related to sustainable development, such as environmental protection, poverty alleviation and the reduction of bureaucratic red taps. Recent administrative reforms by the Chinese government seem to move toward these directions.

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Table A1: Summary of key variables in different samples

	1994-2011 sample	1994-2011 connected sample	2003-2011 sample	2003-2011 connected sample
No. of observations	10425	7196	5497	3930
No. of cities	314	221	308	219
No. of officials	2294	1600	1352	964
GDP growth rate	11.22 (13.48)	10.89 (8.64)	12.46 (8.73)	12.26 (8.21)
PBC	3.10 (1.39)	2.99 (1.35)	2.78 (1.31)	2.78 (1.31)
Age	NA	NA	50.81 (3.99)	50.85 (4.08)
Provincial standing committee member	NA	NA	0.07 (0.26)	0.08 (0.27)
Female	NA	NA	0.03 (0.19)	0.03 (0.20)
No. of cities each official served	NA	NA	1.68 (0.78)	1.71 (0.79)

Note: 1. Standard deviations are in the parentheses. 2. Due to considerable problems of missing biographic information for officials before 2002, we only report the summary statistics of these information for the 2003-2011 sample.

Table A2: Heterogeneous responses to the PBC by capability

Dependent variable: Ratio of fiscal spending to GDP				
	(1) 1st quarter	(2) 2nd quarter	(3) 3rd quarter	(4) 4th quarter
PBC	0.0016***	0.0010	-0.0016	0.0007
	(0.0006)	(0.0010)	(0.0028)	(0.0011)
Age	0.0013**	0.0019***	0.0011***	0.0003
	(0.0005)	(0.0007)	(0.0004)	(0.0007)
Tenure	-0.0016**	-0.0007	-0.0015	-0.0005
	(0.0007)	(0.0009)	(0.0012)	(0.0011)
Constant	-2.082***	-1.129**	-3.039**	-1.417
	(0.459)	(0.536)	(1.265)	(0.853)
Controls	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes
Observations	939	962	964	945
R-squared	0.213	0.438	0.298	0.386

Notes: The sample covers 219 connected cities and 964 officials between 2003 and 2011. The unreported control variables are the same as in Column (2) of Table 1: High School, Community college, Four-year college, Master, Ph.D, Provincial Standing Committee Member, Female, # of cities served, Log Initial GDP per capita, Log total population, and GDP deflator. Within-city standard errors reported in parentheses are clustered at the city level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A3: Heterogeneous responses to the PBC by capability

Dependent variable: Growth of fiscal spending				
	(1) 1st quarter	(2) 2nd quarter	(3) 3rd quarter	(4) 4th quarter
PBC	1.118***	0.471	-0.0817	-0.763
	(0.323)	(0.909)	(0.758)	(1.302)
Age	0.0538	-0.263	0.221	0.0289
	(0.113)	(0.228)	(0.183)	(0.158)
Tenure	0.236	0.412	-0.0963	-0.120
	(0.196)	(0.530)	(0.198)	(0.450)
Constant	-2.082***	-1.129**	-3.039**	-1.417
	(0.459)	(0.536)	(1.265)	(0.853)
Controls	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes
Observations	939	962	964	945
R-squared	0.213	0.438	0.298	0.386

Notes: This table presents the empirical estimates for producing Figure 5. The sample covers 219 connected cities and 964 officials between 2003 and 2011. The unreported control variables are the same as in Column (2) of Table 1: High School, Community college, Four-year college, Master, Ph.D, Provincial Standing Committee Member, Female, # of cities served, Log Initial GDP per capita, Log total population, and GDP deflator. Within-city standard errors reported in parentheses are clustered at the city level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A4: Heterogeneous responses to the PBC by capability

Dependent variable: Growth in per capita GDP				
	(1) 1st quarter	(2) 2nd quarter	(3) 3rd quarter	(4) 4th quarter
PBC	0.742***	0.489***	0.391	0.256
	(0.248)	(0.153)	(0.254)	(0.189)
Age	0.139*	-0.000632	0.0551	-0.0495
	(0.0803)	(0.0707)	(0.0774)	(0.0708)
Tenure	-0.0236	-0.167	-0.0945	0.0505
	(0.186)	(0.181)	(0.120)	(0.146)
Constant	-2.082***	-1.129**	-3.039**	-1.417
	(0.459)	(0.536)	(1.265)	(0.853)
Controls	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes
Observations	939	962	964	945
R-squared	0.213	0.438	0.298	0.386

Notes: This table presents the empirical estimates for producing Figure 6. The sample covers 219 connected cities and 964 officials between 2003 and 2011. The unreported control variables are the same as in Column (2) of Table 1: High School, Community college, Four-year college, Master, Ph.D, Provincial Standing Committee Member, Female, # of cities served, Log Initial GDP per capita, Log total population, and GDP deflator. Within-city standard errors reported in parentheses are clustered at the city level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$