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# Electoral incentive dynamics, leaders' capability, and economic performance: New evidence of national executives

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## Abstract

In this paper, I provide the first cross-country empirical analysis to establish three stylized facts on electoral incentive dynamics, national leaders' capability, and economic performance, using a novel data set of national leaders' personal and tenure characteristics and countries' institutional features: (1) In democracies with (exogenous) term limits, the positive association between leaders' performance and their capability is significantly less pronounced in their last term, when they do not have any re-election incentives; (2) In democracies with term limits, the positive association between leaders' performance and their capability is decreasing over time on average in their entire tenure, but exhibits a jump in the term right before the last term; and (3) The above patterns are more salient in presidential democracies with binding term limits than parliamentary democracies while non-existent in non-democracies where leaders are not appointed via elections. These facts are consistent with a theoretical model of the dynamic decision-making of a politician with re-election concerns.

*JEL Classification: D72, O11, O43, P16, P51*

*Keywords: leader; institution; economic performance; election and re-election incentives; electoral dynamics*

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# 1 Introduction

The relationship among electoral incentive dynamics, political leaders' capability, and economic performance is one of the most prominent research topics in political economy. In democracies where leaders are elected and re-elected, their performance is not only shaped by their capability but jointly shaped by election and re-election incentive dynamics. There is a large body of literature that examines the relationship between electoral systems and performance (Cheibub and Przeworski, 1999, A. Huber and Gordon, 2004, Persson and Tabellini, 2004, Persson, 2004, Berdejó and Yuchtman, 2013), but it does not particularly emphasize the role of political leaders and their capabilities.<sup>1</sup> At best, the literature focuses on leaders within one or a few countries (Berry, Berkman and Schneiderman, 2000, Sakurai and Menezes-Filho, 2008, Alt, Bueno de Mesquita and Rose, 2011, De Janvry, Finan and Sadoulet, 2012). In particular, the literature does not involve any concrete measures of leaders' capabilities. There is another large body of literature on leaders' capabilities and performance (Jones and Olken, 2005, Jones and Olken, 2009, Besley and Reynal-Querol, 2011, Besley, Montalvo and Reynal-Querol, 2011), but it also does not emphasize the role of electoral systems and election and re-election incentive dynamics. In all, the existing literature is almost silent on the empirical facts that associate the leaders' capability, electoral incentive dynamics, and performance *all at the same time*, especially at the cross-country and national levels. In this paper, I fill this gap and provide the first empirical analysis of the effects of national leaders' electoral incentive dynamics on the nexus between capability and economic performance, using a novel data set of national leaders' characteristics and tenure information of 135 countries after 1960. I especially follow Shi (2023) (published at the *Economics Letters*) and measure leaders' capabilities using the richness of work experience in public sectors (REPS).

In the empirical analysis, I document three stylized facts on leaders' capability, electoral incentives, and economic performance: (1) In democracies with exogenous binding term limits<sup>2</sup> (such as some presidential democracies), the positive association between leaders' performance and their capability is significantly less pronounced in their last term when they do not have any re-election incentives; (2) In democracies with exogenous binding term limits, the positive association between leaders' performance and their capability is decreasing over time on average in their entire tenure, but exhibits a jump in the term right before the last term, indicating that leaders try their utmost to be re-elected for the last time; and (3) The above patterns are more salient in presidential democracies than parliamentary democracies while non-existent in non-democracies where leaders are not appointed via elections.<sup>3</sup> These facts are consistent with a theoretical model of the dynamic decision-making of a politician with re-election concerns, which is presented in Appendix A. I address the endogeneity issue using fixed-effects and an instrumental variable estimation approach in which the instrument for leaders' capability is the log distance between the birthplace and the national capital.

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<sup>1</sup>Ashworth (2012) and Lim and Snyder Jr (2021) provide an excellent review of the related issues.

<sup>2</sup>The term limits are shaped before the start of the leader's tenure, and, in this sense, are predetermined and exogenous.

<sup>3</sup>I restrict the non-democratic subsample to countries without elections.

## 2 Empirical analysis

### 2.1 Data

The data set used in the empirical analysis is a country-year (unbalanced) panel data set of 135 countries for 1960-2010. It is compiled in the same way as Shi (2023). Summary statistics are provided in Table B1. Details of the data are provided in Appendix D.

First, to get information on the leaders of each country, a team from Peking University<sup>4</sup> and I manually collected the biographies of the leaders. I focus on the pre-tenure experience of the leaders. I define the richness of experience in public sectors (REPS) as an indicator that counts the number of categories in the following seven categories of *public sectors*: (1) vice executive; (2) minister; (3) legislator; (4) local governor; (5) party leader; (6) central government; (7) military. If a leader has experience in three categories, then his/her REPS equals three. According to Shi (2023), REPS in public sectors is a strong and positive indicator of national leaders' economic performance. The explanation is that in a task-based framework, national leaders' daily work involves a huge variety of tasks, and, thus, the richness of skills acquired in past work experience in different public sectors contributes to their performance. This explanation is further formalized in Appendix C. In particular, in Shi (2023), I find that REPS is a stronger and more robust predictor of economic performance than educational attainment. Moreover, I document the gender, age, and educational attainment of each leader, and use them as control variables in the regressions.

Second, I use information on the leaders' tenure. I collect information on each country's term limits, how many terms each leader has stayed in office, and which year it is for each year in the leader's tenure.

### 2.2 Empirical strategy

#### 2.2.1 Empirical specifications

In Shi (2023), I established a robust empirical fact that leaders' capability, measured by REPS, has a strong positive causal effect on economic performance. In the empirical analysis in this paper, I first examine whether the contribution of leaders' REPS on economic performance is stronger or weaker during their last term in their career when they are not re-elected **due to exogenous term limits predetermined by institutions**. I estimate the following specification, inspired by Alt, Bueno de Mesquita and Rose (2011)<sup>5</sup>:

$$y_{it} = \beta REPS_{it} \times 1(LastTerm)_{it} + \beta_1 REPS_{it} + \beta_2 1(LastTerm)_{it} + \gamma X_{it} + \lambda_i + \lambda_t + \lambda_{term} + u_{it}, \quad (1)$$

where  $y_{it}$  is the per capita GDP growth rate in the country  $i$  and year  $t$ ,  $REPS_{it}$  is the richness of experience in the country  $i$  and year  $t$ ,  $1(LastTerm)_{it}$  is a dummy indicating whether the leader is experiencing his/her last term in year  $t$ ,  $X_{it}$  is a vector of control variables including the leader's age, gender, and educational attainment, and the country's lagged per capita GDP and population.  $\lambda_i$  is country fixed effects that control for country-specific time-invariant heterogeneity, such as a country's

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<sup>4</sup>Professor Yang Yao and Tianyang Xi led the team. I especially thank their generosity for their help with the data.

<sup>5</sup>Alt, Bueno de Mesquita and Rose (2011) also compare economic outcomes with different terms to pin down the effects of capability and accountability.

(persistent) culture and ideology.  $\lambda_t$  represents year fixed effects that control for common shocks that equally affect each country, such as global economic crises.  $\lambda_{term}$  is a vector of dummies of the ordinal number of the current term of the leader at  $t$ , and it addresses the issue of endogenous selection of more capable leaders.  $u_{it}$  is the error term.

Then, I examine whether the contribution of leaders' REPS on economic performance is stronger or weaker in their tenure over time when their re-election incentives become less pronounced. I estimate the following specification:

$$y_{it} = \beta REPS_{it} \times YearInTerm_{it} + \beta_1 REPS_{it} + \beta_2 YearInTerm_{it} + \gamma X_{it} + \lambda_i + \lambda_t + \lambda_{term} + \lambda_{length} + u_{it}, \quad (2)$$

where  $YearInTerm_{it}$  is what year it is for the leader in his tenure in country  $i$  and year  $t$ .  $\lambda_{length}$  is a vector of dummies of the length of the entire tenure of the leader during  $t$ , and it also addresses the issue of endogenous selection of more capable leaders. The rest of the notations follow equation (1).  $\beta$  is the parameter of interest.

### 2.2.2 Solving endogeneity issues

The main endogeneity issue is the endogenous selection of national leaders, so that more capable leaders survive for more terms and face endogenously shaped last term. While it is usually difficult to establish perfect causality using cross-country data, I try to solve this problem using four strategies. First, I only include the democratic subsample with exogenous term limits, in the sense that they are binding and institutionally determined **before the start of the tenure of the elected leader**. The second one is to include high-dimensional fixed effects. I include the term's ordinal number fixed effects and the tenure-length fixed effects. With these fixed effects, I am comparing leaders in the same term (for example, all in the second term) and with the same length of terms (for example, all with a five-year term), who have or do not have re-election incentives. The inclusion of these fixed effects rules out the case that more capable leaders are more likely to be re-elected and have a longer term. The results are also robust to the additional inclusion of continent-year fixed effects and country-year trends. Third, I control for a multi-year trajectory of past economic and political performance, which may largely affect the results of elections in the following years that determine the capability of the leaders, alleviating the concerns that more capable leaders may be repeatedly elected and that endogenous institutional changes may confound the relationship between leaders and performance. Finally, I exploit an instrumental variable approach, in which the instrument for capability is the log distance from the birthplace to the national capital.

I defend the instrument as follows. First, the farther the birthplace from the national capital, the harder it is for the leader to climb to the center of power, and, thus, (s)he needs more experience to be elected, satisfying the relevance condition. In the first-stage regressions in Table 1, the relevance condition is further verified with a large F-statistic. Second, the national leader was born many years before being elected, and, thus, the distance is by far predetermined, and, orthogonal to **contemporary** (the same time as being elected) key socioeconomic factors such as economic prosperity, especially **conditional on country fixed effects that absorb all time-invariant variations including persistent political ideologies and economic geography, and year fixed effects that absorb all country-invariant variations including global economic crises and political transitions**, satisfying exclusion re-

strictions. Table 2 further supports this argument by indicating that the distance is unrelated to a large vector of **contemporary** socioeconomic factors.

## 2.3 Empirical results

I start by estimating equation (1), and the results are reported in Table 3. In columns (1) and (2), the coefficients on the interaction term between the richness of experience in the public sector (REPS) and the dummy for the last term in the term limit are negative and statistically significant, indicating that leaders' capability contributes to their economic performance significantly less in the last term. The economic significance is also large. As column (1) indicates, the contribution of REPS on growth in the last term is 54.9%<sup>6</sup> smaller than that of the previous terms. Since leaders' capability, measured by their REPS, has positive causal impacts on economic growth (Shi, 2023), such results point to the finding that leaders' economic performance is not pronouncedly associated with their capability during their last term. Finally, note that the results still hold conditional on the term fixed effects, in which I compare different leaders in the same ordinal number of terms, ruling out the case that more capable leaders survive for more terms is driving the main results. IV-2SLS estimation produces similar results.

Also, such findings only hold for democracies with exogenous bidding term limits. For non-democracies, especially those without elections, I test whether leaders' capability contributes equally in the last term as before on growth. The results in columns (5) through (8) indicate so, suggesting that the "lame duck" effects do not exist in non-democracies.

Next, I examine whether the contribution of leaders' REPS on economic performance is larger in the term right before the last term, when the leaders may want to seize the last chance to be re-elected. I interact the REPS with a dummy indicating whether the leader is in his term right before the last term and use it as the main independent variable. The results in Table 4 suggest that the leaders' capability contributes significantly more in the term right before the last term. IV-2SLS estimation produces similar results. Again, such results only hold for democracies with binding term limits, not for non-democracies.

Then, I examine the year-varying effects of leaders' capability on economic performance. I estimate equation (2), where the main independent variable is the interaction term between the REPS and the year during the leaders' whole leadership. The results, shown in Table 5, indicate that the effects of leaders' capability on economic performance decay as the end of the tenure approaches. IV-2SLS estimation produces similar results. Note that the results hold when controlling for term-length fixed effects, in which I am comparing different leaders with different REPS in the same year of their leadership. Finally, again, these results only hold for democracies with term limits.

Next, I examine the above empirical patterns using presidential democracies and parliamentary democracies, respectively. The results are reported in Table 6. I find that all the above patterns are more salient in presidential democracies. In presidential democracies, national executives face explicit and binding term limits and (re-)election incentives are more pronounced in the term right before the last term due to term limits.

In Appendix E.1, I conduct several robustness checks that rule out other confounding factors, such as past economic and political trajectories and political stability, that can explain our main results. I examine the effects on other outcomes, such as total factor productivity and life expectancy. In Appendix

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<sup>6</sup>The number is obtained by  $0.00433/0.00788*100\%=54.9\%$ .

E.2, I also conduct two sets of subnational analyses using the case of the U.S. and China.

### 3 Conclusion

In this paper, I provide the first cross-country evidence of how electoral incentive dynamics matter for the association between national leaders' capability and economic performance. I document that leaders' capability and electoral incentives jointly shape economic performance. These main results survive a set of robustness checks including instrumental variable regressions. These facts are also consistent with a simple model of the dynamic decision-making of a politician with re-election concerns. Future research can focus on cross-country empirical analysis that involves subnational administrative units.

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Table 1: First-stage regressions

	(1)	(2)
	REPS_pub	
	First-stage regression	
log(1+distance from birthplace to capital)	0.0792*** (0.0224)	0.0954*** (0.0225)
lag log per capita GDP		0.103 (0.257)
lag log population		-0.386 (0.365)
First-stage F-statistic	212.45	188.66
Country FE	Y	Y
Tenure starting year FE	Y	Y
Observations	689	617
R-squared	0.460	0.472

*Notes:* The sample covers 135 countries and 51 years from 1960 to 2010. Each observation corresponds to an appointed national leader. \* Significant at 10%, \*\* 5%, \*\*\* 1%. The standard errors are clustered at the country level.



Table 2: Validating IV

	(1)	(2)	(3)	(4)
	log(1+distance from birthplace to capital)			
log per capita GDP	0.0793 (0.570)			
per capita GDP growth rate	2.202 (1.363)			
log population	0.221 (0.716)			
log per capita government expenditures	-0.181 (0.364)			
Vote difference		-0.202 (1.833)		
REPS of loser		0.351 (0.234)		
lag per capita GDP growth rate			1.205 (1.966)	
lag 2 per capita GDP growth rate			-1.095 (2.347)	
lag 3 per capita GDP growth rate			1.661 (2.396)	
lag 4 per capita GDP growth rate			-1.580 (2.103)	
lag 5 per capita GDP growth rate			-1.939 (2.148)	
lag unrest				0.0102 (0.247)
lag 2 unrest				-0.119 (0.237)
lag 3 unrest				0.246 (0.236)
lag 4 unrest				0.461* (0.241)
lag 5 unrest				0.238 (0.236)
Joint F-statistic	0.6128	0.3042	0.7943	0.1676
Country FE	Y	Y	Y	Y
Tenure starting year FE	Y	Y	Y	Y
Observations	659	659	610	656
R-squared	0.504	0.739	0.502	0.499

*Notes:* The sample covers 135 countries and 51 years from 1960 to 2010. Each observation corresponds to an appointed national leader. \* Significant at 10%, \*\* 5%, \*\*\* 1%. The standard errors are clustered at the country level.

Table 3: Performance in the last term

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	per capita GDP growth rate							
	Democracies with term limits				Non-democracies			
	OLS		IV-2SLS		OLS		IV-2SLS	
REPS_pub	0.00788*** (0.00228)	0.00844*** (0.00244)	0.00762*** (0.00220)	0.00793*** (0.00233)	-0.00326 (0.00488)	-0.00333 (0.00460)	-0.00355 (0.00508)	-0.00362 (0.00480)
I(Last term)	0.0123 (0.00808)	0.0172** (0.00868)	0.0117 (0.00753)	0.0156* (0.00803)	-0.0188* (0.0103)	-0.0183* (0.00983)	-0.0207** (0.0110)	-0.0203* (0.0105)
REPS_pub*I(Last term)	-0.00433* (0.00232)	-0.00516** (0.00248)	-0.00409* (0.00216)	-0.00456** (0.00227)	0.00687 (0.00460)	0.00696 (0.00448)	0.00743 (0.00668)	0.00754 (0.00898)
Controls	N	Y	N	Y	N	Y	N	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Term FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	2,231	2,231	2,231	2,231	2,647	2,647	2,647	2,647
R-squared	0.984	0.985	0.985	0.985	0.967	0.967	0.967	0.967
Number of countries	83	83	83	83	96	96	96	96

Notes: The sample covers 135 countries and 51 years from 1960 to 2010. Each observation corresponds to a country-year cell. The sample of democracies is restricted to those with exogenous binding term limits. The sample of non-democracies is restricted to countries without elections. Control variables include the leader's age, gender, and educational attainment, and the country's lagged per capita GDP and population. \* Significant at 10%, \*\* 5%, \*\*\* 1%. The standard errors are clustered at the country level.

Table 4: Performance in the term right before the last term

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	per capita GDP growth rate							
	OLS		Democracies		Non-democracies		IV-2SLS	
REPS_pub	0.00406*** (0.00121)	0.00379*** (0.00125)	0.00605*** (0.00168)	0.00604*** (0.00178)	0.00179 (0.00196)	0.00175 (0.00188)	0.00194 (0.00193)	0.00191 (0.00185)
1(Right before last term)	-0.0113 (0.00898)	-0.0177* (0.00939)	-0.0144 (0.00978)	-0.0216** (0.0105)	0.0102 (0.0147)	0.00978 (0.0142)	0.0107 (0.0155)	0.0103 (0.0150)
REPS_pub*1(Right before last term)	0.00351* (0.00260)	0.00474* (0.00272)	0.00453* (0.00272)	0.00585** (0.00290)	-0.00307 (0.00694)	-0.00297 (0.00675)	-0.00323 (0.00716)	-0.00313 (0.00696)
Controls	N	Y	N	Y	N	Y	N	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Term FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	2,231	2,231	2,231	2,231	2,647	2,647	2,647	2,647
R-squared	0.984	0.985	0.961	0.964	0.967	0.967	0.967	0.967
Number of countries	83	83	83	83	96	96	96	96

Notes: The sample covers 117 democratic countries, 96 non-democratic countries, and 51 years from 1960 to 2010. Each observation corresponds to a country-year cell. The sample of democracies is restricted to those with exogenous binding term limits. The sample of non-democracies is restricted to countries without elections. Control variables include the leader's age, gender, and educational attainment, and the country's lagged per capita GDP and population. The instrument for REFS in the IV-2SLS estimation is the log distance from the birthplace to the national capital. \* Significant at 10%, \*\* 5%, \*\*\* 1%. The standard errors are clustered at the country level.

Table 5: Year in the term and performance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	per capita GDP growth rate							
	Democracies with term limits				Non-democracies			
	OLS		IV-2SLS		OLS		IV-2SLS	
REPS_pub	0.00731*** (0.00166)	0.00676*** (0.00165)	0.00718*** (0.00168)	0.00646*** (0.00165)	0.00320 (0.00368)	0.00379 (0.00333)	0.00365 (0.00362)	0.00437 (0.00323)
Year in the term	-0.000718 (0.00551)	-0.00596 (0.00525)	-0.00764 (0.00553)	-0.00643 (0.00526)	0.00150*** (0.000204)	0.00187*** (0.000318)	0.00152*** (0.000205)	0.00194*** (0.000332)
REPS_pub*Year in the term	-0.000523*** (0.000156)	-0.000441*** (0.000147)	-0.000508*** (0.000166)	-0.000390*** (0.000145)	-0.000278 (0.000307)	-0.000303 (0.000307)	-0.000296 (0.000305)	-0.000322 (0.000307)
Controls	N	Y	N	Y	N	Y	N	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Term FE	Y	Y	Y	Y	Y	Y	Y	Y
Term length FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	2,231	2,231	2,231	2,231	2,647	2,647	2,631	2,631
R-squared	0.985	0.985	0.985	0.986	0.968	0.968	0.968	0.968
Number of countries	83	83	83	83	96	96	96	96

Notes: The sample covers 117 democratic countries, 96 non-democratic countries, and 51 years from 1960 to 2010. Each observation corresponds to a country-year cell. The sample of democracies is restricted to those with exogenous binding term limits. The sample of non-democracies is restricted to countries without elections. Control variables include the leader's age, gender, and educational attainment, and the country's lagged per capita GDP and population. The instrument for REPS in the IV-2SLS estimation is the log distance from the birthplace to the national capital. \* Significant at 10%, \*\* 5%, \*\*\* 1%. The standard errors are clustered at the country level.

Table 6: Presidential democracies and parliamentary democracies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	per capita GDP growth rate (of democracies only)											
	OLS			IV-2SLS			OLS			IV-2SLS		
	Pre.	Par.	Pre.	Par.	Pre.	Par.	Pre.	Par.	Pre.	Par.	Pre.	Par.
REPS.pub	0.0112*** (0.00348)	0.00499** (0.00196)	0.0102*** (0.00320)	0.00477** (0.00190)	0.00759*** (0.00211)	0.00452*** (0.00155)	0.00728*** (0.00209)	0.00454*** (0.00160)	0.00385** (0.00151)	0.00218** (0.00102)	0.00414*** (0.00154)	0.00231** (0.00103)
1(Last term)	0.0236** (0.0117)	0.0113 (0.00772)	0.0200* (0.0103)	0.0103 (0.00731)								
REPS.pub*1(Last term)	-0.00748** (0.00351)	-0.00347 (0.00221)	-0.00616** (0.00302)	-0.00316 (0.00208)								
Year in the term					0.00184** (0.000712)	0.000762 (0.000802)	0.00164** (0.000646)	0.000786 (0.000815)				
REPS.pub*Year in the term					-0.000496** (0.000206)	-0.000352* (0.000209)	-0.000425** (0.000188)	-0.000358* (0.000212)				
1(Right before last term)									-0.0240* (0.0128)	-0.00939 (0.00828)	-0.0200* (0.0113)	-0.00768 (0.00787)
REPS.pub*1(Right before last term)									0.00765** (0.00382)	0.00235 (0.00237)	0.00623* (0.00330)	0.00179 (0.00225)
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Term FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Term length FE	N	N	N	N	Y	Y	Y	Y	N	N	N	N
Observations	2,231	2,282	2,215	2,282	2,231	2,282	2,215	2,282	2,231	2,282	2,215	2,282
R-squared	0.981	0.992	0.981	0.992	0.980	0.992	0.981	0.992	0.981	0.992	0.981	0.992
Number of countries	83	67	83	67	83	67	83	67	83	67	83	67

Notes: The sample covers 83 presidential democratic countries, 67 parliamentary democratic countries, and 51 years from 1960 to 2010. Each observation corresponds to a country-year cell. Controls include the age, a dummy for college and a dummy for graduate school, a gender dummy of the leader, and lagged log per capita GDP and lagged log population of the country. "Pre." stands for presidential democracies, while "Par." stands for parliamentary democracies. The instrument for REPS in the IV-2SLS estimation is the log distance from the birthplace to the national capital. \* Significant at 10%, \*\* 5%, \*\*\* 1%. The standard errors are clustered at the country level.

# Online Appendix

## A Model

In this section, I provide a theoretical model to explain the relationship between leaders' capability and economic performance under different election incentives and to rationalize all the empirical findings.

Time is discrete:  $t = 0, 1, 2, \dots$ . In each period, there is a politician in office. Suppose each politician has a capability, denoted by  $A$ . The capability is measured by the richness of experience in public sectors in the empirical analysis. The economic outcome of each period,  $y_t$ , is a function of the politician's capability  $A$  and effort  $e_t$ :  $y_t = f(A, e_t)$ , where  $f'_1 = \frac{\partial f}{\partial A} > 0$ ,  $f'_2 = \frac{\partial f}{\partial e_t} > 0$ , and  $f''_2 = \frac{\partial^2 f}{\partial e_t^2} < 0$ . Suppose the cost function of the politician is  $c(e_t)$ , where  $c', c'' > 0$ . Suppose the probability of being successfully re-elected is  $p_t$ , which is a function of  $y_t$ :  $p_t = p(y_t)$ , where  $p' > 0$  and  $p'' < 0$ . Suppose being in office in a single period brings the politician per-period payoff  $u > 0$ . The payoff of the outside option is normalized to zero. Denote the politician's discount factor by  $\beta$ .

Suppose that the politician faces a term limit of  $T$  periods, i.e., he has to leave office when he has stayed in office for  $T$  periods. Let the value function of period  $t$  be denoted as  $V_t(A)$ . Thus,  $V_t(A)$  satisfies the following equation:

$$V_t(A) = \max_{e_t} u - c(e_t) + \beta p(f(A, e_t)) V_{t+1}(A), \quad (3)$$

subject to  $e_t \geq 0$ . Especially,  $V_{T+1}(A) = 0$ . Thus,  $e_T$  satisfies  $e_T = \arg \max_{e_T} u - c(e_T) + \beta p(f(A, e_T)) \times 0 = \arg \max_{e_T} u - c(e_T)$ . Denote a variable with superscript  $*$  as the optimal decision. It is thus obvious that  $e_T^* = 0$ , since there is no re-election incentive and it incurs a cost to the politician to exert a strictly positive amount of effort. Thus,  $V_T(A) = u$ . By backward induction, we have  $e_{T-1} = \arg \max_{e_{T-1}} u - c(e_{T-1}) + \beta p(f(A, e_{T-1})) \times u$ . The first-order condition is thus  $-c'(e_{T-1}) + \beta u p'(y_t) f'_2(e_{T-1}) = 0$ . Given the concavity of  $p(\cdot)$  and  $f(\cdot)$  and the convexity of  $c(\cdot)$ , the equation has a unique solution. Assume further that  $u - c(0) + \beta p(f(A, 0)) > 0$ , thus the first-order condition has a strictly positive solution.

For the last period, the relationship between optimal effort and capability is  $\frac{\partial e_T^*}{\partial A} = 0$ , since  $e_T^*$  is a constant zero. By implicit function theorem,  $-c''(e_{T-1}^*) \frac{\partial e_{T-1}^*}{\partial A} + \beta u [p'(f(A, e_{T-1}^*)) (f''_{21}(A, e_{T-1}^*) + f''_{22}(A, e_{T-1}^*) \frac{\partial e_{T-1}^*}{\partial A}) + p''(f(A, e_{T-1}^*)) (f'_1(A, e_{T-1}^*) + f'_2(A, e_{T-1}^*) \frac{\partial e_{T-1}^*}{\partial A})] = 0$ . Thus, rearranging the terms yields:

$$\frac{\partial e_{T-1}^*}{\partial A} = \frac{\beta u [p'(f(A, e_{T-1}^*)) f''_{21}(A, e_{T-1}^*) + p''(f(A, e_{T-1}^*)) f'_1(A, e_{T-1}^*)]}{c''(e_{T-1}^*) - \beta u [p'(f(A, e_{T-1}^*)) f''_{22}(A, e_{T-1}^*) + p''(f(A, e_{T-1}^*)) f'_2(A, e_{T-1}^*)]}. \quad (4)$$

Given that  $p''(\cdot)$  is small (we can set  $p''(\cdot) = 0$ ), we have  $\frac{\partial e_{T-1}^*}{\partial A} > 0$ . For  $t < T - 1$ , suppose  $V_{t+1}(A) = V_{t+1}$  with  $V_t > V_{t+1} > u$ , then from the first-order condition, we have

$$e_t^* > e_{t+1}^* > \dots > e_{T-1}^* > e_T^* = 0. \quad (5)$$

Furthermore, under some regularity conditions (with some functional form restrictions on  $u(\cdot)$ ,  $p(\cdot)$ , and  $f(\cdot)$ ), we have that

$$\frac{\partial e_t^*}{\partial A} > \frac{\partial e_{t+1}^*}{\partial A} > \dots > \frac{\partial e_{T-1}^*}{\partial A} > \frac{\partial e_T^*}{\partial A} = 0. \quad (6)$$

Therefore, we have the following prediction:

**Prediction 1.** *In democratic institutions with term limits, over time, leaders exert significantly less effort in developing the economy, and the effort is less positively associated with capability.*

If the politician does not have any re-election incentives, i.e.,  $p(y_t) \equiv \bar{p}$  for all  $y_t$ , then the politician exerts zero effort for all periods since the marginal return of the effort is zero and the marginal cost of effort is strictly positive. Therefore, we have the following prediction:

**Prediction 2.** *In non-democratic institutions without term limits and re-election incentives, leaders' effort is not associated with capability.*

All these predictions are supported by the empirical evidence to be presented in Section 2.3.

## B Additional table

Table B1: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP growth rate	6,264	0.022	0.064	-0.671	0.926
1(Unrest)	5,952	0.427	0.495	0	1
TFP growth rate	4,391	0.004	0.053	-1.081	0.423
Life expectancy growth	6,241	0.333	0.445	-4.557	5.724
REPS_pub	7,193	2.326	1.214	0	7
Terms	7,355	7.864	8.302	0	82
Age	7,384	56.501	11.348	15	91
1(Female)	7,389	0.020	0.141	0	1
Educational attainment	7,540	2.630	0.548	1	3
1(Last term)	7,540	0.695	0.460	0	1
1(Right before last term)	7,540	0.181	0.385	0	1
Polity2 score	7,481	0.527	7.519	-10	10

## C REPS as a measurement for leaders' capabilities

This section illustrates the logic of why the richness of experience in public sectors serves as a good measure of leaders' capability. It draws heavily from Shi (2022). Suppose the economic performance  $y$  is achieved through completing  $N$  different tasks  $(G_1, \dots, G_N)$ , where  $G_i$  denotes how well the leader performs  $i$ 's task. This setting is consistent with Besley's description regarding leaders: "In practice, political competence is probably a complex mix of skills. It could include intangible leadership skills, like persuading others in debate or inspiring trust, and also more standard analytical skills, such as spotting flaws in policy proposals."

The quality of the completion of each task,  $G_i$ , is a strictly increasing and strictly concave function of the leader's work experience in doing that task, which is denoted by  $x_i$ . So  $G'_i(x_i) > 0$ , and  $G''_i(x_i) < 0$ .

For simplicity, assume that the economic performance is a linear combination of all tasks, with a weight  $\lambda_i$  for task  $i$ :  $y = \sum_{i=1}^N \lambda_i G_i(x_i)$ , where  $\lambda_i > 0$  for all  $i$ . Suppose the sum of experience for each task  $x_i$  is faced with a constraint:  $\sum_{i=1}^N x_i = \bar{x}$ , where  $\bar{x} > 0$ . This constraint means that the lifetime of a leader is fixed, and he can only optimally allocate his work experience among these tasks.

Thus, the leader maximizes the economic performance given the constraint of his experience allocation, and the maximization is  $\max \sum_{i=1}^N \lambda_i G_i(x_i)$ , subject to  $\sum_{i=1}^N x_i = \bar{x}$ . Given some regularity conditions, an interior solution is achieved, where  $\lambda_i G'_i(x_i) = \mu$ .  $\mu$  is the Lagrangian multiplier associated with the experience constraint. Thus, the optimal experience allocation  $x_i^* = G'^{-1}(\frac{\mu}{\lambda_i})$ .

Now define the richness of experience *REPS* as  $REPS \equiv \sum_i 1(x_i^* > 0)$ . Define the best economic performance given each REPS index as  $y^*(REPS = k) = \max_{x_i, \sum_{i=1}^N 1(x_i > 0) = k} \sum_{i=1}^N \lambda_i G(x_i)$ . Given the concavity of  $G_i(\cdot)$  functions, we can easily prove the following proposition:

**Proposition 1.**  $y^*(REPS = k) > y^*(REPS = j)$  if and only if  $k > j$ . In other words, a higher REPS index leads to better economic performance.

This proposition is the foundation of the empirical tests. The intuition of the proposition is that since the leader's experience in each task has diminishing marginal returns, the optimal way to allocate it is to allocate each experience evenly to all tasks, which leads to a higher REPS index.



## D Data appendix

This paper uses the same data set as in Shi, Xi and Yao (2020). In that paper, the authors manually collect information on national executives' political experience in 135 countries from 1960 to 2010. We focus on the chief executive of the administration, that is, the president in presidential systems and the prime minister (premier) in parliamentary systems. For the leaders in semi-presidential systems, we follow the definition in Przeworski et al. (2013) to identify the president as the chief executive if the president has the constitutional power to remove the prime minister. The authors also follow Goemans, Gleditsch and Chiozza (2009) to identify the general secretary of the Communist Party as a national executive for communist regimes. The authors document seven categories of executives' pre-tenure political experience in the public sectors. *Vice executive*: a dummy variable that indicates whether the executive served as the vice president (or vice prime minister in parliamentary systems). *Minister* is a dummy variable that indicates whether the executive served as a minister or head of a bureaucratic agency. *Legislator* captures whether the leader served as a lawmaker in the lower or upper chamber. *Local governor* specifies whether the executive has executive experience at a subnational level. *Party leader* measures whether the executive served as the general secretary or chair of a political party. *Central government* indicates whether the leader worked as a technocrat in any bureaucratic office of the central government. *Military* captures whether the leader served in the military sector or an intelligence agency. Based on those measures, the authors construct an index for the richness of political experiences by summing the binary categories.

Second, I use information on institutions using the Polity IV database. To be specific, I use the polity score (Polity2) to measure a country's institution. The "Polity Score" captures this regime authority spectrum on a 21-point scale ranging from -10 (hereditary monarchy) to +10 (consolidated democracy). The Polity scores can also be converted into regime categories in a suggested three-part categorization of "autocracies," "anocracies," and "democracies." I manually collect information on institutional details such as whether the country is presidential or parliamentary and whether it is subject to binding term limits.

Finally, I use the Penn World Table data set that has information on the economic variables for each country. It is a database with information on relative levels of income, output, input, and productivity, covering 183 countries between 1950 and 2019. I focus on three variables: per capita GDP, population, and TFP.

## E Additional evidence

In this section, I first provide several robustness checks for the main results. Next, I provide sub-national evidence regarding the case of the largest democratic economy, the U.S., and the largest non-democratic economy, China, in the world.

### E.1 Robustness checks

In this subsection, I provide three sets of robustness checks. First, I control for the past trajectories of economic crises (past three years), to rule out the scenario that the main results are driven by recessions

and economic hardships rather than re-election incentives. An economic crisis is defined as a case in which the GDP growth rate is negative or the inflation rate is larger than 20%, following the definition of Giuliano, Mishra and Spilimbergo (2013). I report the results in Table E1. The estimated coefficients, for both OLS and IV estimations, are qualitatively the same as the previous analysis. Second, I control for the past trajectories of political crises (past three years), to rule out the scenario that the main results are driven by turmoils of the political system, rather than re-election incentives. A political crisis is defined as a case in which the regime is under significant threat of being overthrown, which is provided by the Quality of Governance data set. The results presented in Table E2 are still qualitatively robust. Third, I include stable democratic countries only in the regression sample, which refers to remaining democratic in the past three years. The sample size is smaller, but the results in Table E3 are qualitatively similar to the main results. In all, the main results survive the robustness checks I conduct.

Finally, I test whether other outcomes are also affected by leaders' re-election incentives. I examine two outcomes: total factor productivity (TFP) growth and life expectancy growth. The first outcome is associated with allocative efficiency in the economy (Hsieh and Klenow, 2009). The second outcome is associated with the accumulation of human capital (Oster, Shoulson and Dorsey, 2013). The estimation results are shown in Table E4. Similar to the above findings, the positive contribution of leaders' capability on these outcomes is smaller in the last term, larger in the term right before the last term, and decays as the end of the tenure approaches. In all, all of these findings are consistent with the explanation of re-election incentives, which only exist in democracies.

Table E1: Controlling for past trajectories of economic crisis

	(1)	(2)	(3)	(4)	(5)	(6)
			per capita GDP growth rate			
		OLS			IV-2SLS	
REPS_pub	0.00681*** (0.00171)	0.00167* (0.000938)	0.00446*** (0.00119)	0.00637*** (0.00168)	0.00171* (0.000934)	0.00437*** (0.00122)
1(Last term)	0.0116* (0.00609)			0.0102* (0.00577)		
REPS_pub*1(Last term)	-0.00602*** (0.00183)			-0.00552*** (0.00173)		
1(Right before last term)		-0.00508 (0.00590)			-0.00358 (0.00553)	
REPS_pub*1(Right before last term)		0.00369** (0.00172)			0.00314* (0.00162)	
Year in the term			0.00135** (0.000560)			0.00132** (0.000550)
REPS_pub*Year in the term			-0.000382** (0.000152)			-0.000377** (0.000151)
Controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y
Observations	2,231	2,231	2,231	2,231	2,231	2,231
R-squared	0.987	0.987	0.987	0.987	0.987	0.987
Number of countries	83	83	83	83	83	83

*Notes:* The sample covers 114 democratic countries and 51 years from 1960 to 2010. Each observation corresponds to a country-year cell. Controls include the age, a dummy for college and a dummy for graduate school, a gender dummy of the leader, and lagged log per capita GDP and lagged log population of the country. Economic crises are defined as a situation in which the per capita GDP growth rate is negative or the inflation rate is larger than 20%. The instrument for REPS in the IV-2SLS estimation is the log distance from the birthplace to the national capital. \* Significant at 10%, \*\* 5%, \*\*\* 1%. The standard errors are clustered at the country level.

Table E2: Controlling for past trajectories of political crisis

	(1)	(2)	(3)	(4)	(5)	(6)
			per capita GDP growth rate			
		OLS			IV-2SLS	
REPS_pub	0.00692*** (0.00173)	0.00181* (0.000951)	0.00465*** (0.00123)	0.00647*** (0.00170)	0.00185* (0.000950)	0.00455*** (0.00126)
1(Last term)	0.0118* (0.00612)			0.0103* (0.00580)		
REPS_pub*1(Last term)	-0.00601*** (0.00184)			-0.00550*** (0.00174)		
1(Right before last term)		-0.00508 (0.00588)			-0.00357 (0.00553)	
REPS_pub*1(Right before last term)		0.00362** (0.00173)			0.00307* (0.00163)	
Year in the term			0.00135** (0.000576)			0.00131** (0.000566)
REPS_pub*Year in the term			-0.000398** (0.000158)			-0.000390** (0.000157)
Controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y
Observations	2,231	2,231	2,231	2,231	2,231	2,231
R-squared	0.987	0.987	0.987	0.987	0.987	0.987
Number of countries	83	83	83	83	83	83

*Notes:* The sample covers 114 democratic countries and 51 years from 1960 to 2010. Each observation corresponds to a country-year cell. Controls include the age, a dummy for college and a dummy for graduate school, a gender dummy of the leader, and lagged log per capita GDP and lagged log population of the country. Political crises are defined as a situation in which the regime is under significant threat of being overthrown. The instrument for REPS in the IV-2SLS estimation is the log distance from the birthplace to the national capital. \* Significant at 10%, \*\* 5%, \*\*\* 1%. The standard errors are clustered at the country level.

Table E3: Including only stable democracies

	(1)	(2)	(3)	(4)	(5)	(6)
			per capita GDP growth rate			
		OLS			IV-2SLS	
REPS_pub	0.00897*** (0.00240)	0.00273** (0.00126)	0.00591*** (0.00180)	0.00850*** (0.00230)	0.00281** (0.00128)	0.00570*** (0.00181)
1(Last term)	0.0137 (0.00836)			0.0122 (0.00773)		
REPS_pub*1(Last term)	-0.00691*** (0.00241)			-0.00637*** (0.00220)		
1(Right before last term)		-0.0136 (0.00940)			-0.0114 (0.00863)	
REPS_pub*1(Right before last term)		0.00615** (0.00273)			0.00539** (0.00248)	
Year in the term			0.00117* (0.000707)			0.00107 (0.000686)
REPS_pub*Year in the term			-0.000364** (0.000183)			-0.000334* (0.000181)
Controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y
Observations	2,231	2,231	2,231	2,231	2,231	2,231
R-squared	0.987	0.987	0.986	0.987	0.987	0.986
Number of countries	83	83	83	83	83	83

*Notes:* The sample covers 111 democratic countries that have remained democratic over the past three years and 51 years from 1960 to 2010. Each observation corresponds to a country-year cell. Controls include the age, a dummy for college and a dummy for graduate school, a gender dummy of the leader, and lagged log per capita GDP and lagged log population of the country. The instrument for REPS in the IV-2SLS estimation is the log distance from the birthplace to the national capital. \* Significant at 10%, \*\* 5%, \*\*\* 1%. The standard errors are clustered at the country level.

Table E4: Other outcomes

	(1)	(2)	(3)	(4)
	TFP growth	Life expectancy growth OLS	TFP growth	Life expectancy growth IV-2SLS
REPS_pub	0.0111*** (0.00277)	0.0570** (0.0274)	0.0103*** (0.00268)	0.0543** (0.0268)
1(Last term)	0.0174* (0.00921)	0.156** (0.0725)	0.0138 (0.00857)	0.141** (0.0694)
REPS_pub*1(Last term)	-0.0111*** (0.00260)	-0.0475** (0.0215)	-0.00996*** (0.00241)	-0.0432** (0.0206)
Controls	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Country FE	Y	Y	Y	Y
Observations	2,231	2,231	2,231	2,231
R-squared	0.935	0.088	0.936	0.087
Number of countries	83	83	83	83
	(5)	(6)	(7)	(8)
	TFP growth	Life expectancy growth OLS	TFP growth	Life expectancy growth IV-2SLS
REPS_pub	0.000940 (0.00116)	0.0136 (0.0119)	0.00113 (0.00117)	0.0143 (0.0121)
1(Right before last term)	-0.0157 (0.0108)	-0.140* (0.0814)	-0.0116 (0.0102)	-0.135* (0.0771)
REPS_pub*1(Right before last term)	0.0107*** (0.00308)	0.0426* (0.0246)	0.00940*** (0.00289)	0.0414* (0.0234)
Controls	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Country FE	Y	Y	Y	Y
Observations	2,231	2,231	2,231	2,231
R-squared	0.935	0.086	0.936	0.086
Number of countries	83	83	83	83
	(9)	(10)	(11)	(12)
	TFP growth	Life expectancy growth OLS	TFP growth	Life expectancy growth IV-2SLS
REPS_pub	0.00656*** (0.00196)	0.0298 (0.0193)	0.00620*** (0.00196)	0.0297 (0.0191)
Year in the term	0.00171** (0.000841)	0.00544 (0.00758)	0.00145* (0.000799)	0.00497 (0.00741)
REPS_pub*Year in the term	-0.000561** (0.000233)	-0.00182 (0.00241)	-0.000494** (0.000221)	-0.00166 (0.00234)
Controls	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Country FE	Y	Y	Y	Y
Observations	2,231	2,231	2,231	2,231
R-squared	0.932	0.082	0.934	0.083
Number of countries	83	83	83	83

*Notes:* The sample covers 83 (120) democratic countries and 51 years from 1960 to 2010. Controls include the age, a dummy for college and a dummy for graduate school, a gender dummy of the leader, and lagged log per capita GDP and lagged log population of the country. The instrument for REPS in the IV-2SLS estimation is the log distance from the birthplace to the national capital. \* Significant at 10%, \*\* 5%, \*\*\* 1%. The standard errors are clustered at the country level.

## E.2 Subnational evidence of the U.S.

In this subsection, I provide subnational evidence regarding the U.S. state governors. I collect information on the term limit of each state and define a dummy whether the governor's current year is in the last year of his entire term limit, and a dummy whether he is facing re-election in the current year. Using the same difference-in-differences specification, I find that, in Table E5, the positive REPS-performance nexus is weaker during the last year in term, when the state governor has no re-election incentives. It is stronger, however, during the year right before the last year of the first term, when the re-election incentives are the strongest. The nexus is also weaker over time. Thus, using the largest democratic economy in the world as a case in point, I validate the predictions of the theoretical model with subnational evidence that is consistent with cross-country evidence.

Table E5: Subnational evidence from U.S. state governors

	(1)	(2)	(3)	(4)	(5)	(6)
		GDP growth			Unrest	
			OLS			
REPS	0.00760*** (0.00171)	0.00481** (0.00188)	0.00976*** (0.00228)	0.00923 (0.0128)	0.00477 (0.0119)	-0.00389 (0.0167)
1(Last Year)	0.00402 (0.00266)			0.0203 (0.0469)		
REPS*1(Last Year)	-0.00839*** (0.00153)			-0.0103 (0.0199)		
1(Right Before Last Year)		-0.00300 (0.00244)			-0.0233 (0.0399)	
REPS*1(Right Before Last Year (of 1st Term))		0.00406*** (0.00125)			0.00807 (0.0177)	
Year In Term			0.000894 (0.000615)			-0.00940 (0.00630)
REPS*Year In Term			-0.00109*** (0.000324)			0.00282 (0.00287)
Controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
State FE	Y	Y	Y	Y	Y	Y
Observations	1,200	1,200	1,200	1,200	1,200	1,200
R-squared	0.539	0.510	0.516	0.054	0.054	0.055
Number of states	50	50	50	50	50	50

*Notes:* The sample covers 50 U.S. states and 24 years from 1999 to 2022. Controls include the interaction terms between state dummies and linear yearly trends. \* Significant at 10%, \*\* 5%, \*\*\* 1%. The standard errors are clustered at the state level.

### E.3 Subnational evidence of China

Finally, I conduct an analysis using a subnational case of Chinese cities. China is the largest non-democratic economy in the world, so the pattern of democracies should not hold for China. I focus on city mayors because they are mainly responsible for city affairs such as boosting economic growth and maintaining social stability. For city mayors, there is no term limit, and they may be promoted or transferred elsewhere unexpectedly. Therefore, we expect that the patterns of democracies regarding term limits may not hold for Chinese city mayors. I report the results in Table E6. I examine whether the effects of REPS are more or less salient if the year is the last year in term, the year right before the last year in term, and over time. Using interaction term regressions, I find that none of the coefficients on the interaction term is statistically significant. Therefore, we cannot replicate the main results using data of Chinese cities.

Table E6: Subnational evidence from Chinese city mayors

	(1)	(2)	(3)	(4)	(5)	(6)
	GDP growth			Unrest		
				OLS		
REPS	-0.0352 (0.0292)	-0.0252 (0.0269)	-0.0365 (0.0443)	-0.0896*** (0.00224)	-0.0897*** (0.00219)	-0.0903*** (0.00150)
1(Last Year)	-0.410 (0.294)			0.00251 (0.00849)		
REPS*1(Last Year)	0.0308 (0.0334)			-0.000476 (0.00112)		
1(Right Before Last Year)		0.252 (0.264)			-0.00332 (0.00700)	
REPS*1(Right Before Last Year)		-0.0205 (0.0340)			0.000154 (0.000885)	
Year In Term			-0.00153 (0.0879)			-0.00184 (0.00358)
REPS*Year In Term			0.00212 (0.0108)			0.000203 (0.000466)
Controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
City FE	Y	Y	Y	Y	Y	Y
Observations	8,341	8,341	8,341	9,482	9,482	9,482
R-squared	0.418	0.417	0.417	0.926	0.926	0.926
Number of cities	284	284	284	288	288	288

*Notes:* The sample covers 284(288) Chinese cities and 24 years from 1994 to 2017. Controls include the age, educational attainment dummies, a gender dummy, and ethnicity dummies of the city mayor. \* Significant at 10%, \*\* 5%, \*\*\* 1%. The standard errors are clustered at the city level.