UC San Diego

UC San Diego Electronic Theses and Dissertations

Title

Band of Rivals: Career Incentives, Elite Competition, and Economic Growth in China

Permalink

<https://escholarship.org/uc/item/3kv0d37r>

Author

Lee, Jonghyuk

Publication Date

2018

Peer reviewed|Thesis/dissertation

UNIVERSITY OF CALIFORNIA SAN DIEGO

Band of Rivals: Career Incentives, Elite Competition, and Economic Growth in China

A dissertation submitted in partial satisfaction of the
requirements for the degree of Doctor of Philosophy

in

Political Science and International Affairs

by

Jonghyuk Lee

Committee in charge:

Professor Victor C. Shih, Chair
Professor Stephan Haggard
Professor Barry J. Naughton
Professor Kwai Ng
Professor Margaret E. Roberts
Professor Susan L. Shirk

2018

Copyright

Jonghyuk Lee, 2018

All rights reserved

The Dissertation of Jonghyuk Lee is approved, and is acceptable in quality and form for publication on microfilm and electronically:

Chair

University of California San Diego

2018

TABLE OF CONTENTS

Signature Page	iii
Table of Contents	iv
List of Tables.....	vi
List of Figures	vii
Acknowledgements.....	ix
Vita.....	xi
Abstract of the Dissertation	xii
1. Introduction	1
2. Career Prospects and Incentives in the Chinese Provincial Leadership.....	14
2-1. Background: Meritocratic Selection and Subnational Performance.....	14
2-1-1. The Theory of Promotion Tournament.....	14
2-1-2. Correcting the Theory of Promotion Tournament.....	18
2-2. Feature 1: Relationship between Career Prospects and Career Incentives.....	22
2-2-1. Shaping Career Prospects of Chinese Officials.....	28
2-2-2. Categorization of Chinese Officials by Career Prospects	34
2-3. Feature 2: Collective Decision-making Institution in Chinese Provinces.....	41
2-3-1. The Standing Members of the Provincial Party Committee (SMPC)	42
2-3-2. Historical Changes of the SMPC Composition from 1980 to 2016.....	49
3. Estimating Career Prospects of Individual Officials	69
3-1. Model Selections	70

3-1-1. Measuring Political Advancement	74
3-1-2. Building the Theoretical Model	77
3-1-3. Building the Prediction Maximization Model.....	83
3-2. Prediction Results	85
4. Constructing Provincial-level Career Incentives	89
4-1. Converting Career Prospects into Career Incentives	89
4-2. Aggregating Individual Career Incentives to Collective Career Incentives	93
5. Empirical Evidence	98
5-1. Hypothesis 1: Collective Career Incentives and Economic Growth in China.....	98
5-1-1. Hypothesis Building.....	98
5-1-2. Model Specification	102
5-1-3. Empirical Results	103
5-2. Hypotheses 2: Collective Career Incentives and Investment Allocation in China	111
5-2-1. Hypothesis Building.....	111
5-2-2. Model Specification	116
5-2-3. Empirical Results	117
6. Conclusion.....	125
Reference	127
Appendix.....	140

LIST OF TABLES

Table 2-1: List of Concurrent Positions Held by Standing Members of Provincial Committee ..	44
Table 3-1: The Number of SMPC Positions from 1985 to 2015	75
Table 3-2: SMPC's Expected Career Paths by Types	76
Table 3-3: Selected Descriptive Statistics of SMPCs from 1985 to 2015	79
Table 5-1: Effect of Each Type by SMPC Positions	107
Table 5-2: Interaction Effects of Rank-and-File Careerists by Top Leaders' Types	108
Table 5-3: Types of Subnational Officials and Investment Allocation Patterns	112
Table 5-4: Coefficients of Predictors on Overall Investment Amount.....	118
Table 5-5: Coefficients of Predictors on Investment Allocation.....	120

LIST OF FIGURES

Figure 2-1: Relationship Between Career Prospects and Career Incentives.....	35
Figure 2-2: Composition of the SMPC from 1980 to 2016	50
Figure 2-3: VPS Double Appointments	52
Figure 2-4: Proportion of the SC in the SMPC from 1980 to 2016.....	55
Figure 2-5: The Trends of the Fixed SC Positions from 1980 to 2016.....	57
Figure 2-6: The Trend of Vice Governors W/WO Joint Appointments	58
Figure 2-7: Composition of the Possible SC from 1980 to 2016.....	62
Figure 2-8: The Trends of the Possible SC Positions from 1980 to 2016.....	63
Figure 3-1: Model Design to Measure Officials' Self-Assessment of Career Outcomes	73
Figure 3-2: SMPC's Expected Career Paths from 1985 to 2015	75
Figure 3-3: Determinants of Promotions by the Central Party Congresses	81
Figure 3-4: Accuracy Comparisons between the Theoretical and Machine-Learning Models.....	86
Figure 3-5: Predicted Probabilities of Political Advancement for SMPC	87
Figure 3-6: Career Prospects Examples: Xi Jinping and Bo Xilai.....	88
Figure 4-1: Promotion Thresholds for SMPC Positions from 1995 to 2015	91
Figure 4-2: Predicted Probability Plot with Thresholds in 2002, Lowest to Highest	93
Figure 4-3: Proportions of Careerists for Selected Provinces.....	96
Figure 4-4: Proportions of Careerists by SMPC Positions from 1995 to 2015	96
Figure 5-1: China's GDP Growth Rates Compared to World.....	99
Figure 5-2: China's GDP Growth Rates Disaggregated by Provinces.....	100
Figure 5-3: Coefficients of Each Type on Economic Growth.....	104

Figure 5-4: The Relationship between Career Incentives and Economic Growth.....	105
Figure 5-5: Coefficients of Careerists by SMPC Positions	106
Figure 5-6: Coefficients of Rank-and-File Careerists at Different Confidence Levels	109
Figure 5-7: Coefficients of SC Careerists on Economic Growth by SC Positions	110
Figure 5-8: Investment in Top 25th and Bottom 25th Percentiles Cities (Careerists)	122
Figure 5-9: Investment in Top 25th and Bottom 25th Percentiles Cities (Dead-enders)	123
Figure 5-10: Investment in Top 25th and Bottom 25th Percentiles Cities (Rising-stars)	124

ACKNOWLEDGEMENTS

Foremost, I would like to express my sincere gratitude to my advisor Prof. Victor C. Shih for being the world's best advisor. His patience, motivation, enthusiasm, and enormous knowledge guided me in all the time of research and writing of this dissertation. He has immensely influenced on my thoughts and attitudes toward Chinese politics and unceasingly enlightened me to seek for how to critically examine the Chinese political elites. I am profoundly proud of sharing intellectual ideas and viewpoints with him. I am also grateful that he always carefully listens to my concerns and provides the perfect remedy for them. His comments and suggestions allowed me to feel a tremendous relief as well as greatly improve the quality of my research. In addition, he provided me with countless research and fieldwork opportunities to develop my research ideas. This dissertation would not have been possible without these experiences. I also would like to gratefully acknowledge my committee members, Prof. Stephan Haggard, Prof. Barry J. Naughton, Prof. Kwai Ng, Prof. Margaret E. Roberts, and Prof. Susan L. Shirk for their passionate academic guidance and support for my Ph.D. study. Finally, I would like to give special thanks to my family and friends for supporting me spiritually throughout my life.

This dissertation was supported by the Chiang Ching-kuo Scholarship, the Carnegie Foundation Research Fund, the Sanford Lakoff Research Fellowship, and the Minerva Study of Innovation and Technology in China (SITC) Project Fellowship. The author also would like to acknowledge Kwan-Jeong Educational Foundation for its generous scholarship throughout my Ph.D. study.

Chapters 1 ~ 5 contain material that has been submitted for publication as “Band of Ri-

vals: Career Incentives, Elite Competition, and Economic Growth in China.” The dissertation author is the principal author of this work.

Chapter 2, in part, is submitted for publication as “Institutional Compliance of Local Leadership in the Post-Mao Era of China.” The dissertation author is the principal author of this work.

VITA

2018 Ph.D. in Political Science and International Affairs

University of California San Diego (UCSD), La Jolla, California

“Band of Rivals: Career Incentives, Elite Competition, and Economic Growth in China”

Committee: Victor C. Shih (Chair), Stephan Haggard, Barry J. Naughton, Kwai Ng,

Margaret E. Roberts, Susan L. Shirk

2011 A.M. in East Asian Studies - China

Harvard University, Cambridge, Massachusetts

“State Intervention and Performance of the Chinese Asset Management Companies”

2008 B.A. in Chinese and Economics

Hankuk University of Foreign Studies, Seoul, Korea

“Monetary Integration between Hong Kong and Mainland China”

ABSTRACT OF THE DISSERTATION

Band of Rivals: Career Incentives, Elite Competition, and Economic Growth in China

by

Jonghyuk Lee

Doctor of Philosophy in Political Science and International Affairs

University of California San Diego, 2018

Professor Victor C. Shih, Chair

This dissertation addresses the question of how bureaucratic incentives affect economic performance in China at the provincial level. This project develops a novel model to measure promotion incentives of the Chinese provincial standing committee members from 1995 to 2015. Using machine learning to incorporate over 200 variables of individual features, this project derives a predicted probability of political advancement as a proxy to evaluate officials' career prospects. The empirical results show that Chinese provincial governments are likely to generate higher economic growth rates when composed of a greater proportion of officials facing intense

promotion competition. On the other hand, higher proportions of provincial leaders whose careers are at a dead-end or on a fast track have no effect. Contrary to popular belief, better economic performance stem mainly from the career incentives of the rank-and-file standing committee members, not from those of the supreme leaders of the province.

1. Introduction

Identifying the determinants of economic growth is one of the central themes in social sciences. Many scholars point out that the state bureaucratic structure is the fundamental institutional foundation of economic growth. As Weber proposes, bureaucratic organizations characterized by meritocratic selection and predictable career rewards are effective in preventing rampant rent-seeking by bureaucrats, thus allowing market activities to flourish (Weber 1962). A more contemporary extension of Weberian theory argues that a meritocratic bureaucracy can effectively institute developmental policies which help developing countries “catch up” with advanced countries (Evans 1995; Evans and Rauch 1999; Haggard 1990; Wade 2004).

This dynamic is particularly salient in China. The country has achieved rapid economic expansion, maintaining nearly double-digit growth rates for over three decades. Many scholars point out that the meritocratic political selection of officials by the Chinese Communist Party (CCP) is a key institutional factor to accomplish this spectacular economic growth (Blanchard and Shleifer 2001; Bo 2002; Montinola, Qian, and Weingast 1995; Qian and Weingast 1996). Under the economically decentralized system, clearly designated career rewards on economic performance by the central leadership led subnational governments to engage in jurisdictional yardstick competition. Specifically, local officials who produce higher economic growth in their jurisdictions will be rewarded with political advancement to higher levels of the CCP’s hierarchy. As a result, each locality competitively develops its economy. This selection system is often characterized as the “promotion tournament.”

The theory of promotion tournament and economic growth implies two causal steps. The first step is that the CCP leadership should consistently promote those who have displayed better economic performance. The second step is that the political competition induced by meritocratic promotion incentives should lead to economic development in locali-

ties. Regarding the first step, the existing literature remains somewhat inconclusive but does not completely reject the possibility of performance-based promotion. While Li and Zhou (2005) find a positive correlation between economic performance and political advancement for top leaders of provinces, Shih, Adolph, and Liu (2012) refute the meritocratic selection hypothesis by arguing that political patronage is the main vehicle for the CCP leadership to make promotion decisions for the central leadership. More recently, scholars attempt to bridge these two determinants of promotion by providing additional identifications. Jia, Kudamatsu, and Seim (2015) suggest that there is a complementary effect between economic performance and political patronage. In addition, Landry, Lü, and Duan (2017) argue that the effects of performance and patronage are heterogeneous depending where officials serve on the administrative hierarchy.

Surprisingly, there has been no systematic analysis on the second causal step of meritocratic selection: the effect of promotion competition on economic growth at the provincial level. Theoretically, promotion incentives are a catalyst for yardstick competition, which encourages economic growth. Without competition, the career incentives may not necessarily lead to economic development (Maskin, Qian, and Xu 2000; Xu 2011). However, the existing scholarship focuses primarily on analyzing the selection institution itself by gauging the implementation of the meritocratic system at the national level. This approach tends to overlook the heterogeneous responses of subnational agents toward the centrally-designed selection institution. Therefore, the current theory can only explain how the country managed to achieve rapid economic growth, but cannot account for why some localities displayed better economic performance than others. In other words, given that all subnational officials presumably face the same incentive structure imposed by the center, how can we explain subnational variations in economic development even after controlling for inherent characteristics of the regions?

This project seeks to clarify this theoretical puzzle by setting economic performance as an outcome and political competition as an explanatory variable. The current approach to identify meritocratic selection in the CCP's personnel management system is in need of revisions. The traditional dichotomous analysis on the determinants of promotion, whether the relationship between performance and political patronage is complementary or conflictive, may not be valid to link subnational officials' promotion incentives with policy outcomes in their localities, such as economic development. Although most of the promotion determinants are included in the party's formal cadre evaluation scheme (Edin 2003), there is a fundamental difference between performance metrics and other formal and informal determinants of promotions. While most of the promotion determinants are institutionally fixed and unchangeable in the short term, the levels of performance are highly dependent on individual officials' efforts. Hence, performance indicators should be considered not as motivations for promotions but as outcomes from political competition induced by officials' promotion incentives.

The level of political competition that subnational officials face in the promotion tournament differs depending on officials' political endowment that affects their promotion probabilities. For a variety of reasons, specified in **Chapter 2-2**, numerous formal and informal institutional factors play an important role in determining promotions in the Chinese bureaucracy. For example, objective qualifications, such as age and education level, serve as the minimal requirements for promotions. At the same time, political patronage and factional affiliation are also major determinants of political advancement. These factors collectively constitute officials' career prospects as officials consider these metrics in evaluating their own political strength in the promotion tournament. Ultimately, by measuring the levels of political competition based on officials' career prospects, this study elucidates the degree to which subnational officials, bounded by the selection institution, comply with the center's perfor-

mance-based directives, such as economic development.

This project finds that when Chinese subnational leadership is composed of a greater number of leaders facing intense competition in the promotion tournament, it likely displays better performance by generating higher economic growth rates. On the other hand, subnational officials who perceive their careers as dead-ends exert less effort toward growing local economies. Additionally, contrary to popular belief, political rising stars whose careers are significantly more promising than other leaders also have weak incentive to produce above-average economic growth in their jurisdictions, because performance is not necessary for them to advance in any case. Further analysis shows that the promotion incentives of subnational leadership overall are a better indicator to explain the economic development patterns than those of the top decision-makers of the subnational leadership, such as provincial party secretaries and governors. These findings further elucidate how meritocratic promotion criteria translate to economic growth through varying degrees of political competition faced by subnational officials.

The analysis incorporates two important qualifications that the existing literature fails to include. First, the theory of meritocratic selection, as well as the Weberian model of rational bureaucracy, presumes that subnational agents are homogeneously influenced by the incentive structure designed by the center. However, individual officials may strategically choose how much they respond to the center's policy priorities depending on career prospects. For example, if officials approach formal retirement age, the officials are naturally sheltered from political competition and expend smaller effort for their future career. On the other hand, younger officials can compete with each other in order to attain the limited access to higher positions in the administrative hierarchy. The strategic responsiveness to career concerns in the case of bureaucrats has been less articulated than in the case of politicians or corporate managers (Gibbons and Murphy 1992; Jacobson 1989). Instead, this study explores the dy-

namic and strategic changes of career concerns within an individual bureaucrat's career path.

Second, instead of examining one or two top leaders in a province, which is done by most of the previous research, this study explores the collective nature of the decision-making process by analyzing the full list of the Standing Members of the Provincial-level Committees (SMPC, also referred to as the provincial standing committee members) in China. Previous research has focused on the decision-making process of one or two top provincial leaders, such as the party secretary and the governor of the province (Bo 1996; Donaldson 2011; Huang 1999; Li and Zhou 2005; Persson and Zhuravskaya 2015). However, analyzing a provincial government from the perspective of one or two top leaders' career background creates a tendency to ignore political dynamics in the collective leadership. It is well established that policymaking at the local level is not monolithic and top-down from the top official of the province but instead is based on consensus by the collective leadership (Baum 1992; McGregor 2010; Miller 2011; Shirk 1993).

In order to empirically integrate the above two distinctive features, this study develops a novel model to measure career prospects of the Chinese provincial standing committee members. In this project, an official's career prospects are defined as the initial political endowments that affect one's promotion probabilities prior to considering the level of policy efforts to show better performance. However, the definition needs two important qualifications to link officials' career prospects with their policy efforts. Career prospects should be constructed in "relative" and "self-evaluated" way. First, each individual official's career prospects should be comparable. Promotions are restricted to a small number of officials. In order to obtain the limited opportunities, officials have to outperform their rivals at the same rank. Therefore, the measurement of the career prospects should reflect this aspect by summarizing all the relevant determinants of promotion into a single indicator to enable us to make comparison with each other's career prospects.

For this purpose, this project derives predicted probabilities of political advancement for each individual official (i.e. prior likelihood of political advancement) as a proxy to measure one's career prospects. By setting up the historical patterns of promotion as a dichotomous outcome variable, this project uses a variety of parametric and non-parametric estimation models to produce each individual official's predicted probability of political advancement. The estimated predicted probability of political advancement indicates how likely an official, in a certain position in a given year, is promoted to a more promising position in the following year. By summarizing all measurable determinants of promotion in a separate model, the predicted probability of promotion enables the systematic assessment of an official's overall prospects in the next promotion round. By ranking the predicted probabilities of promotion, we can identify individual officials' relative career prospects, compared to contemporaneous rivals, at any given point in time.

The second qualification on the definition of career prospects is that career prospects should be evaluated by officials themselves. The existing research on the Chinese political system has examined the effectiveness of the overall selection institution mainly by analyzing whether the system is meritocratic, patronage-based, or both. However, unlike the previous studies where scholars focus on the institution itself, the main subject matter of this project is how individual officials respond to such selection institution and how the response toward the institution alters officials' policy-making strategies. In other words, we make use of biographical and career data to estimate career prospects as perceived by individual officials who have their own personal criteria in evaluating the existing selection institution.

This aspect raises two fundamental problems to estimate the predicted probability of political advancement. First, as outsiders, we have limited information on the exact criteria that Chinese provincial officials generally apply to predict their own career outcomes. Outsiders can only indirectly guess officials' self-assessment on their career prospects by using

the observable factors that have been identified by previous studies. However, it is plausible that Chinese officials in general know better than outsiders regarding their career outcomes, because they have access to insider information. Second, individual officials may adopt a different set of rationales in evaluating their career prospects. Based on their personal and professional experiences, officials may have diverse levels of understanding on how the selection system works in China. It is not guaranteed that each official relies on the same metrics in guessing their own political fortune, except for several explicit and universal factors, such as age, tenure, education level, key administrative experience, and factional ties. My field interviews with provincial organization department cadres enhance this point by suggesting a great deal of universality in the importance of these factors.

In sum, it is empirically challenging to measure individual officials' subjective evaluations on their future career outcomes. In order to deal with these issues, this research indirectly targets the Chinese officials' self-assessment on their career prospects by using fundamentally different approaches. The two estimation models used to produce the predicted probabilities of promotion for individual officials include theoretical models and machine-learning models. The first model is called the "theoretical" model where predicted probabilities of promotion are estimated by using the variables which have been identified by the previous studies on the Chinese political system and by field interviews with provincial organization department cadres. In the analysis, the theoretical model is considered the most conservative model as its predicted probabilities of promotion are calculated on the basis of the widely-known information on the determinants of political advancement.

However, the theoretical model is not sufficient to infer the main target of this research, the self-assessment of individual officials on their own career prospects. In general, Chinese officials overall are better informed on the political selection institution than outsiders. With more insider information, it is fairly possible that they may resort to different com-

binations of variable metrics from those of outside scholars in evaluating their career prospects. Moreover, it is convincing to assume that individual officials acknowledge more about their own specific situation with regard to promotion chances. Compared to the theoretical model that imposes the same variable combination on every official, individual official's own perception can reflect the volatile and situation-specific nature of career prospects, thus is expected to serve as a better predictor in terms of accuracy.

In order to increase the prediction accuracy of predicted probabilities, this study builds the “machine-learning” model where the estimation incorporates as many relevant features as possible to maximize the prediction accuracy of the promotion outcomes. The model adopts a variety of parametric and non-parametric machine learning techniques to find the best variable combinations in terms of prediction accuracy for each year and position. The machine learning prediction is fundamentally superior to the officials' self-assessment since it literally tests with all the measurable candidates for promotion determinants in the CCP selection institution. Although Chinese officials in general have insider information, their predictions on their own career prospects are not as perfect as those estimated by the machine learning techniques because officials cannot observe and integrate all the possible combinations of promotion determinants. This research is designed to indirectly proxy officials' self-assessment of their own career prospects by setting up a range of prediction accuracy from theoretical models and machine-learning models.

In estimating the predicted probabilities of promotion for each individual official, the machine learning model uses numerous variables, including biographical (e.g. age, gender, education, and minority status), career (e.g. party-years, tenure-years in each position, administrative experiences, and job diversities), contextual (e.g. geopolitical characteristics of the working provinces), factional (e.g. affiliations with various members of the central leadership), and network (e.g. network centralities and political connections with top central leaders)

information. In each iteration round of the model, the machine learning algorithms choose important variables, remove irrelevant ones, and decide a sufficient subset for predictions based on information from up to ten years prior to the year of target estimation.

Finally, in each year and position, the predicted probabilities of promotion are produced with the variable combinations that maximize the prediction accuracy of the model. The predictions are calculated only by using the data of the past ten years, since officials are expected to evaluate their career prospects based on patterns of promotion from the recent past rather than the patterns from over a decade ago. The estimated career prospects, in the form of predicted probability of promotion, essentially indicate the levels of political competition that subnational officials need to deal with in order to acquire the limited opportunities for political advancement. This in turn motivates them to deliver various level of performance to the central leadership in order to improve their promotion chances.

However, the predicted probability of promotion itself is not enough to explain one's relative career prospects, because promotion frequencies varied across years and positions. Even the same levels of promotion probabilities can be interpreted differently, depending on the number of promotions occurring in a given year for a given position. Therefore, a baseline of promotion probabilities should be set up in order to accurately evaluate an official's career prospects relative to their contemporaneous rivals. As the baseline, the prior machine learning model estimates the thresholds of promotion, which are susceptible to change in accordance with years and positions. If an official's predicted probability of promotion is significantly higher than the promotion threshold, the model identifies that the official as highly likely to be promoted in the following year. If significantly lower, the official is highly likely to stay in the current position.

Depending on the estimated career prospects and the promotion thresholds, the degree of endeavor for individual officials to carry out the center's directives is accordingly varied.

To operationalize this concept in the Chinese context, this study categorizes provincial standing committee members into three groups: careerists, dead-enders, and rising-stars. “Careerists” are officials whose career prospects are neither high enough to secure the next promotion nor low enough to be disqualified from the selection process. Their predicted probabilities of promotion approximate the promotion thresholds. Therefore, they face the highest levels of political competition. In order to maximize the promotion probabilities, they are expected to have strong incentive to pursue the center’s policy priorities.

On the other hand, subnational officials whose future careers are fairly predictable naturally have weaker incentives to accomplish the center’s tasks. Regardless of the level of effort they exert, the promotion decisions are already made for these officials, thus reducing the role of effort. In the analysis, officials whose career prospects are significantly lower than the promotion thresholds are designated as “dead-enders.” Dead-enders are mostly older officials who are generally blocked from the selection process due to formal criteria, such as age, education credentials, and job diversities. This type of official faces retirement in the near future. If officials’ career prospects are significantly higher than the promotion threshold, this research labels them as “rising-stars.” They are usually young and capable protégés of the central leaders. Rising-stars experience less competitive pressure from their peers because they have affluent political endowments and their imminent promotions are already secured.

With the above distinct characteristics, this study investigates the effect of provincial leaders’ career incentives on local economic growth in Chinese provinces. Economic growth has been the policy priority of the central leadership since the economic reform in the 1980s. Some scholars argue that authoritarian regimes such as China can gain implicit political legitimacy from the public by generating high economic performance (Desai, Olofsgård, and Yousef 2009; Zhao 2009; Zhu 2011). In order to maintain performance legitimacy, the CCP leadership has emphasized economic growth by designing a series of promotion institutions

that include economic indicators as one of the crucial criteria of political advancement (Landry 2008; Whiting 2004). As a result, there are a fair number of journalistic articles about “zhengji” (political achievement), a word used to describe Chinese local leaders’ endeavors to stimulate local economies in order to gain promotions (Duan and Wang 2006; He 2004; Wang 2013; Zhang 2015).

This study argues that provincial leadership in China is likely to generate higher economic growth rates when its provincial standing committee is composed of a greater number of the “careerists.” The empirical analysis also demonstrates that the proportions of “dead-enders” and “rising-stars” in the provincial leadership have no effect on the scales of economic growth in provinces. In addition, this study shows that better economic performance comes from the career incentives of a specific group of the rank-and-file provincial standing committee members, not from those of the top leaders of the province, such as the party secretary and the governor. This finding suggests that although party secretaries and governors have the greatest formal power in a province, they tend not to be driven by performance competition to obtain their promotions, even if they sit on the cusp between promotion and status quo. Province-level growth variation is instead driven by provincial elites who oversee major cities and economic arenas. If they are careerists, they have both the incentives and the opportunity to make a difference to overall provincial growth.

In addition to enriching the theory of meritocratic selection and economic growth, the empirical results of this study have important implications for understanding political selection institutions in China and in authoritarian regimes in general. Although the extant literature provides an over-arching explanation for authoritarian policy-making, these broad frameworks cannot predict actual policy outcomes because actors in authoritarian systems face heterogeneous incentives. Specifically, scholars argue that the relative sizes of the selectorates and the winning coalition determine the types of public policies (Besley and

Kudamatsu 2008; Bueno de Mesquita et al. 2004). However, they fail to account for the possibility that authoritarian institutions may motivate each member of the winning coalition differently. If that is the case, subnational subordinates in authoritarian regimes may respond to the incentive structure created by the central authorities in a variety of ways. This research attempts to extend the literature on authoritarianism by measuring the degree of agent shirking in subnational governments and the heterogeneous outcomes of such shirking.

While the existing literature on Chinese bureaucratic politics tends to focus only on promotion-seekers' behaviors in local politics, this study is also designed to investigate subnational agents who do not internalize promotion incentives in their utilities. As Downs (1967) suggested long ago, there are largely two types of officials: one type actively seeks promotions, and the other is only concerned with its own security and convenience. In this research, provincial leaders whose careers are either dead-end or significantly more promising suffer from the lack of incentives to accomplish the center's goals. How to incentivize such subnational agents to align with the center's interests is one of the core issues in developing a successful decentralization system in China (Blanchard and Shleifer 2001; H. Cai and Treisman 2006; Landry 2008).

This study suggests that the uncertainty of officials' career outcomes, combined with the performance-based selection system, is the key element to motivate subnational agents to deliver performance to the central leadership. Officials strive to accomplish the center's objectives only when they believe that better performance can increase their promotion probability and alter their expected career outcomes. Therefore, promotion decisions made not by performance, but by other unchangeable traits, such as age or political connections, would harm subnational official's career incentives. Ironically, the enforcement of a mandatory retirement age, which was initially designed by the CCP leadership to remove incapable old cadres, may discourage officials to actively engage in generating economic growth (Manion

1993). As officials approach the formal retirement age, they gradually lose their incentives to acquire political advancement. Promotion decisions based on political patronage may also cause procrastination among subnational leaders. The larger effect of political connections on promotion decisions, the fewer officials believe in the role of performance. By emphasizing career rewards on the basis of performance, the central leadership can better incentivize subnational leaders to perform.

The rest of the dissertation is organized as follows. In the next chapter, I will review the extant literature on the theory of meritocratic selection, followed by the theoretical framework of this study. By incorporating the suggested theoretical framework with the Chinese political institutions, hypotheses fully reflecting the Chinese context will be presented. In **Chapter 3**, I will show how to measure the level of political competition that each subnational official faces in the promotion tournament. Next, details on machine learning procedures and the construction of individual career incentives will be discussed along with a discussion of data collecting processes. Then, I will provide a way to aggregate individual career incentives into provincial-level collective incentives. In **Chapter 5**, the constructed provincial-level independent variables, including aggregate provincial level career incentives, will be used to explain growth performance across provinces. I also estimate how provincial officials in various positions impact provincial economic growth if they are career incentivized. The conclusion will further discuss the broader implications of my findings for political economy and authoritarian politics.

Acknowledgement

Chapter 1 contains material that has been submitted for publication as “Band of Rivals: Career Incentives, Elite Competition, and Economic Growth in China.” The dissertation author is the principal author of this work.

2. Career Prospects and Incentives in the Chinese Provincial Leadership

2-1. Background: Meritocratic Selection and Subnational Performance

2-1-1. The Theory of Promotion Tournament

Selecting qualified political leaders is one of the most crucial factors in the political economy of development (Acemoglu, Egorov, and Sonin 2010; Besley 2005; Olken and Pande 2012). Since the time Weber first differentiated the rational bureaucratic institution from the patrimonial selection system, scholars have focused on the meritocratic bureaucracy, highlighting performance-based selections and associated long-term career rewards as one of the primary mechanisms for economic growth (Evans 1995; Evans and Rauch 1999; Wade 2004; Weber 1962). In the case of China, scholars also extensively examine the efficiency of the Chinese bureaucratic system in terms of economic growth. In particular, the promotion incentive structure to motivate subnational officials to develop local economies is often analogous to a “tournament,” where they compete with each other in order to acquire limited opportunities for political advancement (Maskin, Qian, and Xu 2000; Xu 2011).

The theory of the promotion tournament requires at least two pre-conditions. First, a non-monopolistic and decentralized economic structure should exist across subnational regions. Unlike the Soviet Union where local economies were organized by a unitary and centralistic governing system, the main organizational form in China has been geography-based and self-sufficient, thus each subnational government has multiple economic sectors that compete with one another as rival producers of the same goods (Qian and Xu 1993). It is also well documented that the Chinese central government has decentralized economic affairs to the subnational level in order to stimulate inter-jurisdictional competition since the outset of the economic reforms in the early 1980s (Blanchard and Shleifer 2001; Jin, Qian, and Weingast 2005; Landry 2008; Weingast 1995). This setting enables the central leadership to

have an evaluation tool to examine the relative performance of subnational officials based on yardstick competition.

The second pre-condition is that subnational officials should be controlled by a centralized personnel management system. In general, regional competitions of the promotion tournament is essentially different from that of fiscal federalism, where subnational officials are elected by the local public (Epple and Zelenitz 1981; Xu 2011). In the promotion tournament, regional competition does not occur by providing more public goods to attract residents; rather, it occurs through local politicians facing strong career incentives for political advancement. Therefore, the powerful central leadership should possess dominant authority on appointments, promotions, and demotions of subnational agents. Despite the dedicated implementation of economic decentralization in China, the existing literature suggests that the Chinese personnel management for subnational officials has maintained centralization throughout the reform period (Landry 2008). This centralized cadre management system has played a crucial role in invigorating the lower level governments' incentives to implement the higher level governments' policy preferences (Bo 2002; Cai and Treisman 2006; Huang 1999).

Under this economically decentralized and politically centralized system, scholars argue that the CCP's meritocratic selection institution, where the central leadership evaluates local officials by their performance, is a key dynamic for economic growth in China (Chen, Li, and Zhou 2005; Li and Zhou 2005; Maskin, Qian, and Xu 2000; Xu 2011). In order to empirically identify meritocratic selection in Chinese politics, the major strategy adopted by scholars is to examine whether the CCP leadership consistently promotes those who achieved better performance than their rivals. Many quantitative and qualitative studies support the existence of meritocratic selection. For example, Li and Zhou (2005) find that the promotion probabilities of provincial leaders increase with their average performance measured in annu-

al GDP growth rate. Chen, Li, and Zhou (2005) also suggest that the turnover among provincial leaders depends on provincial economic achievement relative to their immediate predecessors. According to Bo (2002), provincial leaders are more likely to be demoted or forced into retirement with poor economic performance, whereas greater revenue contribution by a province to Beijing leads to the higher chances of promotion for the top leaders of a province.

In addition to the quantitative findings, there is also a large volume of qualitative literature on the performance-based promotion scheme in the Chinese political selection process. In their analysis of promotion patterns within different governmental hierarchies, these scholars have found that the CCP's cadre evaluation policies enforced by the central organization department are effective in determining officials' promotion probabilities (Burns 1989; Edin 2003; Zhang 2015). After the implementation of the "New Cadre Management System" in the 1980s, local leaders should display to their superiors not only their loyalty to the party, but also their economic performance, which was measured by easily quantifiable economic indicators, such as GDP growth rates, industrial outputs, and fiscal revenues (Manion, Oksenberg, and Harasymiw 1985; O'Brien and Li 1999; Whiting 2004; Zhong 2003). The very existence of the scoring system on an official's policy performance can be seen as evidence that subnational officials in China are motivated to perform well to acquire political advancement in the CCP hierarchy.

However, the theory of promotion tournament has been refuted by many scholars mainly due to its theoretical ambiguity for empirical testing. In particular, Shih, Adolph, and Liu (2012) extensively summarized the theoretical and empirical drawbacks of the theory of promotion tournament. First, the theory is not theoretically fine-grained enough to make a causal inference between bureaucratic characteristics and policy outcomes, such as economic growth. The direct causality between the two is fundamentally difficult to identify because the former is stable over time while the latter is highly time-sensitive. If the meritocratic se-

lection has existed since the reform and has not changed, how can we infer that policy outcomes are affected by that bureaucratic feature? Moreover, some subnational entities perform better than others, and even within the same entity, policy performance differs at times. In the current setting, the theory of promotion tournament cannot explain these subnational variations in policy outcomes.

Second, many scholars are also skeptical of the assumption of the meritocratic selection in authoritarian regimes. Selecting subordinates based on their performance essentially assumes that the top Chinese leadership is unified and has sufficient time horizon to consistently motivate subordinates to maximize their performance (McGuire and Olson 1996). Incentivizing subordinates to produce long-term economic outputs clearly can serve as one of the policy goals for authoritarian regimes. However, the literature on authoritarian survival suggests that there are many other considerations that the authoritarian rulers need to take into account for regime survival, in addition to the horizontal performance-based selection institution. Especially in a situation where the authoritarian regime constantly faces internal and external threats to its survival, maintaining loyalty by providing short-term economic rents to its subordinates may be more beneficial than pursuing long-term economic development for the regime stability (Bueno de Mesquita et al. 2004; Gandhi and Przeworski 2007; Magaloni and Kricheli 2010). Although there is possibility that the meritocratic criteria influence elite promotions, the argument that the meritocratic selection is the major determinant for political advancement in China needs an additional analysis to solve the authoritarian dilemma between loyalty and performance in the selection process.

The empirical evidence on the theory of promotion tournament also suffers from serious inconsistency in both qualitative and quantitative studies. Although there is ample qualitative literature describing the cadre evaluation system, the existence of evaluation is not sufficient to justify the direct relationship between the meritocratic selection and local economic

growth. The causal mechanism on the relationship between two should be supported by systematic and consistent evidence. In addition, the interviews conducted by various scholars draw different conclusions. In the Whiting (2004)'s interviews, the Chinese county officials seem to be highly motivated by the newly established evaluation system. On the other hand, the interviewees in Hillman (2010) and Landry (2008) research did not agree that the economic performance is one of the critical determinants for their political advancement. Rather, the economic and quantifiable criteria in the evaluation system are presented as a mere reference to the promotion consideration.

As the quantitative evidence on the theory of promotion tournament, the previous studies on the provincial leadership in China generally find that provincial economic growth tends to increase the promotion probabilities of the two top provincial leaders, such as the provincial party secretary and the governor (Chen, Li, and Zhou 2005; Li and Zhou 2005; Maskin, Qian, and Xu 2000). However, a more comprehensive analysis done by Shih, Adolph, and Liu (2012) on the provincial and central high-ranking officials does not find any evidence between economic performance and promotion probabilities. In their article, they further criticize the existing identification strategies to analyze the provincial leadership by pointing out the poor measurements on promotions and the possibility of selection bias. Moreover, Landry (2008) confirms that exceptional economic growth is not systematically correlated with the promotion probabilities of the top leaders at the city level neither.

2-1-2. Correcting the Theory of Promotion Tournament

The abundant criticism on the theory of promotion tournament suggests that the theory needs to be improved both theoretically and empirically. However, rather than improving the promotion tournament theory, critics on the tournament theory neglects the potential for meritocratic selection and instead provides alternative mechanisms for determining promotions. Numerous studies have argued that political patronage and factional afflictions play a

decisive role in making promotion decisions while rejected the idea of meritocratic selection (Cai and Treisman 2006; Dittmer and Wu 1995; Hillman 2010; Huang 2000; Meyer, Shih, and Lee 2016; Nathan 1973; Oppen, Nee, and Brehm 2015; Pye 1981; Shih, Adolph, and Liu 2012; Shih and Lee 2018; Teiwes 1990). For example, Shih, Adolph, and Liu (2012) find that the elite rankings in the alternate Central Committee are mainly determined by the members' political connections with the current party secretary general. Moreover, Meyer, Shih, and Lee (2016) strengthen the effect of factional politics on promotion decisions by using different definitions of forming factions in the Chinese central leadership. Shih and Lee (2018) have gone farthest in emphasizing the importance of political connections by finding that the followers' career outcomes are closely related to those of their political patrons.

The backlash of the excessive emphasis on political connections for promotions results in the compromise between the meritocratic selection and the patronage-based selection. Although there is rich literature that proposes political connection is the major determinant for promotion, it is unconvincing to conclude that China's enormous economic success since the reform has been realized with a political model of nepotism and patronage. If the CCP leadership operates in this corruptive way, the Chinese public would hardly support the regime and would hardly believe that the government performs well in terms of economic development (Chen 2004; Chen and Dickson 2010; Chen and Zhong 2002; Dickinson 2016; Whyte 2010). It is also fairly perplexing to explain why local governments would initiate numerous infra-structure projects for long-term economic growth if there is no effect of economic performance on their cadre evaluations (Oi 1999; Xu 2011).

In this view, the recent research on the promotion determinants mainly attempts to reconcile the selection mechanisms between meritocracy and patronage. Jia, Kudamatsu, and Seim (2015) suggest that there is an interaction effect between economic performance and political patronage. If officials have political connections with senior central leaders, the offi-

cials would benefit more from their economic performance. According to Landry, Lü, and Duan (2017), the effects of these two mechanisms are heterogeneous depending on the administrative levels. They argue that the effect of political connections increases and that of performance decreases, as the officials' administrative levels are higher. Additionally, Choi (2012) demonstrates that political patronages only work for provincial party secretaries while economic performance influences the promotion probabilities of both party secretaries and governors.

Overall, the current analysis on the existence of meritocratic selection mainly focuses on explaining whether the meritocratic selection mechanism is strong enough to overcome other considerations, such as political connections, and thus is able to motivate subnational officials to engage in political competition based on their performance. The empirical results have not reached at consensus on this issue. By setting up economic performance and political patronage as two competing elements on political advancement, scholars have completely ignored the meritocratic selection mechanism or tried to attach certain conditions for each case to evaluate the effectiveness of the meritocratic selection. In consequence, the existing debates on the theory of promotion tournament became somewhat disoriented and rampant with case-specific arguments.

If the CCP leadership operates unitary and centralized selection institutions to promote local subordinates, why is it so challenging to identify the effect of meritocratic selection on promotion decisions? A problem is that the effect of economic performance on promotions is clear with one subset of local leaders, whereas studies with another subset of the group demonstrate that economic performance is only impactful under certain conditions. Even with the same dataset, the empirical evidence sometimes indicates totally contradictory outcomes based on the model specifications. The effect of economic performance on promotion decisions may differ for each individual official. Furthermore, the combinations of indi-

vidual characteristics that affect the effect of economic performance also seem to be not institutionalized and to change all the time. Eventually, it becomes more convincing to claim that the mechanism of meritocratic selection should be viewed on a case-by-case basis, and it is nearly impossible to differentiate the effect of economic performance from that of other promotion determinants.

This project argues that the case-specific outcomes for the theory of promotion tournament are mainly stemmed from an inappropriate identification strategy adopted by the previous research. The current configuration to answer whether economic performance is one of the major determinants of political advancement is fundamentally problematic because it treats performance indicators as same as other promotion determinants. Performance is essentially not determined by centrally-imposed promotion institutions, but by individual officials' incentives to comply with such institution. However, the previous studies on meritocratic selection consider economic performance as one of the institutionalized factors whose causes and effects are decided by the central leadership. This is why the empirical evidence of economic performance on promotion decisions falls into case-specific arguments.

The nature of performance is completely different from those of other formal and informal institutional factors, such as political connections. While other determinants, such as age, education level, administrative experiences, and factional affiliations, are fixed and at least unchangeable in the short term, performance indicators can rapidly change over time, and more importantly, the effect of performance is entirely dependent on individual officials' efforts. Performance indicators represent the outcomes from individual officials' willingness to comply with the center's objectives. In this sense, performance indicators should be regarded as a dependent variable, not as one of the independent variables to explain promotion outcomes. The remaining question is rather to explore how to construct an individual-level explanatory model that uses performance indicators as outcome variables, which will be cov-

ered in the next section.

2-2. Feature 1: Relationship between Career Prospects and Career Incentives

The existing literature on authoritarian power-sharing is primarily based on the relationship between dictators and their subordinates. Authoritarianism is frame as a political regime where dictators govern through the use of credible threats in order to exploit their subordinates by wielding their inability to coordinate against the ruler (Kuran 1991; Tullock 1987). A fundamental dilemma in such regime, where rulers are self-appointed and in which there is no legitimate procedure for substituting them, is that the more power rulers acquire, the higher is the probability of being overthrown. If rulers manage subordinates only through repression and coercion alone, there is a high possibility for rulers to fail to make a credible commitment to their subordinates that they will not harm the subordinates as long as they support the rulers.

By providing governmental spoils for loyalty as well as threatening, authoritarian rulers can show a credible signal to their subnational agents (Wintrobe 2000). While distributing, dictators use their subordinates to implement public policies (Bueno de Mesquita et al. 2004; Magaloni and Kricheli 2010). However, there is a monitoring problem where subordinates have an incentive to free-ride or to shirk or to use policies to establish alternative patronage system against the regime. The ruling elites in authoritarian regimes often adopt electoral institutions in order to acquire credible information about the loyalty and the power of their subordinates (Blaydes 2010; Brownlee 2007; Gandhi and Przeworski 2007; Geddes 2005). Authoritarian regimes distribute to the most loyal members defined by electoral outcomes, and residents in localities connected with the loyalists have an incentive to maintain their support to the regime (Lust-Okar 2006; Magaloni 2006).

While the information and monitoring problems need to be solved to secure regime stability, authoritarian regimes without electoral institutions also need to have such institution

to ensure the loyalty and compliance of subnational officials. Unlike a democratic or semi-democratic authoritarian system where the future careers of subordinates are also affected by the general public through electoral institutions, authoritarian subnational leaders in one party regime like China are solely evaluated by their superiors in the bureaucratic hierarchy. The central rulers in China have to institute proper bureaucratic career incentives to monitor its subnational agents, as Egypt's one-party regime solved this problem by using a semi-auction electoral system (Blaydes 2010).

Many scholars point out the Chinese bureaucracy characterized as meritocratic selection as a key factor to make the Chinese subnational officials credible to the central leadership. Clearly designated career rewards on performance led the subnational subjects to engage in so-called 'jurisdiction yardstick competition' where the subordinates competed to achieve the center's goals, such as economic development (Maskin, Qian, and Xu 2000; Montinola, Qian, and Weingast 1995; Qian and Weingast 1997; Qian and Xu 1993). Additionally, the central leadership frequently rotated subnational officials through promotions and transfers in order to reduce the risk of local capture and competition for rents within the regions (Bo 2002; Huang 1995; Landry 2008). By providing proper career rewards on performance and controlling political mobility, the Chinese personal management system gave subnational officials a clear incentive to follow the center's directives.

There is well-developed literature on how these career incentives would hold agents accountable to their principals. Holmström (1999) presents a formal model to describe that career incentives increase the efficiency of managerial behaviors under incomplete information of labor market. In the same vein, Dewatripont, Jewitt, and Tirole (1999) also propose that in order to maximize one's chance to be hired in the relevant labor market, an agent exerts efforts to be promoted without other incentives. This line of scholarship can be applied to the Chinese officials whose career advancement is based on their performance. Also, the per-

formance evaluation is done by their superiors who have incomplete information about subordinates. These characteristics resemble those of relevant labor market (Guo 2009).

Surprisingly, the theory of meritocratic selection and career incentives as well as the Weberian model of rational bureaucracy presumes that subnational agents are uniformly influenced by the career incentives created by the central leadership. However, bureaucratic incentives are not exclusively formed under the rule of meritocratic promotions. There are numerous other formal and informal institutions that affect individual officials' future careers. Depending on their own evaluations on their own career prospects, which are shaped by a variety of institutional contexts, individual officials may have different levels of bureaucratic incentives to comply with the center's directives. For example, in the early 1980s, the CCP implemented a mandatory retirement plan that forced old cadres to retire once they reached certain age limits (Manion 1993). If officials approach the formal retirement age, the officials are naturally sheltered from future political competition and expend smaller effort for their future career. On the other hand, it is intuitive to assume that relatively young officials are vigorously competing with each other in order to attain the limited access to higher offices in the hierarchy. As they perceive that their contemporaneous rivals are competent and qualified, these young officials are expected to strive to accomplish the center's objectives.

In order to maintain the accountability of subnational officials to the central leadership, the Chinese leadership successfully has instituted a proper personnel management system and constantly restructured it in the face of the new social and economic dynamics in the post-Mao era. When the economic reform started in the late 1970s, the CCP leadership began to train young and competent subordinates to replace old revolutionaries whose knowledge and abilities became obsolete for the new era. A series of reforms on the personnel management were implemented to improve bureaucratic efficiency while maintaining center's personnel controls on local officials. For example, objective qualifications, such as age, educa-

tion level, and administrative experiences act as strong requirements for local officials' career advancement (Edin 2003; Kostka and Yu 2015; Kou and Tsai 2014; Landry 2003; Whiting 2004). This rule-based selection institution is originally designed to select capable and competent candidates for high-ranking officials, but this system also gives local subordinates a significant incentive to predict their own career prospects.

Moreover, a group of scholars also suggests that the effect of political patronage on the selection process in China has remained intact throughout the post-Mao era (Cai and Treisman 2006; Dittmer and Wu 1995; Hillman 2010; Huang 2000; Meyer, Shih, and Lee 2016; Nathan 2003; Oppen, Nee, and Brehm 2015; Shih 2008; Shih and Lee 2018; Teiwes 2001). In addition to identifying capable officials, authoritarian rulers also make career decisions for their subordinates based on loyalty, which is mainly generated through political connections (Landry, Lu, and Duan 2017; Magaloni and Kricheli 2010; Svobik 2012; Wintrobe 2000). Although the informal patronage connection between the central leadership and their local followers is not easily identifiable by outsiders, subnational officials in China well recognize their political affiliations. Especially in a non-democratic regime where career decisions are exclusively determined by superiors, local officials can make predictions on their career outcomes based on their political connections with the central leadership.

These two formal and informal institutional elements, characterized as the official requirements and the political connections, play crucial roles in shaping individual officials' career prospects. Any rational subordinates in the system would be able to predict their immediate career prospects based on these factors. Furthermore, the more vivid and straightforward criteria the central rulers used in selection decisions, the easier individual officials can predict their own career prospects. However, in the previous studies on authoritarianism, bureaucratic politics, and Chinese political institution, there are few attempts to examine how much the expected career prospects influence an individual official's career incentives, the

levels of effort that the official is willing to exert in order to achieve the center's policy priorities in exchange for potential promotions.

It is striking that the strategic responsiveness to career incentives in the case of bureaucrats has been less articulated than in the case of politicians or corporate managers. The literature on strategic behaviors among U.S. politicians suggests that politicians have different levels of incentives to run in the next election according to winning prospects (Jacobson 1989; Jacobson and Kernell 1983). The literature on the incumbency effect in U.S. House elections also proposes that potential opponents are not willing to run before the seat becomes empty due to the difficulties of competing against powerful incumbents (Abramowitz 1975; Fiorina 1977; Mann and Wolfinger 1980). In managerial economics, it is well established that corporate executives have heterogeneous incentives on their future career destinations, depending on their ages or previous performance (Chevalier, Judith and Ellison 1999; Gibbons and Murphy 1992). Because of the need to differentiate assigned bureaucrats from elected politicians, scholarly work on bureaucrats mostly tend to focus on categorizing bureaucrats in accordance with their tasks or professions (Alesina and Tabellini 2007; Maskin and Tirole 2004; Morris 2001).

Similar to politicians in democratic societies and executive managers of companies, officials in non-democratic systems may also strategically choose how much they respond to the central government's policy priorities depending on their career prospects. The extant literature on authoritarian politics also tends to ignore the fact that subnational agents in authoritarian regimes face heterogeneous incentives when it comes to implementing public policies. Specifically, scholars argue that the relative sizes of the selectorates and the winning coalition determine the types of public policies (Bueno de Mesquita et al. 2004). However, they fail to account for the possibility that authoritarian institutions may motivate each member of the winning coalition differently. If that is the case, subnational agents in authoritarian regimes

may respond to the incentive structure created by the central authorities in a variety of ways. This study is designed to extend the literature on authoritarian agency by measuring the degree of subnational agents' compliance or shirking to the central authoritarian institutions and by examining heterogeneous outcomes of such actions.

This research explores the dynamic and strategic changes of bureaucratic career incentives within an individual bureaucrat's career path and presents a way of measuring these individual-level prospects. Depending on an official's career prospects that are collectively formed by the formal and informal determinants of political advancement, the official chooses the levels of career incentives, the policy efforts that the official is willing to exert in order to attain the next promotion. However, the relationship between career prospects and career incentives may not be linear and monotonic. Some officials who are unlikely to be promoted may not need to consider what the central leadership directives are, while those who still have a chance to be promoted are willing to accomplish the center's tasks. On the other hand, it is also possible that some officials whose career prospects are significantly more promising than those of their contemporaneous rivals have fewer incentives to deliver performance because their immediate promotions are already guaranteed.

In this section, the details on the determinants of career advancement in the Chinese political system are first presented. The CCP personnel management institution has experienced a series of reconstruction and streamlining during the post-Mao era. There are many formal and informal factors that potentially affect official's career prospects. The historical changes of the major factors for promotion are thoroughly described along with theoretical evidence for such factors. Next, the categorization scheme for Chinese officials, which fully reflect the non-monotonic relationship between career prospects and career incentives, is examined. Based on their career prospects, this study divides the Chinese subnational leaders into three groups: dead-enders, careerists, and rising-stars. Finally, the section will explain

how different types of officials have different incentives for their career outcomes.

2-2-1. Shaping Career Prospects of Chinese Officials

In the post Mao era, the CCP personnel management institution has evolved from virtuocracy, which rewards those who exemplify the moral virtues of the socialist movement, to meritocracy, which rewards professional and intellectual knowledge (Burns 1994; Lieberthal 2004; Manion, Oksenberg, and Harasymiw 1985; Oksenberg 2001; Shirk 2010). Departing from the Cultural Revolution where the extreme virtuocracy led to radical and destructive political activism, the CCP leadership reformed the social and political system to gradually move away from moral assessments of a person, to focus on objective qualifications, such as age, education levels, and professional competency. In an enlarged politburo meeting in 1980, Deng Xiaoping's proposal of the "four principles" on cadre selection criteria emphasized "more revolutionary, younger, better educated, and more professionalized" candidates. Since then, the "four principles" has been considered to be the core guideline of the CCP personnel management system. The CCP leadership imprinted the concepts in the Party Constitution in 1982, and implemented major modifications on the criteria for cadre training, appointment, and promotion (CCP 1979, 1980, 1982).

Each concept of the "four principles" is specified in the dictionary of party building published by the People's Daily, an official newspaper of the CCP (People's Daily 2018). First, "revolutionary" is a legacy of virtuocracy, and indicates a cadre's political and ideological reliability. A cadre should support Marxism, and adhere to the basic principles and lines of the party. Moreover, a cadre should maintain honesty, diligence, and impartiality, and express selfless dedication to the mass. Although abstract, this ideal is the first requirement for the cadre selection. The dictionary points out that without a strong revolutionary mind, a cadre cannot even be considered for leadership positions. Second, "younger" literally refers to cadres younger in age. Replacing relatively older cadres with the younger is expected to re-

sult in the improvement of quality and efficiency in party organizations, although the mechanism seems vague. The dictionary merely mentions that the younger have stronger energy, physique, competency, and vitality. Third, a CCP cadre should equip a firm understanding of Marxism, culture, and science. As such, the selection of knowledgeable cadres with high levels of education is critical to strengthen the party's overall effectiveness. Fourth, "professionalism" is also required in cadres aiming for the leadership position. The CCP leadership shows its interest in a cadre who has accumulated professional experiences in practice and has shown potential to become proficient in the cadre's own profession.

The "four principles" has always served as the core rationale for the party's recruitment and appointment. A more revolutionary, younger, educated, and professionalized cadre is more likely to be promoted to a high-ranking position. By the late 1990s, It is reported that most of the 720,000 cadres in leadership positions at the county level or above had been replaced by young, knowledgeable, and professional officials (He 2004). Since the 1980s, the age of officials has served as the most influential determinant of political advancement. In addition to Deng Xiaoping's emphasis of younger cadres on appointments and promotions, the installation of a mandatory cadre retirement system in the early 1980s also made age one of the most crucial factors in the promotion tournament (Manion 1993). Through a series of party's regulations on personnel selections and promotions, top county leaders were forced to retire at the age of 55, and only cadres below the age of 45 can be on the reserve list for leading positions above the county levels (Zhong 2003). Moreover, the central organization department specifically confirms this point by announcing "the main body of chief party and government leaders at the county level should be around the age of 45" (People's Daily 2006). Therefore, local leaders at the county level in their early 40s try their hardest to be promoted before they become too old to be eligible for higher positions within a few years. By their early 50s, county level officials can expect to end their political careers at the county level.

Although not strictly promulgated, this also seems to be true for the provincial level, the highest level of local administrations. The mandatory retirement rule was gradually adopted in the case of the provincial level. According to Shih and Lee (2017), the last provincial party secretary who was over 65 was Yue Qifeng, the party secretary of Heilongjiang, and he retired in July 1997 at age 66. Since then, the only provincial party secretaries older than 65 were provincial party secretaries with the politburo membership. The party secretaries of Beijing, Tianjin, Shanghai, post-1997 Chongqing, Guangdong, and occasionally Xinjiang provincial-level administrations were one-level higher (i.e. vice national level) than other provincial party secretaries (i.e. provincial level) in the CCP nomenklatura (Miller 2008; Shih and Lee 2018). The retirement age for such leaders is 67, although there is no official restriction. In the case of governor, Chen Andong, the former governor of Shaanxi, retired at 66 in May 2002 (Shih and Lee 2017).

This age limit, combined with the minimum three year requirement to stay in one place, explicitly discourages Chinese local officials to pursue career advancement once their age surpasses certain thresholds (Liu 2014; Pan 2013; Wu and Lansdowne 2013; Xi, Yao, and Zhang 2015). In the case of the provincial level leadership, the age maximum threshold is practically around age 62 above which provincial leaders would not expect further career advancement because the official retirement age for the provincial-level officials is age 65. Numerous studies on political mobility in China have empirically confirmed that top leaders at provincial level party and government are more likely to be promoted to the center or another province if they are younger and the age is below 62 (Landry, Lu, and Duan 2017; Li and Zhou 2005; Persson and Zhuravskaya 2015).

Additionally, scholars also find that education levels have played a prominent role in determining political advancement for Chinese local officials, as Deng Xiaoping continuously emphasized since the early 1980s (Cui 2003; Kostka and Yu 2015; Landry 2008; Shih,

Shan, and Liu 2010; Walder 2006; Walder, Li, and Treiman 2000; Yao 2016). Kostka and Yu (2015) and Landry (2008) suggest that low levels of education credentials decrease official's promotion chances at the county level and the prefecture level respectively. Moreover, Walder, Li, and Treiman (2000) find that a college graduate on average has 2.4 times greater chance of becoming an elite cadre than a high school graduate. In another study, Walder (2006) argues that, by 1990, a party member with only a high school education was four times less likely to be selected as a cadre than a member with a college degree.

Professionalism is often linked with officials' administrative experiences. The previous work experiences in a variety of party, military, and government positions at the central and local departments are positively correlated with Chinese officials' promotion chances. Scholars generally agree that the number of administrative experiences, especially from local leadership, core central party, or economic management positions, has a significant effect on political advancement (Li 2000; Nathan 2003; Shih and Lee 2018; Teiwes 2001). Specifically, the CCP central leadership often dispatches capable and young officials to train them to become the next national leaders. According to Edin (2003) and Huang (1996, 2002), local leaders assigned from central departments have higher possibility of rotating back to central organs. My field interviews with cadres from a provincial organization department confirm that the career prospects of the centrally-assigned officials are substantially more promising than those of cadres transferred from other provinces. Scholars also point out that experiences at the People's Liberation Army (PLA) also affect official's long-term career paths (Kiselycznyk and Saunders 2010; Shambaugh 2002; Wang and Minzner 2015). More recently, a growing literature on Chinese politics starts to focus on the effect of the Communist Youth League (CYL) working experiences on promotion probabilities (Li 2002; Miller 2011).

The tenure length of current position for Chinese officials is also one of the crucial determinants for political advancement. As a Leninist party, CCP leadership at every level is

formed after a party congress at that level convened, typically once every five years. In theory, Chinese leaders are elected to serve a party position at the beginning year of each party congress. Once the full five-year length term ends, most of the leaders likely will be promoted, transferred, or be retired from the assigned party position, except for the special cases where cadres have to work in the same position for a long time because of security issues, such as party leadership positions in politically-sensitive autonomous regions, such as Tibet or Xinjiang. However, in practice, most of Chinese local officials do not serve the full five year tenure term. According to Shih and Lee (2017), the average tenure year for provincial standing committee members is only 3.7 years from 1980 to 2016. Many scholars have advocated that the length of tenure years has a significant impact on promotion probability (Chen, Li, and Zhou 2005; Guo 2009; Kou and Tsai 2014; Landry 2008).

Even if not statistically identified, a large literature also implies that there is systematic discrimination toward woman and ethnic minority in the Chinese political system. Many articles suggest that the CCP's gender equality is at most official rhetoric and political participation of female party members is seriously limited (Hsiung 2001; Moser 2001; Rosen 1995; Su 2006; Zhang 1993). By conducting cross-provincial analysis, Su (2006) argues that female provincial leaders are less likely to occupy prestigious positions than their male counterparts. She further suggests that the effect of being female leaders is varied depending on political institutions, socio-economic conditions, and cultural background of the province. There is also consistent evidence indicating that ethnic minorities face more difficulties entering more powerful positions of the party or government organizations (Dillon 2016; Fan 2016; Li 2008; Saich 2010; Sautman 1998). According to Shih and Lee (2017), only 6 percent of the provincial standing committees, the highest-ranking leadership of provinces, are occupied by female leaders, and 11 percent by ethnic minorities.

Moreover, whether officials were born in the currently working province also possibly

affects promotion prospects. It is well established that the Chinese central leadership put enormous effort to prevent local leaders from forming alternative patronage channels with local publics by rotating high-ranking local officials across multiple provinces (Blanchard and Shleifer 2001; Bo 2004; Huang 2002; Landry 2008; Liu 2010; Maskin, Qian, and Xu 2000; Zhang and Gao 2008). The former director of the central organization department, Lu Feng, explicitly mentioned in 1991 that one of the principal rationales to rotate officials at the central departments to local positions is dissolving local networks of connections (Huang 1999). Edin (2003) also describes that the CCP central leadership adopts the rotating scheme in order to enhance local officials' identification with the center instead of being close with the local community. In fact, several scholars find that native provincial leaders have different motivations when distributing resources within their jurisdictions (Huang 1999; Jiang and Zhang 2015; Persson and Zhuravskaya 2015). Since it is relatively unchallenging for native local leaders to construct their connections throughout the working regions, the native provincial leaders are expected to have less chance to become provincial highest-ranking officials. According to Shih and Lee (2017), since 2002, native leaders accounts for over 35 percent of the entire provincial standing committee members. However, only 6 percent of provincial party secretaries, the highest ranking officials of provinces, were born in their working province.

Numerous studies on political patronage and factional politics in CCP leadership suggest that political connections have a significant effect on promotion decisions for Chinese officials (Cai and Treisman 2006; Dittmer and Wu 1995; Hillman 2010; Huang 2000; Meyer, Shih, and Lee 2016; Nathan 1973; Oppen, Nee, and Brehm 2015; Pye 1981; Shih, Adolph, and Liu 2012; Shih and Lee 2018; Teiwes 1990). Among them, several scholars provide some hints to measure political connections between central patrons and local followers. According to Shih, Adolph, and Liu (2012), political connections are measured by whether Chinese officials have shared birthplace, workplace, or university experiences with the current or previ-

ous party secretary generals. By focusing on the work ties, Meyer, Shih, and Lee (2016) use four different combinations of factional affiliations, ranging from board ties to restrictive work ties. Keller (2016) proposes that work ties between two officials should exist only when a follower had experienced promotion when the follower was working under the patron in the same administrative unit. Unlike the previous research on the measurements of factional ties that utilizes political connections only with the party secretary general, Shih and Lee (2018) and Oppen, Nee, and Brehm (2015) expand the definition of political patrons to the level of the politburo standing committee members, one level lower than that of the party secretary general. They demonstrate that political connections with the politburo standing committee members also play an indispensable role in promotion decisions for the central officials.

As extensively examined in **Section 2-1**, many scholars have pointed out that economic performance is also one of the main determinants of political advancement. Since the reforms in the late 1970s, economic growth has always been a key policy priority, and CCP promulgated a number of decrees and guidelines that emphasized economic performance in cadre promotions and rotations of the party-state officials (Central Committee 1995; Central Organization Department 1979, 1988). The installation of the “New Cadre Management System” suggests that quantifiable and easily measurable economic indicators, such as GDP growth rate, industrial outputs, and fiscal revenues, are also incorporated in evaluating officials’ promotion probability (O’Brien and Li 1999; Whiting 2004; Zhong 2003). Scholarly research confirms the party’s emphasis on economic achievements of local officials at various administrative levels (Bo 1996; Chen, Li, and Zhou 2005; Li and Zhou 2005). However, the nature of these performance indicators in terms of shaping Chinese officials’ career prospects has to be re-examined, as we looked through in the previous section.

2-2-2. Categorization of Chinese Officials by Career Prospects

In the previous section, this study explores possible candidates for promotion determi-

nants. Numerous formal and informal determinants collectively constitute officials' career prospects. Depending on the level of career prospects, Chinese officials decide the level of policy efforts that they are willing to exert to achieve the center's policy priorities in order to obtain political advancement. As shown in **Figure 2-1**, this research divides subnational officials largely into three groups depending on their career prospects and the related career incentives: dead-enders, careerist, and rising-stars. Each type of official is expected to have heterogeneous degrees of career incentives, and therefore they will behave differently when it comes to implementing public policies. Basically, this study suggests an inverse U relationship between career prospects and career incentives.

Figure 2-1: Relationship Between Career Prospects and Career Incentives

The first group is labeled as “dead-enders” because the future career of this type is about to be dead-ended. Dead-enders are subnational officials who are often discouraged by the formal qualifications in the selection process. For example, a series of personnel management reforms have been institutionalized to bring younger and better-educated leaders into leadership positions (Deng 1980). Moreover, a mandatory cadre retirement system that requires officials over 65 to retire has been installed at all levels since the early 1980s (Manion 1993). This age limit, combined with the minimum three-year requirement to stay in

one place, explicitly discourages Chinese subnational leaders to compete for promotions once their age surpasses 62 (Pan 2013; Xi, Yao, and Zhang 2015; Zhong 2003). In this case, it is highly unlikely for subnational officials aged over 62 to be promoted to the next higher level. Regardless of the level of effort they exert, they are more likely to be retired once the official term is over. It is quite manifest that the career incentives of these older and less-qualified subnational officials are weaker than those of young and well-educated officials.

However, simply judging from age to identify dead-enders is not accurate because these objective criteria are not strictly institutionalized for most of the cases. We can still observe a fair number of provincial-level officials above age 65 in every layer of local organizations. For example, since 1994, 56 provincial standing committee members were still in power past the age of 66 (Shih and Lee 2017). The existence of these exceptions comes from the unique characteristics of Chinese policy-making styles. Chinese policy implementation is often characterized as the guerrilla-style in which local governments enjoy some level of autonomy on the details of policy operationalization (Heilmann and Perry 2011). Depending on other credentials, such as education level, party experience, and, most influentially, political connections with the central top leaders, it is possible that a relatively old local official can also be highly motivated to seek promotion. Moreover, local officials with the same age may have different career incentives depending on the other credentials. In order to decide whether a local leader is truly career-incentivized, a concrete measurement of career prospects for each individual official is required.

There has been little scholarly attention to this type of local official with poor career prospects whose career paths are blocked by age, education credentials, and other formal qualifications. Unlike the labor market where agents cope with a fully competitive environment with little job security, government bureaucracy is still extremely rigid especially in terms of removal of agents. In particular, autocrats cannot just dismiss their subordinates un-

less they severely undermine political stability in the region. In order to prevent possible anti-regime rebels, dictators need to commit to not abusing their loyal subordinates (Boix and Svoblik 2013; Gandhi and Przeworski 2007; Magaloni 2008; Wintrobe 2000). As long as the subordinates remain loyal, dictators would like to keep their commitment to the subordinates and do not simply remove them from access-to-power positions. Consequently, in China, there are still numerous local officials that are ruled out from the promotion tournament, but still have some amount of authority on implementing local economic and public policies. It is a reasonable assumption that dead-enders have the least career incentives because they are already disqualified from the political competitions shaped by the promotion tournament, regardless of the levels of efforts they exert on their performance.

Another group of local officials is composed of local leaders with high career prospects. These officials are labeled as “rising-stars” in the analysis. They are subnational officials satisfying almost all the formal and informal qualifications for career advancement. Rising-stars are young, capable, and well-educated officials who are mostly assigned from the central organizations. Rotating potential central leaders among provinces is one of the elite training strategies adopted by the CCP leadership (Bo 2010; Edin 2003; Huang 2002; Landry 2003; Teiwes 2001). Dispatching these leaders to localities not only helps them accumulate various administrative experiences but is also designed to monitor local governments to ensure that local leaderships implement the center’s policy priorities. Moreover, the CCP leadership has tried to rotate these capable officials among localities in order to diffuse successful reform experiences of one region to another (Chien and Zhao 2007; Xu 2011).

Therefore, rising-stars tend to have diverse work experiences at the central and local levels and are often protégés of powerful national leaders. Li Keqiang was a prime example of such upwardly mobile local cadres when he served in Henan in 2002. He was the youngest governor in China at the time, had a doctoral degree in economics, had served as the Party

Secretary for the Communist Youth League, and had held positions in several provinces. Through these experiences, he was politically connected with the central top leadership including the Party Secretary General at the time, Hu Jintao. It is well observed that most of the central CCP leaders have similar credentials and career trajectories (Teiwes 2001). Hu Jintao was first sent down to Guizhou in 1985 by the order of Hu Yaobang, then-Party Secretary-General. Xi Jinping also piled up his ample provincial experiences by rotating through many provinces, including Hebei, Fujian, Zhejiang, and Shanghai (Shih and Lee 2017).

The group of the centrally-groomed political stars is also expected to be less responsive to career incentives because their chances of being promoted are already high enough to obtain the immediate promotion. Regardless of their performance outcomes, it is fairly predictable that rising-stars will be transferred or promoted to more promising positions. Their levels of political competition in the promotion tournament are, therefore, slightly lower than those of most of the officials, but still higher than those of dead-enders because they need to compete with other rising-stars in the long run. Moreover, rising-stars are expected to act like a conservator because the political stakes are too high. They are officials who are promising and destined to become high-ranking national leaders. Therefore, rising-stars are cautious in implementing economic policies because “great leap” style economic policies may increase the chance of being charged with corruption.

The co-existence of dual economic systems during the transition period and the resulting institutional ambiguities create a number of grey areas involved in economic projects (McNally 2011; Sun 2004). Although officials do not commit economic crimes, such as graft, bribe, fraud, and embezzlement, which are obviously illegal, they are still vulnerable to charges of corruption. Sometimes, culturally accepted ‘normal’ practices such as nepotism and favoritism in the process of investment projects can be seen as abuses of power (He 2000). This grey corruption can be used by political opponents to attack the rival faction. In

particular, minor claims on corruption can ruin an official's career. In the 1980s, there was some level of leniency on punishing corruptive behaviors. However, the punishment has been intensified since the 1990s. According to an interview with an anonymous official in the Central Commission for Discipline and Inspection (CCDI), a minor warning from the CCDI, even one that does not result in demotion or arrest, can halt one's promotion path. Thus, promising Rising-stars may not want to risk themselves by promoting massive investment projects for local economic growth.

Officials who have the strongest career incentives are the leaders between dead-enders and rising-stars. In this study, this type of leader is labeled as "careerists." The career prospects of careerists are not too low such that objective qualifications such as age or education disqualify them, but at the same time, their career prospects are not as high as those of rising-stars who already have secured a good chance for the next promotion. Careerists may have some weaknesses in their profiles. For example, they might be older than their cohorts, not have work experience in central organs, or not be firmly connected with the top central leadership. If an official's expected career prospects are not tremendously high and not too low to cause disqualification, the leader is expected to be highly motivated to make an effort to become a candidate for political advancement.

As **Figure 2-1** describes, careerists' career prospects are located on the verge of the promotion threshold. Therefore, in the promotion tournament, careerists need to compete with each other to acquire limited promotion opportunities. Most of the factors that might affect their promotion probabilities, such as age, education level, administrative experiences, and political patronage, are already fixed and unchangeable in the short term. Their performance is the only stochastic and changeable component that can alter the promotion outcomes. Depending on the levels of efforts on performance, some of them are able to get promotions while others are not. Therefore, they strive to impress their superiors by generating

high economic growth in their jurisdictions. Careerists are often seen as risk-takers because they are sometimes willing to ruthlessly promote high investment even by engaging in illegal activities.

Bo Xilai in Dalian between 1992 and 2000 is an exemplar of a careerist. Reuters reported that although there was no direct evidence of any public financial links between Bo and his business allies, his business allies won a series of government contracts as he was successively promoted to the higher position (Hornby 2012). The Bo's scandal debunked the notion that he was a rising star due to his princeling status. In fact, he needed to show off his ability in order to obtain a promotion to the provincial-level entities. For example, Bo's career prospects, as the party secretary of Dalian municipality, were not as strong as his princeling rival, Xi Jinping in the early 2000s. Despite the fact that Bo was two year older than Xi, Bo's political position was a sub-provincial level, while Xi's position, as the governor of Fujian, is one-level higher than that of Bo. Thus, his massive investment projects can be seen as effort to outperform his rivals. His high-risk behaviors finally led to his expulsion from the party for corruption.

The Bo Xilai scandal perfectly fits this study's prediction that careerists have a stronger incentive to engage in more investment projects, despite the higher chance of being caught by corruption. Other low-prospect or high-prospect provincial party secretaries did not actively promote massive investment as Bo Xilai did. Outsiders know about the Bo Xilai case in details because he was a high profile official and was arrested in the end. However, the examples of the "investment-hunger" in Chinese localities are not rare. As titled by "zhengji gongcheng" (Political Achievement Projects), there are a fair amount of journalistic articles about local leader's excessive interests in promoting investment. These articles reported that local politicians only focus on searching for investment opportunities in urban districts, instead of providing public goods and services (Duan and Wang 2006; He 2004; Wang 2013;

Zhang 2015).

2-3. Feature 2: Collective Decision-making Institution in Chinese Provinces

Previous work measures local leadership's compliance with the center by recording whether the supreme leader of a province, the party secretary or the governor of the province, has a connection with the province she governs through birthplace or workplaces (Donaldson 2011; Persson and Zhuravskaya 2015; Zhao and Zhang 1999). However, analyzing a local government from a single leader's career background creates a tendency to ignore political dynamics in the collective leadership. Policymaking at the provincial level is not monolithic and not conveyed top-down from the highest-ranking official of the province, but instead is based on consensus (Baum 1992; McGregor 2010; Miller 2011; Shirk 1993). Instead of examining one or two supreme leaders, this research explores the collective nature of the decision-making process by analyzing the *full list* of the Standing Members of the Provincial-level Committees (SMPC, also referred to as the provincial standing committee members).

In China, it is commonly accepted that SMPCs have distinct domains for which they are responsible (Huang 2000; Lieberthal 2004; Lieberthal and Oksenberg 1988; Pye 1981). Although not every policy decision is made by consensus, it is plausible to assume that every provincial leader in the provincial standing committee has some level of authority in allocating government resources. In this setting, provincial leadership reaches a consensus by logrolling the agendas among the leaders. Logrolling enables individuals to express finer demands by allowing them to have various preferences over different issues (Buchanan and Tullock 1962; Miller 1977; Riker and Brams 1973; Tullock 1970). Therefore, through logrolling on implementing public policies, even the weakest member of the provincial standing committee can potentially influence resource allocation in the jurisdiction. Although mostly confined to the central level, many scholars have shown evidence of logrolling decision-making in the collective leadership in China (Baum 1992; Fewsmith 1996; Gilli, Li, and

Qian 2016; Lieberthal and Lampton 1992; Shirk 1993, 2013, 2014).

In this sense, analyzing the entire membership of the provincial standing committee is essential to precisely examine policy outcomes of provincial governments. However, most of the existing literature on provincial leadership proceeds to testing hypotheses only with the characteristics of one or two top leaders of provinces, such as provincial party secretaries and governors (Bo 2002; Choi 2012; Huang 1999; Li and Zhou 2005; Persson and Zhuravskaya 2015). This is mainly due to data limitations. From 1980 to 2015, the average number of SMPC in a province for a year ranges from 10 to 15. Combined with 31 provinces, there have been roughly over 13,000 SMPC positions for 35 years. Collecting biographical and career data for this massive number of provincial leaders needs substantial time and energy. This research stands out as one of the very first projects that utilize the full list of the provincial standing committee. Information about the database can be found in [**Appendix 2**](#). This section is designed to provide background information of SMPC by describing institutional details on the compositions and the decision-making processes of the provincial standing committee.

2-3-1. The Standing Members of the Provincial Party Committee (SMPC)

The Chinese Communist Party (CCP) is a Leninist party, which is organized on the basis of democratic centralism, one of the core organizational concepts of the Marxism-Leninism (CCP 1982, General Program: the Party Constitution, hereafter PC). In the democratic centralism, which espouses “freedom of discussion and unity of action,” the decisions made by the highest authority through democratic procedures have absolute power upon all members of the party (Lenin 1906). The relationship between the central committee and the politburo standing committee describes the concept well. According to the Party Constitution, the central committee is theoretically the highest decision-making body of the CCP. For practical and organization purposes, the central committee “democratically” elects the politburo

standing committee, and the decision-making authority is “centralized” in the latter. Once a decision is made by the democratically-elected highest organ of authority (i.e. the politburo standing committee), it is irreversible and binds all the lower ranking institutions. Party organizations at each administrative level in China are also formed in accordance with the democratic centralism, and are obligated to execute the decisions and the resolutions of the higher ranking party organizations.

The CCP’s provincial leadership resembles its central leadership. Like its central counterparts (i.e. the central committee and the politburo standing committee), the provincial party committee also establishes its leadership group, called the provincial standing committee, where a group of the top-ranks of party and government organization makes a variety of important decisions for the corresponding and lower-rank party committees. The configurations of the provincial standing committee - such as who will be appointed, who has a responsibility for a certain domain, and which position is eligible to join - are essentially directed by the central leadership (i.e. the politburo standing committee). By revising the compositions of the provincial standing committee, the CCP central leadership was able to adjust its local institutions to execute the center’s policies and plans.

The provincial standing committee is an elected sub-committee meant to handle day-to-day provincial affairs when its parent organization, the provincial party committee, is not in session (Article 27: PC). In theory, the provincial party committee is the highest authority of the province. Therefore, the provincial standing committee must regularly report to the provincial party committee, who supervises and evaluates the work reports (Article 27: PC). But, in practice, the provincial standing committee is able to wield *de facto* highest decision-making authority, according to the democratic centralism, which implies that decisions made by a democratically elected authority have unchallengeable power upon all members below. The decisions made by the provincial standing committee are carried out effectively without a

review process, and may even occasionally overturn resolutions previously made by the provincial party committee.

Table 2-1: List of Concurrent Positions Held by Standing Members of Provincial Committee

Type ¹	Abb.	Provincial Position	Chinese
PS	PS	Party Secretary	省委书记
VPS	GOV	Governor	省长
VPS	VPS	Vice Party Secretary	省委副书记
F.SC	EGOV	Executive Vice governor	常务副省长
F.SC	DIC	Secretary of Discipline Inspection Commission	省纪委书记
F.SC	PLC	Secretary of Political and Legal Affairs Commission	省委政法委书记
F.SC	OR	Director of Organization Department	省委组织部部长
F.SC	PR	Director of Propaganda Department	省委宣传部部长
F.SC	SG	Secretariat-General	省委秘书长
F.SC	CPS	Secretary of Provincial Capital	省会城市书记
F.SC	SPS ²	Secretary of Sub-provincial Municipality	副省级城市书记
F.SC	MR	Military Representative (Political Commissar or Commander)	省军区政委或司令员
F.SC	UF ³	Director of United Front Department	省委统战部部长
P.SC	VGOV	Vice Governor	常务副省长
P.SC	FTU	Chairman of the Federation of Trade Unions	省总工会主席
P.SC	EDU	Secretary of Education Commission	省委教育工委书记
P.SC	SEC	Director of Public Security Department	省公安厅厅长
P.SC	MEM	Secretary of Main Economic Municipality	经济主体城市委书记

*Note: This categorization is valid as of 2016. ¹ PS: party secretary; VPS: vice party secretary; F.SC: Fixed ordinary standing committee member; P.SC: Possible ordinary standing committee member. ² Sub-provincial Municipality refers to sub-provincial divisions except for the sub-provincial level provincial capital (i.e. Shenzhen, Xiamen, Ningbo, Qingdao, Dalian, Pre-1997 Chongqing, Binhai New District, Pudong New District, Liangjiang New District, and Yili Autonomous Prefecture). ³ Since 2007, Director of United Front Department has effectively become F.SC, but the official announcement was made in 2015.

In principle, the Standing Members of the Provincial Party Committee (SMPC) are first “democratically” elected by the provincial party committee during the plenary session, and later, the results are reported to the central party committee for approval (Article 27: PC). However, in practice, the appointments of the SMPC are essentially pre-determined by the “centralized” decisions of the politburo standing committee (i.e. the highest authority of the CCP) through the central organization department. Article 13 of the Party Constitution and Article 8 in the “Regulations Governing Local Party Committee (hereafter, LC)” mention that the next highest party organization (i.e. the politburo standing committee) has the authority to appoint, transfer, and dismiss the SMPC at will, when the plenary of the corresponding party

committee is not in session (CCP 2016). The only limitation to such directives is that the next highest party organization cannot change more than half of the SMPC for a session (Article 8: LC). Moreover, according to the inner-party regulations promulgated by the central organization department, the SMPC are assigned as “Centrally Managed Cadres,” meaning that personnel management with regard to the SMPC is under the direct control of the central organization department (CCP 1984, 1990, 2008). It is reported that at least one deputy director of the central organization department is dispatched to the plenary session of a province in order to supervise and manage the nomination processes of the SMPC (Cai 2014).

As shown in **Table 2-1**, the SMPC are composed of the top-ranking leaders of the provincial-level organizations. Historically, the number of SMPC ranges between 10 and 15, although it varies across times and regions. It was not until 2016 that the central leadership first designated an exact number for the SMPC, which is now between 11 and 13 for the provincial-level committee (Article 8: LC 2016). There are largely three groups in the SMPC: Party Secretary (PS), Vice Party Secretary (VPS), and Ordinary Standing Committee Members (SC). The ranks of the SMPC are contingent upon the protocol sequence. Party secretary, the provincial party chief, is ranked first. Then, among the multiple vice party secretaries, the governor (governor hereafter, although the name of the position depends on each provincial-level division: governor in provinces, mayor in directly-administrated municipalities, and chairman in autonomous regions), who is also the first-ranked vice party secretary, is ranked second. Next, executive vice party secretary, also called the full-time vice party secretary after 2006, is ranked third, followed by other ordinary vice party secretaries.

The remaining members are ordinary standing committee members. Most are the department heads of the important party or government organizations in the province. Among the ordinary standing committee members, there are permanent positions whose office holders always have seats in the provincial standing committee. Executive Vice Governor

(EGOV), Secretary of Discipline Inspection Commission (DIC), Secretary of Political and Legal Affairs Commission (PLC), Director of Organization Department (OR), Director of Propaganda Department (PR), Secretariat-General (SG), Secretary of Provincial Capital (CPS), Secretary of Sub-provincial Municipality (SPS), and Military Representatives (MR), are constantly selected as SMPC throughout the post-Mao period.

According to the LC, the provincial standing committee can also appoint additional members when necessary with the approval of the central party committee. Although the portfolio of the additional members has frequently changed over time, the second or third-ranked Vice Governor (VGOV), Director of United Front Department (UF), Chairman of the Federation of Trade Unions (FTU), Secretary of Education Commission (EDU), Director of Public Security (SEC), and Secretary of Main Economic Municipality (MEM) are often chosen to the additional SMPC positions. In 2016, 36 municipal-level party secretaries had the provincial standing committee membership as the secretary of main economic municipality (e.g. Beihai, Datong, Luoyang, Qinhuangdao, Sanya, Suzhou, Tongliao, Wenzhou, Yan'an, Yanbian, Zunyi, etc.).

The ranking rule among the ordinary standing committee members is not stringently institutionalized, and the ranks are not determined by the office they hold. Outsiders can only make assumptions about the ranks by the order of precedence at the standing committee meetings. But, it is more challenging to identify the exact hierarchy of the provincial leadership than its central counterpart, because the provincial meetings are less exposed to the public media. In general, it is reported that the ranks of the ordinary standing committee Members are decided on the basis of seniority in the provincial standing committee. The members who have advanced to the SMPC earlier tend to occupy higher ranks in the committee. If multiple members become the SMPC at the same time (which occurs frequently), the one promoted to the sub-provincial level first is placed in the higher position at the provincial

standing committee meetings (Chu 2014a).

In addition to the seniority rule, there are a few exceptions on the ranking conventions. While not strictly imposed, the Secretary of Discipline Inspection Commission (DIC) is historically ranked fourth in many provinces. Moreover, if a member is directly transferred from the central departments, the member is more likely to have a higher rank than those promoted internally. Although the order of precedence exists, the ranks among the ordinary standing committee members do not necessarily reflect the actual authority held by the members. Regardless of the rank, each member is able to exert a significant influence on the issues related to the member's professional specialty (Chu 2014b, 2015). For example, the military representative is entitled to preside over the standing committee meeting when discussing the provincial military affairs.

The provincial standing committee exercises the functions and powers of the provincial party committee. The Party Constitution only states that the provincial standing committee is formed to manage day-to-day provincial works (Article 27: PC). The day-to-day provincial works are defined in Article 7 of the LC: other than convening the plenary session of the provincial party committee, the provincial standing committee should carry out the directives of the central party committee and the resolutions of the provincial standing committee on virtually every aspect of the provincial affairs. Specifically, the provincial standing committee is responsible for the province's economic and social development, propaganda and ideological controls, inner-party organizational and disciplinary works, mass organization directions, social and political unification, law enforcement, and cadre personnel managements. The detailed list of the activities managed by the provincial standing committee can be found in the "Reports on the Work of the Provincial Standing Committee," which is an annual mandatory work report to its parent organization (i.e. the provincial party congress) in accordance with the Party Constitution. In the reports, the provincial standing committee of each prov-

ince addresses a multitude of subjects, such as economic policies (i.e. investment management, land acquisition, real estate, urban planning, taxation, etc.), social programs (i.e. inequality alleviation, pension and healthcare building, education and culture spending, etc.), and political decisions (i.e. selections, appointments, training, promotions, and demotions of the lower ranking officials).

Regarding the decision-making processes, the SMPC must collectively fulfill the responsibilities, while individual members conduct independent roles (Article 10: PC). First, collective decisions should be made through democratic procedures. The LC specifies the rules by which decisions are made (Chapter 4, Section 2: the 1996 LC; Chapter 5: the 2016 LC). For general issues, at least half of the SMPC should attend the meeting, while two-thirds of the SMPC are needed for discussion on personnel matters. Decisions are made when half of the participants agree upon the issue by means of verbal agreement, a show of hands, or secret or disclosed ballots. Second, the provincial standing committee should handle the provincial affairs based on the division of work. In the provincial standing committee meetings, each position has its own domain of work, and is obligated to actively lead discussions on the assigned responsibilities. Other SMPC are not to interfere with the domain of another SMPC (Article 10: the 1996 LC; Article 11: the 2016 LC).

However, the actual operating mechanisms in the SMPC meetings are still black-boxed. The methods by which the meetings secure equal rights of the lower-ranking attendees on decisions remain obscure, especially when there is no veto-power or check and balance against the higher-ranking leaders in the provincial standing committee. While there are few discourses on the actual decision-making processes of the provincial standing committee, the politburo experience implies the dominance of the highest-ranking member during the standing committee meetings. According to Hu Qiaomu, a retired politburo member, the politburo's decisions are made not by vote, but by consensus through collective discussions. In the

politburo meeting, the general secretary (i.e. the highest-ranking member in the politburo) sets the agenda, and presides over the discussions. The opinion of the general secretary is the most influential, and the consensus is normally generated in favor of the general secretary, unless there is a strong opposition from a member in charge of the issue-at-hand (Miller 2003).

In fact, the “Provisional Regulations Governing Local Party Committee” disproportionately grants great authority to the provincial party secretary, the highest-ranking member in the provincial standing committee (CCP 1996). In Article 12, one of the SMPC’s responsibilities is assisting the party secretary’s works and accepting the party secretary’s supervision and investigation without a question. Additionally, the party secretary is entitled to hold a special meeting whenever necessary (Article 25: the 1996 LC). Although the party secretary-led meeting is designed to improve agility and flexibility of the provincial leadership in the face of an emergency, the meeting tends to be overused, and increasingly over-represent the authority of the party secretary. Therefore, in the latest version of the “Regulations Governing Local Party Committee,” a new clause was inserted in Article 25, stating that the decisions of the party secretary-led special meeting are not allowed to replace those of the provincial party committee (CCP 2016).

2-3-2. Historical Changes of the SMPC Composition from 1980 to 2016

The data is retrieved from the CCP Elite Provincial Database that contains demographical and career information of the 2608 Standing Members of Provincial-level Committees (SMPC) from 1976 to 2017 (Shih and Lee 2017). **Figure 2-2** describes the number of SMPC from 1980 to 2016. Note that the numbers are calculated on the basis of the three month rule (Shih and Lee 2017). Only provincial officials holding a standing committee membership between April and September of the year are counted in. If an SMPC loses the membership due to promotion or retirement, before April (e.g. January, February, and March)

or after September (e.g. October, November, and December), the SMPC does not appear in the analysis. Therefore, it is also possible that the number of SMPC is not static across provinces and years, as some positions may be double-counted because of political mobility. For example, if a sub-provincial level official is promoted to director of the provincial organization department between April and September, the analysis includes both the preceding and the succeeding appointees as the director of the department. It is also worth pointing out that Hainan and Chongqing joined the provincial-level division in 1988 and 1997 respectively.

Figure 2-2: Composition of the SMPC from 1980 to 2016

From 1980 to 2016, the average number of SMPC in a province is 13. The number is slightly higher before 1983 at 15, and lower between 1983 and 1992 at 10. Since the formation of a new civilian leadership led by Jiang Zemin in 1992, the average number of SMPC per province has been stabilized to be between 12 and 13. Regarding the number of each SMPC position, there have been only one Party Secretary (PS) and one Governor (GOV) in a province throughout the period. The numbers of the Vice Party Secretary (VPS) and the Ordinary Standing Committee Members (SC) vary over time, as the CCP implemented a series of personnel institutional reforms on the provincial leadership during the post-Mao era. In **Figure 2-2**, the number of VPS per province is between 7 and 8 from 1980 to 1982, and between 3 and 5 from 1983 to 2006. After 2007, the number is fixed to 2 (one Governor and

one Full-time VPS). The number of the SC per province is between 7 and 8 from 1980 to 2006. As the number of the VPS decreased to 2 in 2007, the average number of the SC consequently increased to 10 members to maintain the total number of the SMPC.

There have been two major institutional changes in the composition of SMPC. One is the 1982 reform and the other is the 2007 reform, as **Figure 2-2** illustrates. First, at the 12th national party congress in 1982, the CCP leadership conducted extensive reforms on provincial-level institutions. Along with the massive turnover of provincial leaders, the provincial personnel and administrative bodies also underwent structural reconfigurations to downsize and streamline the provincial party and government organizations (Forster 1984). Thus, the CCP leadership reduced the number of the provincial standing committee membership, and abolished the previous personnel management system, which classified provincial party leaders into 5 positions (i.e. first-rank secretary, second-rank secretary, third-rank secretary, secretary, and vice secretary). In Article 27 of the 1982 Party Constitution, the central leadership inserted a statement that local standing committees consist of Party Secretary (PS), Vice Party Secretary (VPS), and Ordinary Standing Committee Members (SC) (CCP 1982). Note that in this chapter, VPS prior to 1982 includes every secretary, except for the First-rank secretary, which is equivalent to the current party secretary. In 1985, the central leadership specified the number of the provincial Vice Party Secretary. Article 10 of the “Provincial Decisions on Several Issues on Local Party Committees” dictates that the number of the provincial VPS must be between three and five (CCP 1985).

Second, the fourth plenary session of the 16th national party congress in 2004 ratified the reduction of the provincial vice party secretary in order to effectively realize the “Collective Leadership” by assigning more responsibilities to the ordinary standing committee members (CCP 2004). As a follow-up, the central committee distributed a regulation (CCP 2006) in 2006, where the central party leadership reduced the number of the SMPC (14-15 for Xi-

zang, Qinghai, and Xinjiang; 11-13 for the other provincial-level divisions), and Vice Party Secretary (two VPS: one Governor and one Full-time VPS). Since April 2006, each province has gradually adopted the “One PS and two VPS” system, as the next provincial party congress convened. Hubei was the first province to have decreased the number of VPS to two in June 2006, while Hunan was the first official province to have elected two VPS at the new party congress in November 2006. Shandong was the last province to have adopted the system in June 2007, and Neimengu was the last autonomous region to have implemented the system in April 2008. As a result, all Provincial-level Party Committees employed the two VPS system by 2008, with the exceptions of Xizang, and Xinjiang which were allowed to maintain the four VPS due to the idiosyncratic characteristics of the two autonomous regions (e.g. Commanders of Xinjiang Production and Construction Corps hold the VPS membership) (Jing 2014). The CCP leadership officially finalized the number of the provincial VPS as two in the new version of “Regulations Governing Local Party Committee” in 2016 (CCP 2016).

Figure 2-3: VPS Double Appointments

In 2006, the central leadership exchanged the title of Executive Vice Party Secretary (EVPS) with the title of “Full-time Vice Party Secretary,” who was mainly tasked with inner-party affairs, such as enhancement of the party organization’s coherence, ideological and political education to cadres, and supervision and oversight of the provincial party school (Li

2014). But prior to 2006, the provincial standing committee was allowed to set up four or five Vice Party Secretaries (VPS). The VPS could hold other positions in the provincial party or government organizations, depending on policy priorities of the province. **Figure 2-3** outlines the positions that the VPS jointly held. Note that the figure also incorporates the transition periods when transferring between two positions (i.e. a promotion usually requires an overlap between two positions wherein the person of interest gradually transfers from one position to the next). Occasionally, an SMPC may temporarily hold the previous position for hand-over purposes, even after a promotion or a transfer of the cadre is announced. Moreover, prior to retirement, the SMPC is generally assigned to the “Second-line,” (i.e. the provincial people’s congress, or the provincial people’s political consultative conference) in advance to exiting from the provincial standing committee.

Historically, the vice governor primarily holds the largest share of the VPS double appointments. It is crucial for the SMPC to work close with the provincial government, since the provincial standing committee also determines a variety of social and economic matters, as well as internal party affairs. In order for the party leaders to exert influence on government departments, many of the provincial standing committees granted the vice governor memberships to the VPS. Particularly, after Deng Xiaoping emphasized the facilitation of economic development to cope with the pervasive conservatism in the early 1990s, the Provincial Standing Committee set their policy priority on building “Socialist Market Economy,” which required a rapid growth of the private economy of the region (Naughton 2007). To this end, increasing numbers of vice governors (who is primarily in charge of economic affairs) were assigned to the VPS, who are able to employ greater authority in decision-making processes. The same strategy was used and maintained in the late 1990s to stabilize China’s overheated economy. In contrast to the economic growth promotion of the early 1990s, the central government now desired to control the growth, and directed the provincial leadership

to curb indiscreet investments in local economies (Huang 1999).

The Full-time Vice Party Secretary (FVPS) position was first established in 2006, and the party stated in early 2007 that the main task of the FVPS is to assist the Party Secretary (PS) in party organizations, and to handle the Party Secretary assigned responsibilities (CCP 2007). At first, the FVPS generally did not jointly hold other standing committee positions. Instead, the FVPS was mostly appointed to insignificant positions, such as the provincial party school, the provincial administrative institute, provincial leading small groups, and temporary cooperative offices (Li 2013). But, there were growing concerns that the role of the FVPS in the provincial standing committee was becoming opaque. Without de-facto authority in party functions (i.e. organization, discipline and inspection, and propaganda), the FVPS was reckoned as merely a nominal position. Despite clarification needs, the CCP leadership left the responsibility of the FVPS vague by stating that different regions have different characteristics (Qian 2011). From early 2008, the provincial standing committees began to assign secondary positions to the FVPS. In 2009, six FVPS had additional positions in the provincial standing committees, and the number was increased to twelve in 2012.

Unlike the VPS management institution, the composition of the Ordinary Standing Committee Members (SC) has been relatively stable during the post-Mao era, as **Figure 2-4** illustrates the proportion of the SC in the provincial standing committee. The Secretaries of the Discipline and Inspection Commissions (DIC), the Political and Legal Affairs Commissions (PLC), the Provincial Capital (CPS), and the Sub-Provincial-level Municipality (SPS), the Directors of Secretariat (SG), Organization Department (OR), and Propaganda Department (PS), the Military Representatives from the Provincial Military Base (MR), and lastly, Vice Governors (VGOV) are the nine fixed and *ex-officio* provincial standing committee members. The ETC category includes the additional standing committee members, whose membership varies across times and regions. For instance, there are the Director of the United

Front Department (UF), the Director of the Federation of Trade Unions (FTU), the Secretary of Education Commission (EDU), the Director of Public Security (SEC), the Secretary of Agricultural and Industrial Committee (AIC), the Party Secretaries of the Main Economic Municipalities (MEM), etc. Moreover, if a SMPC's profession is unidentifiable because of the data limitation, the SMPC is categorized as the “Unknown” group in the analysis (roughly 3 percent of the total observations). Mostly, old cadres in the 1980s are distributed in the “Unknown” category, because the career information of the old cadres is relatively difficult to find. Occasionally, the SMPC in the 1980s and of the autonomous regions (especially Xizang and Xinjiang) have provincial standing committee membership without holding any office. This type of the leaders is also included in the “Unknown” category.

Figure 2-4: Proportion of the SC in the SMPC from 1980 to 2016

Figure 2-5 demonstrates the trends of the number of each fixed position in the SC by years. Note that the joint appointments both between VPS and SC and between SC and SC are not included in the left graph, but included in the right graph in **Figure 2-5**. With the exceptions of DIC, MR, and VGOV (which are highlighted with the bold lines), the number of each fixed position increased over time, as the SC position became gradually institutionalized. It was not until the 14th national congress in 1992 that the SC positions were selected on the basis of individual work domains. For example, in the 1980s, not every director of the organ-

ization or propaganda departments was in the provincial standing committees. Only 70-80 percent of the current fixed SC positions were endowed with SC membership before 1992. Instead, department heads of diverse party organizations were able to enter the provincial standing committee, as indicated **Figure 2-4** by the large proportions of the ETC category prior to 1992.

Without these joint appointments, the occurrence of DIC Secretaries plummeted between 2002 and 2007 because the DIC positions were also jointly appointed as VPS, as described in **Figure 2-3**. In the right graph, the trend of the DIC position is also similar to that of other SC positions. The other two positions with the bold lines (i.e. MR and VGOV) are relatively independent from VPS authority. Military Representative (MR: the category includes all military-related positions before 1983) frequency was higher than that of other positions in the early 1980s in the left graph, but the frequency was significantly decreased when the central leadership implemented reforms on the cadre management system in 1983. The MR still maintains relatively higher numbers than other positions throughout the period because the military position in the provincial standing committee enjoyed a high level of independence from the civilian leadership. Of note, the MR position has never been jointly held by VPS or other standing committee members, and vice versa. Furthermore, the average tenure year of the MR is shorter than that of other SMPCs. the higher replacement ratio increases the probability of double-counts, and in turn higher occurrences in the analysis.

The Executive Vice Governor (EGOV) has a permanent position in the provincial standing committee. In addition, the second-ranked or third-ranked vice governor is also eligible to become an SMPC. Thus, the total number of the vice governor is generally higher than other SC positions in **Figure 2-5**. In China, governor manages and oversees the provincial government at large, and vice governors operate in independent work domains in the government. Each vice governor leads a specific domain of the government departments.

Overall, the EGOV is in charge of the core areas, including reform management, construction, finance, and taxation. Other provincial affairs led by vice governors are political legal affairs, commerce and trade, technology and education, agriculture and rural development, transportation, ethnicity and religions, and government secretariats (Su 2016). With the exception of the EGOV (who is always the first-ranked vice governor), the rankings of the remaining vice governors vary, depending on policy priorities of the province. In general, political legal affairs, commerce and trade, and government secretariats occupy relatively higher rankings across provinces (Jin 2017).

Figure 2-5: The Trends of the Fixed SC Positions from 1980 to 2016

China is a party-state system, in which the party governs all other governmental and societal institutions. Thus, the greater numbers of vice governor's appointments in the provincial standing committees implies that the provincial leadership places greater emphasis on civilian controls thought its government, than on internal party management. The CCP's vice governor controls in the provincial standing committees are particularly related to its economic strategies. Economic growth has been a primary target of the party leadership in the Post-Mao era. The trends of the vice governors in **Figure 2-5** suggest that the numbers of the vice governors in the provincial standing committees are highly correlated with the party's

emphasis on economic development. When the party needs rapid economic growth, the numbers of the vice governors in the provincial standing committees are also increased. In contrast, when the central leadership requires to streamline local organizations, or to improve local economic stability, the numbers of the vice governors in the provincial standing committees are accordingly decreased.

Figure 2-6: The Trend of Vice Governors W/WO Joint Appointments

Figure 2-6 describes the CCP's vice governor controls in the provincial standing committees. The red line is the average number of the vice governors per province, which also includes the joint appointments of the vice governors to VPS or other SC members, while the blue line excludes the joint appointments. The grey bars indicate the difference between the red line and the blue line (i.e. the average numbers of the joint appointments of the vice governors per province). In the early 1980s, the recovery from the destructive Cultural Revolution led party and government organizations to become redundant and over-staffed, as abolished ministries and agencies were restored, and large numbers of the expelled and disgraced cadres were rehabilitated. The provincial leadership was also unorganized, and a systematic leadership selection institution did not exist (Christensen, Dong, and Martin 2008).

In **Figure 2-6**, the average number of vice governors per province was 2.4 from 1980 to 1982. Note that the big differences between the red line and the blue line in the early 1980s

were mainly resulted from the peculiar personnel management system. Before the 1982 institutional reform, the formation of provincial standing committee was not based on “professions,” but on “seniority,” which divided Secretaries into five ranks (i.e. first-rank secretary, second-rank secretary, third-rank secretary, secretary, and vice secretary). All the secretaries (with the exception of first-rank secretary, the supreme leader of the province) are coded as vice party secretaries in the analysis, although most of the pre-1983 Secretaries are actually ranked lower than the post-1983 vice party secretaries. Due to the five-rank secretary system, many vice governors also acquired the secretary membership. Thus, it is challenging to identify the precise numbers of the vice governor’s joint appointments before 1983, because the analysis tends to over-count the vice party secretary membership.

In 1982, the CCP leadership led by Deng Xiaoping started to downsize and streamline the bloated and overlapping party and government organizations in order to successfully implement the economic reform and open-door policy. Accordingly, the average number of vice governors in the provincial standing committees was sharply decreased from 2.5 in 1982 to 1.4 in 1983. The number maintained at 1.3 on average until 1988. In 1987, the 13th national congress led by Zhao Ziyang administration realized that the party’s excessive interference with the governmental affairs was one of the major obstacles to deepen the economic reforms. The CCP leadership initiated a new round of the institutional reform that attempted to detach the party’s influence from the government under the slogan of “the party rules the party” (Ngok and Zhu 2007). As a result, the average number of vice governors in the provincial standing committees was further dropped to 0.8 in 1989. Due to the two rounds of the administrative reconstruction, the number of vice governor was only 1.2 on average during the period between 1983 and 1992. In addition, the average number of the conjoined appointments of the vice governors during the same period was relatively low, meaning that the vice governor positions in the provincial standing committees became full-time and professionalized.

In the aftermath of Tiananmen incident in 1989, the CCP leadership began to slow down the marketization process, and the 13th national congress's proposal on the separation of the party from the government was instantly reversed (Fewsmith 2008). Due to the rampant conservatism on economic reforms in the late 1980s and the early 1990s, the number of the vice governors maintained only at 1.2 in 1991. The trend was changed after the Deng Xiaoping's Southern Inspection Tour in 1992, where he supported the reformist idea of the further economic reforms. The 14th national party congress in 1992 swiftly resolved to accelerate the economic reform whose main objective was to fundamentally alter the state-business relationship. Rather than merely downsizing the government agencies, the CCP leadership deeply transformed the functions of the government by delinking the state-owned enterprises from the direct controls of the government. To this end, the provincial leadership also recruited large numbers of vice governors into the provincial standing committees in the following year, which resulted in approximately two vice governors per province.

With the aim of strengthening the macro-controls of the central leadership on local economies, the Jiang Zemin-Zhu Rongji administration in 1997 further streamlined the central bureaucracy by reducing the number of ministries by one-half, but by increasing the number of bureaus, which were directly administrated by the central government (K. Yang 2007). During the period between 1997 and 2002, the total numbers of vice governors in the provincial standing committees maintained at 1.8. However, the composition of the vice governors in the provincial standing committees was dismantled from the previous pattern. The joint appointments of the vice governors to other positions were noticeably increased during the 15th national congress period (1997-2002). Almost one of two vice governors jointly held other VPS/SC positions during the period.

The average number of vice governors was decreased from 1.8 in 2002 to 1.1 in 2003, after the new administration led by Hu Jintao and Wen Jiabao launched an administrative re-

form in order to enhance the center's hierarchical controls on local governments. The 2003 institutional reform was primarily targeted to fine-tune the bureaucratic coherence between the central and local governments, rather than just to downscale the over-sized governments. By emphasizing the central regulatory bodies to supervise local financial and industrial institutions, and by increasingly utilizing the regional representatives of the central bureaus, the CCP leadership began to curb the self-indulgent local governments (Wang 2010). As a result, the numbers of vice governors in the provincial standing committees continued to be as low as 1.2 during the 16th national congress (2002-2007).

In order to cope with the economic recession induced by the 2007 global financial crisis, the Chinese governments implemented the expansionary fiscal and monetary policies. The central government financed over 4 trillion Yuan's direct grants and interest rate subsidies, and the provincial governments also initiated their own stimulus packages, which were amount of 18 trillion Yuan (Yu 2010). In order to mitigate the impact of the global crisis and operate the massive amounts of the fiscal packages, the provincial leadership needed to assign a greater number of vice governors in the provincial standing committee. Therefore, the number of the vice governors in the provincial standing committee per province was significantly increased to 1.8 in 2007, and the numbers maintained throughout the 17th national congress (2007-2012). Moreover, the core organizational principles of the 17th national congress were simplicity and efficiency of party and government agencies (Dong, Christensen, and Painter 2010). These principles were also applied to the "one PS and two VPS" system that contributed to the professionalization of the vice governors in the provincial standing committees. As the number of the VPS (who were generally conjoined with the vice governor position) was reduced, the average number of the vice governor's joint appointments per province was also cut in half from 0.3 in 2007 to 0.15 in 2008, and maintained the level until today.

Figure 2-7: Composition of the Possible SC from 1980 to 2016

The “Regulations Organizing Provincial Party Committee” (Hereafter, the Regulation) allows the provincial party congress to institute additional standing committee members when necessary with the permission of the central committee (CCP 1996). As in **Figure 2-7**, the Regulation designates the list of the possible SC positions, although the list varies over time. Historically, there have been the Director of the United Front Department (UF), the Director of the Federation of Trade Unions (FTU), the Secretary of Education Commission (EDU), the Director of Public Security (SEC), the Secretary of Agricultural and Industrial Committee (AIC), and the Party Secretary of the Main Economic Municipality (MEM). In addition to the possible SC positions, the Regulation also provides some level of autonomy to the provincial leadership regarding the selection of the SMPC by stating that the provincial standing committee can appoint a person in charge of the department that the province established for special purposes.

The appointment of the additional SC members is one of the key strategies for the central authority to influence the provincial leadership in order to achieve the center’s objectives. In accordance to the central committee’s decisions and resolutions, the compositions of the possible SC members in the provincial standing committees are correspondingly modified. **Figure 2-7** illustrates the historical compositions of the possible SC members from 1980 to

2016. Note that the joint appointments of the vice party secretaries and other fixed SC members are not included in the analysis. For instance, if an SMPC holds a fixed SC position and a possible SC position simultaneously, the analysis only considers the fixed SC position of the SMPC. Also note that the party secretaries of the MEM, the directors of the province-assigned departments, and the unidentifiable positions are included in the ETC category. The additional SC members constituted a relatively high proportion of the provincial standing committee during the 1980s (over 40 percent of the provincial standing committee members), because the provincial leadership was not fully professionalized on the basis of individual bureaucratic specialties, such as organization, propaganda, discipline and inspection, security, and economy (S. Cui 2007). The proportion of the additional SC members was decreased to approximately 10 percent in the early 1990s, and maintained the similar level until today if the UF director is excluded, which virtually became a fixed SC position from 2012.

Figure 2-8: The Trends of the Possible SC Positions from 1980 to 2016

Among the possible SC members, the Director of the United Front Department (UF), whose official purpose is uniting different political and social groups, is the most prevalent position, consisting of 15 percent of the total additional SC members and 61 percent of the total possible SC members. After 2002 when Hu Jintao administration introduced the “Socialist Harmonious Society,” which stresses the overall societal balance and harmony, the UF has

had an increasing number of appearances in the SMPC, despite the fact that there are no official requirements for such action. **Figure 2-8** describes the trends of all possible SC members from 1980 to 2016. In the graph, 12 provinces had an UF in the provincial standing committee in 2003, 21 provinces in 2007, and since 2012, nearly every province (29 provinces) has established an SMPC position for the UF. Yet, it is not until 2016 that the central leadership promulgated the “Provisional Regulations Governing the United Front Work,” where Article 9 mandates that the UF at each level is generally entitled to attain the standing committee membership at the corresponding party committee (CCP 2015).

The Director of the Federation of the Trade Unions (FTU) is also one of the most commonly chosen positions in the provincial standing committee. The provincial FTU is a regional branch of the All-China Federation of Trade Unions, the sole trade union in China. The FTU was most frequently selected as a SMPC, especially during the Hu Jintao-Wen Jiabao administration from 2002 to 2012. The logic of the FTU selection into the provincial standing committee was analogous to that of the UF selection. Under the slogan of the “Socialist Harmonious Society,” the CCP leadership focused on the role of the FTU to mitigate social and economic unrest by improving worker’s rights (Bai 2011). In the 14th and 15th national congress (1992-2002), only four provinces, such as Beijing, Neimenggu, Liaoning, and Hubei, installed an SMPC position for the FTU. The number of the provinces became more than doubled to 10, during the 16th and 17th national congress (2002-2012), before the number was dropped again to 4 in the 18th national congress in 2012. Historically, Liaoning accounts for the highest portion (18 percent of the total FTU counts in SMPC), followed by Beijing (12 percent), Hubei (10 percent), and Sichuan (10 percent).

Other possible SC positions, such as Secretary of Agricultural and Industrial Committee (AIC), Director of the Public Security Department (SEC), and Secretary of the Education Commission (EDU) occupy the similar proportions of the total number of the possible SC po-

sitions (7 percent, 6 percent, and 5 percent, respectively), although their flourishing timings are different from each other. The AIC appeared most frequently in the early 1980s, when the Chinese leadership had implemented the extensive reforms on agricultural and rural area since the late 1970s. Roughly ten provinces had the AIC in their standing committees between 1980 and 1985, and the number was decreased to five at the 13th national congress in 1987 (i.e. Jilin, Heilongjiang, Jiangxi, Guizhou, and Xizang). Finally, the AIC virtually disappeared in the provincial standing committee after the 14th national congress in 1992, when the series of the reforms on agricultural products, and township and village enterprises were completed (Powell 1992).

The Director of the Public Security Department (SEC) is generally jointly appointed with the Secretary of Political and Legal Affairs Commission (PLC). Nevertheless, a few provinces assigned their SEC to the provincial standing committee without the PLC membership. For example, Beijing (3 counts), Shanxi (7 counts), Liaoning (6 counts), Zhejiang (5 counts), Hubei (9 counts), Guangdong (4 counts), Guangxi (6 counts), Guizhou (2 counts), and Shaanxi (4 counts) are the provinces that have the sole-appointed SEC. As the PLC and SEC institutions have been restructured since the 17th national congress (2007-2012), the number of the SEC in the provincial standing committee is also dropped to nearly zero. The selections of the Secretary of the Education Commission (EDU) have been stable throughout the Post-Mao era. Annually, three or four provinces chose the EDU secretary, and most of them are the education-centered metro cities, such as Beijing, Tianjin, and Shanghai. Beijing nearly always had the EDU (30 counts), While Tianjin and Shanghai selected the EDU into the provincial standing committee 14 times and 8 times, respectively. Lastly, the Party Secretaries of the Main Economic Municipalities (MEM, in the case of provinces), or Districts (in the case of directly-administrated municipalities) have been one of the popular possible SC members throughout the period. On average, 8 to 15 MEMs were solely appointed in the pro-

vincial standing committee. Provinces, such as Jilin (34 counts), Guizhou (30 counts), Jiangsu (29 counts), and Guangdong (25 counts) have a higher tendency to set up the SC positions for the MEM.

The ETC category of the additional SC positions in **Figure 2-7** contains a variety of positions. First, the number of the ETC positions is substantially decreased from 2002. The majority of the ETC positions in the post-2002 are the self-established special departments of the provinces. Each provincial committee is eligible to set up a special organization with the permission of the central committee. The Regulation specifies that a person in charge of the special department can be selected into the provincial standing committees. The vivid examples are the secretary of the “Two-oriented Society” experimental district of Hunan province, the director of mass department of Hainan province, the secretary of the Ningdong energy and chemical industry base commission of Ningxia province, and the commanders of Xinjiang production and construction corps.

Second, the pre-1992 provincial standing committees consisted of provincial leaders from fairly diverse party and government organizations. Before the 14th national congress in 1992, when the CCP leadership decided to further streamlined and reconfigured local party committees, different provinces were able to assign different positions to the SMPC membership for their needs. Secretary of Ethnic Affairs Commission (ETH) and Secretary of the Science, Technology, and Industry Commission (TEC), are the most frequently appeared positions. The total number of the ETH appearance in the provincial standing committees in the Post-Mao era is 30 counts. Among then, the occurrence of the ETH is most prevalent in Sichuan (12 counts) until 2000, followed by Yunnan (7 counts) until 1998. In the 1980s, Shaanxi (5 counts), Hunan (3 counts), and Guizhou (3 counts) also had the ETH in the provincial standing committees. The TEC were thriving during the 12th and 13th national congress (1982-1992). Relatively developed provinces, such as Beijing (4 counts), Tianjin (9 counts),

Shanghai (8 counts), and Sichuan (6 counts) instituted the TEC.

Secretary of the Direct Organ Work Committee (DIR) and Secretary of the Provincial State-owned Assets Supervision and Administration Commission (SASAC) (previously named the provincial working committee for enterprises), are also chosen by many provinces even in the recent years. There are 46 counts for the DIR, which are evenly distributed across times and provinces. In 1988, Yunnan and Heilongjiang, in 1992, Shandong, and Henan, in 2007, Jiangxi, Hubei, and Xinjiang, and in 2014 Hunan, Yunnan, and Xizang appointed the DIR Secretaries to the provincial standing committees. On contrary, the SASAC selections into the provincial leadership were clustered in two provinces, Heilongjiang and Sichuan. After the national SASAC was founded in 2003, the two provinces that own the China's largest petroleum fields attached great importance to the provincial SASAC leaders. Between 2003 and 2011, the two provinces chose the SASAC as the provincial standing committee members.

The remaining ETC entries are caused by the residual positions during the transition periods. Depending on timings, the appointment to the provincial standing committees requires a few months of the transition period for hand-over purposes. Occasionally, a cadre is granted SMPC membership first, and promoted to the fixed or possible SC positions later. For example, when a PLC vice secretary, a non-SC position, is about to be promoted to the PLC secretary, one of the fixed SC positions, the cadre's SMPC membership can be announced a few months prior to the appointment to the PLC secretary. In this case, the PLC vice secretary position during the transition period is categorized as the ETC in the analysis.

Acknowledgement

Chapter 2 contains material that has been submitted for publication as "Band of Rivals: Career Incentives, Elite Competition, and Economic Growth in China." The dissertation

author is the principal author of this work.

Chapter 2, in part, is submitted for publication as “Institutional Compliance of Local Leadership in the Post-Mao Era of China.” The dissertation author is the principal author of this work.

3. Estimating Career Prospects of Individual Officials

The existing literature on bureaucratic politics and political selection presumes that selection institutions incentivize all subnational officials homogeneously. This project addresses this flawed assumption by arguing that subnational officials put different levels of endeavor on the basis of their own career prospects. As the first building block of the research, this chapter is designed to develop a model to measure the career prospects of individual officials. In the analysis, an official's career prospects are defined as the 'relative' and 'self-evaluated' political strength in the promotion tournament prior to exerting any form of policy effort to achieve promotion. Then, the level of policy effort that an individual official is willing to exert in order to obtain political advancement (i.e. career incentives) is essentially determined by the career prospects, which plays a role as an initial guideline to gauge the official's expected marginal utility from such policy efforts.

There are mainly two methodological concerns in order to operationalize the career prospects of individual officials. First, the career prospects are defined as the overall political endowment in the promotion tournament. To make the career prospects comparable to each individual official, we need to build a single indicator that summarizes all the relevant formal and informal determinants for political advancement in the Chinese selection process. Second, officials' career prospects have to be based on the officials' self-assessment of their own career potentials, because they are used as a guideline to decide how much officials themselves are willing to exert efforts on policy implementation. However, as an outsider, it is practically impossible to directly measure each individual official's perceptions on his or her career prospects. An indirect measurement is needed to estimate individual officials' self-evaluations on their future career outcomes.

This chapter is designed to deal with these two issues in measuring the career prospects of the Chinese provincial officials. The analysis proceeds in three steps. First, this

study will look over how to establish a summarized model to measure the overall political strength of individual officials in the promotion tournament. By using a predicted probability of political advancement (i.e. prior likelihood of promotion) as a proxy to measure one's career prospect, this project can convincingly summarize a variety of institutional and non-institutional promotion determinants into a single indicator. Next, I will examine how to approximate officials' self-evaluations on their own career prospects. By setting up a range of the prediction accuracy of the predicted probabilities of political advancement, the empirical models in this chapter are designed to indirectly measure the officials' perceptions on their own career prospects. In the last section, the implications of the different measurements techniques of the estimated career prospects will be presented followed by the actual examples of the Chinese provincial officials.

3-1. Model Selections

An official's career prospects indicate how likely the official obtains political advancement in the bureaucracy. As reviewed in [Section 2](#), the meritocratic selection system enables Chinese officials to pursue political advancement by showing better performance than their rivals. However, the performance measurement is not a sole determinant for political advancement when the Chinese central leadership operates its personnel management system. For a variety of reasons, numerous other formal and informal institutional factors also play a critical role in the promotion decision-making process in China. These factors essentially constitute officials' career prospects as they serve as an initial guideline for officials to evaluate their own political strength in the promotion tournament. Each official is situated at a different level in terms of the political endowments that potentially affect the promotion probabilities. Unlike the performance criteria, which are highly dependent on individual's efforts, these other promotion determinants are institutionally fixed and unchangeable in the short term. In order to measure the level of policy efforts that individual officials are willing

to exert to display better performance, we first need to find a method to identify where an official is located in the promotion tournament.

In this project, an official's career prospects are defined as the initial political endowments that affect one's promotion probabilities prior to considering the level of policy efforts to show better performance. However, there are two important qualifications on the definition of the career prospects, when we attempt to link officials' career prospects with their policy efforts. The career prospects should be constructed in a 'relative' and 'self-evaluated' way. First, each individual official's career prospects should be comparable to those of each other. In the promotion tournament, the positions at the higher bureaucratic rank are restricted to a smaller number of officials, thus not every official at the same rank can achieve immediate political advancement. In order to obtain the limited promotion opportunities, officials have to outperform their rivals at the same rank. The measurement of the career prospects should reflect this aspect by summarizing all the relevant determinants of promotion into a single indicator to enable us to make comparison with each other's career prospects.

For this purpose, this project estimates predicted probabilities of political advancement for each individual official (i.e. prior likelihood of political advancement) as a proxy to measure one's career prospects. By setting up the historical patterns of promotion as a dichotomous outcome variable, this project uses a variety of parametric and non-parametric estimation models to produce each individual official's predicted probability of political advancement. The estimated predicted probability of political advancement indicates how likely an official, in a certain position in a given year, is promoted to a more promising position in the following year. By summarizing all measurable determinants of promotion in a separate model, the predicted probability of promotion enables the systematic assessment of an official's overall prospects in the next promotion round. By ranking the predicted probabilities of promotion, we can finally identify individual officials' relative career prospects, compared to

contemporaneous rivals, at any given point in time.

The second qualification on the definition of the career prospects is that the career prospects should be evaluated by officials themselves. The existing research on the Chinese political system has examined the effectiveness of the overall selection institution mainly by analyzing whether the system is meritocratic, patronage-based, or both (Jia, Kudamatsu, and Seim 2015; Landry, Lu, and Duan 2017; Li and Zhou 2005; Shih, Adolph, and Liu 2012). However, unlike the previous studies where scholars focus on the institution itself, the main subject matter of this project is how each individual official responds to such selection institution and how the response toward the institution alters the official's policy-making strategies. Therefore, the career prospects in this research are estimated not by those driven from the elements of the existing selection institution, but by those perceived by each individual official who has own personal criteria in evaluating the existing selection institution.

This aspect raises two fundamental problems to estimate the predicted probability of political advancement. First, as outsiders, we have limited information on the exact criteria that Chinese provincial officials generally apply to predict their own career outcomes. Outsiders can only indirectly guess officials' self-assessment on their career prospects by using the observable factors that have been identified by the previous studies. However, it is plausible that Chinese officials in general know better than outsiders regarding their career outcomes, because they have access to insider information. Second, each individual official may adopt a different set of rationales in evaluating own political prospects. Based on their personal and professional experiences, individual officials may have diverse levels of understanding on how the selection system works in China. It is not guaranteed that each official relies on the same logics on the determinants of political advancement, except for several obvious factors, such as age, tenure, education level, and administrative experience.

Figure 3-1: Model Design to Measure Officials' Self-Assessment of Career Outcomes

In sum, it is empirically challenging to measure individual officials' subjective evaluations on their future career outcomes. In order to deal with these issues, this research indirectly targets the Chinese officials' self-assessment on their own career prospects by setting up different approaches to estimating individual official's perceptions on their own career prospects. There are two estimation models to produce the predicted probabilities of promotion: theoretical model and machine-learning model. The first model is called the 'theoretical' model where predicted probabilities of promotion are estimated by using the variables which have been identified by previous studies on the Chinese political system. In the analysis, the theoretical model is considered the most conservative model as its predicted probabilities of promotion are calculated on the basis of the widely-known information on the determinants of political advancement.

As shown in **Figure 3-1**, officials' self-evaluation on their own career prospects is expected to be more accurate than the theoretical model. It is plausible to assume that the Chinese officials overall have more insider information on the political selection institution. They may resort to different variable combinations from those of outside scholars in evaluating their career prospects. Moreover, it is possible that each individual official knows better about own specific situations with regard to promotion chances. Compared to the theoretical model that imposes the same variable combination to every official, each individual official's own assessment on the career prospects is expected to be a better predictor.

The other model is the 'machine-learning' model that maximizes the prediction accuracy of the promotion outcomes. This model is designed to include as many relevant varia-

bles as possible and estimate predicted probabilities by adopting a variety of parametric and non-parametric machine learning techniques to find the best variable combinations in terms of prediction accuracy for each year and position. This machine learning prediction is fundamentally superior to the officials' self-assessment since it literally incorporates all observable candidates for promotion determinants in the Chinese political system. Although individual officials have insider information, their predictions on their own career prospects are not as perfect as those by the machine learning techniques because they cannot observe and integrate all the possible combinations of promotion determinants. Ultimately, this research is designed to cover the officials' self-assessment of their own career prospects between the theoretical model and the machine-learning model in terms of prediction accuracy.

3-1-1. Measuring Political Advancement

The main analysis of this project examines the relationship between career incentives and provincial policy outcomes during the time period between 1995 and 2015. The year 1995 is chosen as the start year because the Chinese government restructured its economic and financial statistics in that year (Naughton 2007). However, a longer time period is required in order to precisely measure each official's perception of future careers, because individual officials can evaluate their own career prospects based only on the previous patterns of promotions. This study chooses the past 10 years when estimating career prospects for each year. For example, predicted probabilities of promotion for officials in 1995 are calculated on the basis of the data between 1985 and 1994. **Table 3-1** describes the numbers of SMPC positions from 1985 to 2015. In the dataset, there are 12,650 SMPC positions overall. Note that party secretary occupies 8%, governor 7%, and vice party secretaries 20% respectively. Most of SMPCs over 65% are the rank-and-file standing committee members.

In this project, the career prospects of individual SMPCs are measured by predictive probabilities of political advancement (i.e. an SMPC's likelihood of political advancement).

Political advancement is defined as whether an SMPC is promoted or transferred to a more desirable position in a given year. Promotion means that an SMPC is assigned to one-level higher rank (e.g. the rank-and-file to vice party secretary, vice party secretary to governor, and governor to party secretary). If an SMPC is moved from one standing committee position to another at the same rank, it is coded as a transfer.

Table 3-1: The Number of SMPC Positions from 1985 to 2015

	PS	GOV	VPS	SC								
<i>N</i> (12,650)	1016	975	2527 (430)*	8132								
				DIC	PLC	OR	PR	SG	CPS	SPS	VGOV	MR ETC
				714	790	887	869	721	581	139	1115	1061 1255

*VPS is often double-appointed to one of the standing committee positions. The number in parentheses indicates the number of Executive vice party secretaries who have no double-appointment.

Note that bureaucratic promotion here is based on the administrative ranking. For example, in terms of the party hierarchy, governor and vice party secretary are in the same ranking with different titles: the full-rank governmental vice party secretary and the non-governmental vice party secretary, respectively (CCP Constitution). However, governor is one-level higher than vice party secretary in terms of the administrative hierarchy, because governor is the head of the provincial government and vice party secretary is the vice head of the provincial party committee. Therefore, moving from vice party secretary to governor is measured as a promotion.

Figure 3-2: SMPC's Expected Career Paths from 1985 to 2015

If an SMPC is transferred from one position to another in the same province, the transfer is not considered political advancement. However, transfers to a different province or a central organization are treated differently. For SMPCs, rotating different provinces or working at any central department grant greater political authority and a higher probability to gain a leading role in the near future, as the central leadership value those with wide administrative experiences in local and central departments (Li 2000; Teiwes 2001). In the case of the provincial party secretaries, only transfers to another province and central transfers and promotions are regarded as political advancement. Note that promotions or transfers to the nominal and ‘second-line’ positions in the center, such as the National People’s Congress and the National People’s Political Consultative Conference are not included in the analysis.

Table 3-2: SMPC’s Expected Career Paths by Types

Type	Sub-Type	PS	GOV	VPS	SC	Total
Within	Promotion	0 (0)	78 (0.49)	110 (0.41)	348 (0.54)	536
Between	Transfer	42 (0.40)	7 (0.04)	43 (0.16)	101 (0.15)	193
	Promotion	0 (0)	18 (0.11)	37 (0.14)	47 (0.07)	102
Center	Transfer/Promotion	62 (0.59)	54 (0.34)	72 (0.27)	143 (0.22)	331
Total		104	157	262	639	1162

*Note: Percentage in parentheses

There are largely three types of political advancement that an SMPC can pursue: a promotion to a higher-level in the current province of employment (Within), a promotion or transfer to another province (Between), or a promotion or transfer to the central party or government departments (Center). **Figure 3-2** displays SMPC’s expected career paths from 1985 to 2015. Throughout the period, 1162 political advancement occurred in the provincial standing committees. Around half of the political advancement, 536 (46.1%), were within-provincial promotions. Between-provincial promotions or transfers, 295 (25.3%) cases, and advancement to the central departments, 331 (28.4%) cases, accounted for the other half. Generally speaking, the years around when the central Party Congresses were altered (the vertical dashed lines in the plot) have a tendency to experience more personnel changes in the

provincial standing committees.

3-1-2. Building the Theoretical Model

As explored in [Section 2-2](#), many scholars in China studies have examined the determinants of political advancement. In this section, predicted probabilities of political advancement for individual officials are estimated by using only variables previously identified by the studies on the Chinese political system.

$$P_{it+1} = \gamma Bio_{it} + \delta Car_{it} + \varepsilon Con_{it} + \theta Fac_{it} + \pi Net_{it} + \sigma_t + \tau_{it} + \epsilon_{it}$$

$$\hat{P}_{it} = \Phi (X'_{it} \beta)$$

The above equation indicates the theoretical model where probit estimation is adopted to calculate predicted probabilities of political advancement ($\hat{P}_{it}$). Note that the predictions are made only with the previous 10 years of data. In the model, P_{it+1} denotes whether an SMPC i obtain political advancement in year $t+1$. The candidate predictors indicate each individual official's characteristics, including biographical (e.g. age, gender, education, and minority status), career (e.g. party-years, tenure-years in each position, administrative experiences, and job diversities), contextual (e.g. geopolitical characteristics of the working provinces), factional (e.g. competing affiliations with the central leadership), and network (e.g. network centralities and political connections with top central leaders) information. Additionally, the probit model includes time-variables (σ_t), such as the year passed from the new Central Party Congress, and position-variable (τ_{it}), which position SMPC i is holding at time t . The selected variables for the theoretical model can be found in [Appendix 1](#).

Table 3-3 shows descriptive statistics of the selected determinants of SMPC political advancement in the theoretical model. 6 variables are chosen as the biographical characteristics the Chinese provincial leaders. Age is calculated as incumbent year minus birth year. The mean of SMPC age for 30 years from 1985 to 2015 is around 55. Age over 62 is a dummy

variable whether a SMPC's age is over 62. Education level has five categories: 0 refers to lower than high school graduate, 1 to high school or equivalents, 1.5 to technical school, 2 to college degree, and 3 to post-graduate degrees, such as master or doctoral degrees. We can observe that SMPC have college degrees on average. Female is a gender variable whether a leader is female or not. Minority is also a binary variable where Han ethnicity is coded as 0 and others as 1. Only 6.6 percent of the entire SMPC since 1985 is female, while more than 10 percent of SMPC is minority. Native variable is designed to capture whether a leader was born in the working province. Despite the fact that the Chinese leadership frequently adopts the officials' rotations in order to prevent the patronage linkage between high-ranking officials and localities, over 35 percent of the Chinese provincial standing committee members worked in their native provinces.

As the career variable, tenure years and administrative experiences are included. Tenure indicates the number of working years in the current SMPC position. Tenure above 5 is whether a SMPC is working in the current position for over five years. On average, each SMPC stays in the same position for around 3.7 years and more than 20 percent of the SMPC have experienced more than 5 year tenure in the same position. N. of Exp. variable means an official's numbers of experiences in other provincial or central departments except for those in the currently working province since the official became a SMPC. The mean of the number of experience is 1.3 indicating that most of the SMPC stayed in the same province for their entire careers instead of rotating around other provinces or the central organizations. Central, People's Liberate Army (PLA), and CCP Youth League (CYL) experience variables literally refer to whether an official has worked for each institution respectively. The central experience includes any central party or government organizations, not only including major departments but also including sub-departments, directly controlled administrations, and mass organizations. The experience variables for the PLA and the CYL encompass any central or

local branches of each organization. Note that the military representatives (MR) in the provincial standing committee are considered to have PLA experiences by definition.

Table 3-3: Selected Descriptive Statistics of SMPCs from 1985 to 2015

<i>Type</i>	<i>Variable</i>	<i>Mean</i>	<i>St. Dev.</i>	<i>Min</i>	<i>Max</i>
Biographical Variable	Age	55.272	5.044	37 ¹	76 ²
	Age above 62	0.062	0.241	0	1
	Education Level	2.136	0.813	0	3
	Female	0.066	0.249	0	1
	Minority	0.111	0.314	0	1
	Native	0.374	0.484	0	1
Career Variable	Tenure	3.728	2.514	1	23 ³
	Tenure above 5	0.205	0.404	0	1
	N. of Exp.	1.352	0.629	1	6
	Central Exp.	0.201	0.401	0	1
	PLA Exp.	0.155	0.362	0	1
	CYL Exp.	0.210	0.407	0	1
Contextual Variable	Directly Administrative	0.129	0.335	0	1
	Autonomous Region	0.167	0.373	0	1
	Coastal Region	0.271	0.445	0	1
Factional Variable	Tsinghua	0.024	0.154	0	1
	Elite University	0.082	0.275	0	1
	Shanghai Exp.	0.035	0.184	0	1
	Princeling	0.015	0.122	0	1
Network Variable	PSG Work	0.078	0.268	0	1
	PSG Birth	0.060	0.237	0	1
	PSG Birth Work	0.040	0.195	0	1
	PSG University	0.097	0.296	0	1
	Previous PSG Work	0.065	0.246	0	1
	PSC Work	0.252	0.434	0	1
	PSC Birth	0.263	0.440	0	1
	PSC University	0.173	0.378	0	1
N. of Obs.	12,650				

* Note: ¹Li Haifeng is the youngest SMPC in the database. She started to serve as a member of the Hebei provincial standing committee and the vice party secretary of Shijiazhuang in 1986. After 2000, the youngest leader is Hu Chunhua. He was age 38, when he was a member of the Tibet Autonomous Region standing committee and the Secretariat-General of the region in 2001. ²Gao Yang is the oldest SMPC in the analysis, as he was the party secretary of Hebei province at the age of 76 in 1985. ³Redi was a vice party secretary of Tibet for twenty-three years from 1979 to 2002.

In the contextual categorization, there are three variables to identify whether working in the directly administrative cities, autonomous regions, or coastal provinces has an effect on SMPC's promotion probabilities. Jinagsu, Zhejiang, Guangdong, Fujian, Shandong, and Liaoning are included as the coastal regions. The factional variables include the well-known competition affiliations in the Chinese central leadership. Tsinghua indicates whether a SMPC is graduated from Tsinghua University in Beijing, while elite university variable in-

cludes graduates from Peking University in Beijing, Tsinghua University in Beijing, People's University in Beijing, Fudan University in Shanghai, and Shanghai Jiaotong University in Shanghai. Shanghai Exp. means Shanghai faction formed around the former party secretary general, Jiang Zemin, by identifying SMPC who have working experiences in Shanghai municipality. At last, princeling variable is whether a SMPC is an offspring of the previous central committee member of the CCP. In general, each faction accounts for only 1 to 3 percent of the entire provincial standing committee members.

This analysis also incorporates many identifiable political network variables. The patronage connections through birthplaces, workplaces, and universities have been well established by scholars in China studies. Whether a SMPC shares these traits with the party secretary general or the politburo standing committee members is included in the theoretical model. Around 8 percent of the provincial leaders have shared work experience, 6 percent were born in the same province, and 10 percent graduated from the same university with the incumbent party secretary general. Note that previous PSG work variable indicates whether a SMPC has worked in the birth province of the incumbent party secretary general. Since the numbers of the politburo standing committee are varied across the central party congress from 5 in the 13th to 9 in the 16th and 17th, connected SMPC with the politburo standing committee are generally larger numbers than those of the party secretary general reaching at around 25 percent of the entire provincial standing committee members.

Figure 3-3 shows the coefficients of the theoretical model. In the actual empirical model, each year's coefficients are estimated only based on the previous ten years of data. For the purpose of description, the coefficients in **Figure 3-3** are clustered by the central party congress. Overall, the coefficients are consistent with the theoretical evidence. As an official is older, the promotion probability of the official accordingly decreases. The age effects are consistently negative throughout the central party congresses from the 12th to 18th party

congress. Similarly, the age dummy variable, whether an official's age is over 62, is also negative across all the time periods. The tenure year in the current position has a positive effect on political advancement, whereas staying in the same position for over 5 years decreases one's promotion chances. It is generally correct to claim that the education levels of the Chinese provincial leaders are significantly positive on their promotion probabilities. Whether an official is female, minority, and native to the currently working province all have negative impact on the official's career prospects.

Figure 3-3: Determinants of Promotions by the Central Party Congresses

The number of administrative experience across the central and local departments

greatly increases one's promotion probability, although the effect of the number of administrative experience is diminishing as the number is increasing. While the central and Youth League experiences have significantly positive effects, the working experience at the People's Liberate Army is negatively correlated with SMPC's promotions. This is mainly because the military representatives in the provincial standing committee generally stay in the same military region rather than transferring or promoting to another region. The contextual variables, whether an SMPC is working at directly administrative cities, autonomous regions, or coastal regions largely has no effect. Among the network variables, working connections and university connections with the party secretary general have significant effects on promotion chances in general.

In measuring career prospects for individual provincial leaders, this study tackles many on-going debates on the determinants of cadre promotion in the provincial leadership. As the CCP's cadre professionalization has deepened in the 1990s, the result tells that the CCP put an emphasis on candidate's educational background, seniority of experience as well as age. The younger and Han with higher education level significantly improve the promotion probability of a SMPC. If officials are currently working at their birth province, it is less likely for the officials to expect the future promotions, while the longer be in the provincial standing committee, the substantially higher probability to be promoted. As demonstrated by Shih, Adolph, and Liu (2012), political patronage with the central leaders substantially increase SMPC's promotion probabilities. Landry (2008)'s hypothesis on decreasing promotion probabilities after 5 years of tenure length for the Chinese mayors is also applicable to the provincial standing committee members. In addition, Huang (1996)'s argument, whether an SMPC has had work experience in the central governments, turns out to be one of the pivotal components for SMPC's promotion in some time periods.

3-1-3. Building the Prediction Maximization Model

In order to accurately predict promotion outcomes for individual officials, an intuitive empirical strategy is applying machine learning techniques. Among possible candidates, this project mainly uses a Cross-validated Generalized Linear Model with Stepwise Selection (CV-GLM). There are primarily two rationales for adopting the machine learning model to estimate the predicted probability of political advancement. First, the aim of the model is not identifying the causal relationship between promotion determinants and the promotion outcomes but accurately predicting officials' promotion likelihood at a given point in time. Provincial officials' promotions are potentially influenced by numerous formal and informal institutions in the political system. Moreover, the determinants of promotions are susceptible to change depending on time and central leadership's priorities on selection. Under such circumstances, the best empirical strategy is evaluating as many as possible relevant variables and choosing the sets of variables that maximize the prediction accuracy of the model (Guyon and Elisseeff 2003; Witten et al. 2016).

Second, the machine learning predictions can avoid the over-fitting problem. One of the major methodological challenges in the predictive analysis is that the predicted values correspond too closely to the existing dataset, and thus fail to fit additional data or unseen future observations reliably. The machine learning model can avoid such problems by dividing the data into training sets and test sets and selecting variable combinations based on the prediction performance of the test sets (Lantz 2015). It is also empirically plausible to incorporate some levels of uncertainty in the model. Provincial leaders may not perfectly recognize their current rankings in the promotion tournament, but only vaguely acknowledge their relative strength compared to their contemporaneous rivals. The uncertainty of official's perception on career prospects is built into the machine learning model, thus the model can incorporate a more realistic understanding of the subject.

Out of over 200 features of individual SMPCs in **Appendix 1**, the methods implemented a 5-fold cross-validated probit regression with backward elimination selection. The first procedure was sub-setting the dataset by year. The machine learning model only used the past ten years of the data, when training the model for each year, because it is intuitively true that officials evaluate their own career prospects only by looking at the previous patterns of political advancement. Therefore, the machine should not resort to the future promotion outcomes when estimating predicted probabilities. Next, the dataset was divided into five subsets. Leaving one subset as a test set, the model used the other four subsets as a training set.

With the training set, the probit estimator performed the backward elimination process to select a set of relevant variables that maximized the Area Under the Curve (AUC) of the Receiver Operating Characteristics (ROC) curve. Maximizing AUC for binary outcome variables has been a canonical technique in machine learning for years, as it essentially minimizes the ratio of incorrect predictions relative to correct ones (Bradley 1997). In the procedure, the model first included all the predictors in the initial stage and identified a predictor whose contribution to the model's AUC is the smallest among the candidates. In each subsequent round, the model excluded the identified predictor if adding it did not increase AUC any more than adding a randomly generated dichotomous variable did.

Note that the model did not choose the predictor combination where the AUC of the model was maximized. This is because even inserting a randomly generated variable also increased the AUC of the model by a small margin. Therefore, the optimal model instead was where all the predictors increased AUC more than replacing them with a randomly generated dichotomous variable. The next step was identifying interaction terms between the selected relevant variables. The model used a forward inclusion technique to find a set of interaction variables. If adding interaction terms between two variables (which were selected before by the backward elimination process) increased the model's AUC greater than inserting a ran-

domly generated dichotomous variable, the model accepted the interaction term, otherwise, the proposed interaction term was dropped.

Once the stepwise selection procedures (backward elimination in the initial variable selections and forward inclusion in the interaction term selections) selected a set of predictors and their interactions with the training set, the probit estimator fit the model with the test set and produced each individual SMPC i 's predicted probability of political advancement ($\hat{P}_{it}$) in year t . Comparing the generated predicted values with the actual promotion outcomes, the model calculated AUC for the test set. The 5-fold cross-validated model repeated this procedure five times by rotating the test sets one by one. The final AUC was determined by the mean of the five test sets' AUC. This procedure iterated this entire process 1000 times and chose one with the highest final AUC. The highest final AUC was 0.771. There is no statistical test for whether this value can be interpreted as being well-fitted, but scholars generally consider over 0.7 as a good-fitting (Chakraborty, Rao, and Sen 2012). Most of the theoretically important variables are also selected by the machine-learning model. The full list of variables chosen for each year's predictions is presented in [Appendix 1](#). Details ROC curves by years and positions and the final AUC plots can also be found in [Appendix 3](#).

3-2. Prediction Results

Two estimation models, the theoretical model and the machine-learning model, are used to produce predicted probabilities of political advancement for SMPC from 1995 to 2015. The predicted probabilities estimated by these two models are designed to indirectly measure individual officials' own calculations on their own predicted probabilities of promotion. **Figure 3-4** shows the prediction accuracy comparisons between the theoretical model and the machine-learning model, measured by AUC. As expected, the machine-learning model produced more accurate predictions than those of the theoretical model for the most of years.

Throughout the period from 1995 to 2015, the average of prediction accuracy for the theoretical model is 0.706, while that of the machine-learning is 0.771. As proposed in **Chapter 3-1**, the prediction accuracy of officials' self-assessment on their own career prospects is expected to be higher than those of the theoretical model but lower than those of the machine-learning model. The dashed line in the figure indicates the estimation for the desirable target, which is calculated by the mean value between the theoretical and machine-learning models.

Figure 3-4: Accuracy Comparisons between the Theoretical and Machine-Learning Models

As such, the final predicted probabilities of promotions are also chosen as the mean values of those of the theoretical model and the machine learning model. On the basis of the final model, we can calculate the predicted probabilities of promotions for each SMPC in a given position at a given point in time. **Figure 3-5** describes the trend of individual career prospects measured by predicted probabilities of promotion from 1995 to 2015. If a leader's predicted probability of promotion is higher than that of other leaders in the same position in the same year, the leader is more likely to be promoted in the next term.

For example, when Xi Jinping served as a governor in Fujian in 2002, his promotion probability in the model was 0.8526, one of the highest scores among the entire provincial vice party secretaries in 2002. On the other hand, one of the other vice party secretaries in Fujian, He Shaochuan, had only an 8.01% chance of promotion, one of the lowest scores in

2002. While Xi Jinping was promoted to party secretary of Zhejiang province in the next year, He Shaochuan was transferred to the provincial political consultative conference, a de-facto retirement. The final model correctly predicted that Xi Jinping's career prospect in 2002 was substantially higher than that of He Shaochuan.

Figure 3-5: Predicted Probabilities of Political Advancement for SMPC

This measurement is very dynamic in that it incorporates all the time-varying relevant components that affect political advancement. One's career prospects are renewed every year. For example, as a leader is getting older in the same position, the career prospects of the leader are diminishing. Or, if a leader's superior is promoted to become a politburo member in the central leadership, the career prospects of the leader are also boosted as the leader acquires the new political connection. Career prospects as predicted probabilities of political advancement better describe the current political incentives in a given position at a given point in time than the static and time-invariant models suggested by other scholars such as whether a leader was born in the current province (Persson and Zhuravskaya 2015) or whether a leader had the Youth League experience (Choi 2012) .

Figure 3-6: Career Prospects Examples: Xi Jinping and Bo Xilai

Individual career prospects change dynamically, depending on positions and timings. **Figure 3-6** describes how the career prospects of Xi Jinping and Bo Xilai were changed for their entire careers as the provincial leaders. Y-axis of the figure shows ranking percentiles of predicted probabilities of promotion among all provincial standing committee members in the same SMPC position in each year. From the figure, we can find out that the career prospects of Xi were always high before he entered the central leadership in 2008, while Bo's career prospects were fluctuated from the lowest position when he was a party secretary of Dalian in 1999 to his heyday when he was transferred from the governor of Liaoning to the director of the central commerce ministry in 2003.

Acknowledgement

Chapter 3 contains material that has been submitted for publication as “Band of Rivals: Career Incentives, Elite Competition, and Economic Growth in China.” The dissertation author is the principal author of this work.

4. Constructing Provincial-level Career Incentives

The estimated career prospects, as a form of predicted probability of promotion, essentially indicate the levels of political competition that subnational officials need to deal with in order to acquire the limited opportunities for political advancement. However, the predicted probability of promotion itself is not enough to explain one's relative career prospects, because promotion frequencies are varied across years and positions. Even the same levels of promotion probabilities can be interpreted differently, depending on the number of promotions occurring in a given year for a given position. Therefore, a baseline of promotion probabilities should be set up in order to accurately evaluate an official's career prospects relative to their contemporaneous rivals. As the baseline, we need to estimate the thresholds of promotion, which are susceptible to change in accordance with years and positions.

4-1. Converting Career Prospects into Career Incentives

The estimated career prospects, as a form of predicted probability of promotion, essentially indicate the levels of political competition that subnational officials need to deal with in order to acquire the limited opportunities for political advancement. However, the predicted probability of promotion itself is not enough to explain one's relative career prospects, because promotion frequencies are varied across years and positions. Even the same levels of promotion probabilities can be interpreted differently, depending on the number of promotions occurring in a given year for a given position. Therefore, a baseline of promotion probabilities should be set up in order to accurately evaluate an official's career prospects relative to their contemporaneous rivals. As the baseline, we need to estimate the thresholds of promotion, which are susceptible to change in accordance with years and positions.

If an official's predicted probability of promotion is significantly higher than the promotion threshold, the model identifies that the official is highly likely to be promoted in the following year. If significantly lower, the official is highly likely to stay in the current posi-

tion. By examining the estimated promotion thresholds, this research divides SMPC into three groups based on their relative career prospects: dead-enders, rising-stars, and careerists. Dead-enders are SMPC whose rankings of predicted promotion probabilities, in a given position at a given year, are significantly below the promotion thresholds. Their rankings are so low that it is highly unlikely for them to obtain the next promotion. On the contrary, rising-stars are defined as SMPC whose rankings of predicted promotion probabilities are significantly above the promotion thresholds. Lastly, the rankings of careerists are located between those of dead-enders and rising-stars. Their rankings, in a given position at a given year, are not statistically significantly higher or lower than the promotion thresholds.

In the analysis, the actual promotion threshold was chosen by maximizing sensitivity and specificity of the prediction model, which is called “balanced accuracy” (Altman and Bland 1994; Velez et al. 2006). In the predictive analysis, sensitivity means the true positive ratio, calculated as the proportion of positives that are correctly identified as such by the model. Specificity refers to the true negative ratio, calculated as the proportion of negatives that are correctly identified as such by the model. Promotion threshold for SMPC position s at time t is chosen at the predicted probability level which maximizes sensitivity for position s at time t plus specificity for position s at time t . The threshold indicates that if we assign “promotion” to the values above the threshold and “non-promotion” to the values below the threshold, the model has the best accuracy in terms of the balanced accuracy.

$$Promotion\ Threshold_{st} = \text{Max}(Sensitivity_{st} + Specificity_{st})$$

For each year, we can find the threshold levels of the predicted probabilities that maximize the Balanced Accuracy of the model. Moreover, there are four ranks in the provincial standing committee: party secretary, governor, vice party secretary, and ordinary standing committee member. Provincial leaders in each position are competing with each other at the same rank. It is convincing to assume that the party secretary is not competing with the other

rank-and-file standing committee members. For this reason, we need to assign different threshold levels for each position. **Figure 4-1** describes the estimated promotion thresholds for each year and each position. Thresholds are relatively higher for the years of 1997, 2002, 2007 and 2012 because political mobility in those years was significantly higher than usual, due to the reshuffling of central leadership during the new central party congresses. As the overall levels of predicted probabilities of promotion rise, the promotion thresholds also increase accordingly. The examples of calculating thresholds by maximizing balance accuracy can be found in **Appendix 4**.

Combining the estimated promotion thresholds with individual predicted probabilities of promotion, the provincial standing committee members can be categorized. If someone's credible interval of predicted probability of promotion at the 99% level is exclusively higher than the threshold, the official is assigned as a Rrsing-star. If the credible interval of predicted probability of promotion at the 99% level is significantly lower than the threshold, the leader is assigned as a dead-end. Finally, if a leader's credible interval at the 99% level overlaps with the threshold, the leader is assigned as a careerist. This categorization scheme is constructed as a relative measurement of one's career prospects.

Figure 4-1: Promotion Thresholds for SMPC Positions from 1995 to 2015

Suppose that there is a vice party secretary whose credible interval ranges between 0.2 and 0.3 throughout the period. According to **Figure 4-1**, the leader is designated as a careerist from 1996 to 1998, from 2001 to 2002, and from 2009 to 2013, because there were relatively more promotions occurring in those years, thus the thresholds also became higher. On the other hand, with the same credible interval, the leader is designated as a rising star in the other years, given that the thresholds were lower due to the total number of promotions being fewer in those years. This means that this vice party secretary may evaluate the career prospects differently over time and also may change behaviors in policy implementation accordingly.

Figure 4-2: Predicted Probability Plot with Thresholds in 2002, Lowest to Highest

Figure 4-2 is a predicted probability plot in 2002. The Y-axis indicates predicted probabilities of promotion, and the X-axis is the ranking of the predicted probabilities. The grey area shows the credible intervals of predicted values at 99% level. The dashed horizontal lines represent each position's promotion threshold where sensitivity plus specificity of the model is maximized. The red dots in the plot mean officials labeled as careerists whose credible intervals at 99% level overlap the promotion threshold of each position. Correspondingly, SMPC whose predicted probabilities are above the red dots are assigned as rising-stars and below as dead-enders. There were around 500 Provincial Standing Committee members in 2002. In 2002, the leader with the highest career prospect was Xia Baolong, a 50-year-old vice governor in Tianjin. He was promoted to the party secretary of Zhejiang in 2012. The second highest was Xi Jinping, a 49 year old governor in Fujian. As we know, this already promising leader became the party secretary general of the CCP in ten years. The third highest was the current premier Li Keqiang, then-governor of Henan. Likewise, this analytic tool, developed by examining one's promotion likelihood and corresponding promotion thresholds, is useful to gauge a leader's political status and relative authority on Chinese politics.

4-2. Aggregating Individual Career Incentives to Collective Career Incentives

When it comes to assessing the policy outcomes of provincial governments, we need

to examine the collective leadership: the provincial standing committee. To do so, this section is designed to construct a group-level measure of how much a provincial collective leadership is responding to career incentives by using individual career prospects calculated in the previous chapter. There are several possible ways to aggregate individual career incentives at the collective level. One of the possible candidates is the mean value of predicted promotion probabilities of all the SMPCs. In this scheme, high career prospects are directly interpreted as high career incentives, because cadres with higher promotion probabilities are likely to consider the center's objective more importantly. The mean value is particularly useful because decision-making processes in the provincial leadership lack transparency. Under the circumstances where we do not know about the exact decision making mechanisms, the safest way would be taking a mean value

However, simply averaging all the individual's career prospects is problematic in several ways. First, the relationship between career prospects and career incentives may not be monotonic. There is a possibility that career incentives increase in an inversed U shape as career prospects increase. Perhaps, subordinates who are most eager to fulfill the superior's directives are not the leaders who already have secured the next promotion, but the leaders who need to do something to be promoted. If someone's career prospects are too high, the person may not need to respond to career incentives. More importantly, career incentives should be calculated not absolutely, but relatively. Promotion in bureaucracy is a tournament where a large number of candidates compete with each other to obtain a limited number of opportunities. A local leader can only evaluate her current career prospects in comparison to her peers rather than in isolation. For example, when the central leadership is reshuffled during a party congress the number of potential promotions rises. However, the chance of promotion rises for every official. Hence, we need to build a measurement of career incentives that is non-monotonic and reflects the ever-changing incentives of provincial leaders relative to the ca-

reer prospects of their rivals.

Instead of averaging career prospects, this research calculates the proportions of officials that fall into a certain prospect type in the provincial standing committee. This study divided SMPC into three groups based on their relative career prospects: dead-enders, rising-stars, and careerists. Dead-enders are SMPC whose rankings of predicted promotion probabilities, in a given position at a given year, are significantly below the actual promotion threshold. Their rankings are so low that it is highly unlikely for them to obtain the next promotion. On the contrary, rising-stars are defined as SMPC whose rankings of predicted promotion probabilities, in a given position at a given year, are significantly above the actual promotion threshold. Lastly, the rankings of careerists are located between low-prospect and rising-stars. Their rankings, in a given position at a given year, are not significantly higher or lower than the actual promotion threshold.

The proportions of each type of leaders are particularly useful because they can reflect the collective nature of decision-making process in Chinese provinces. By identifying what portion of leadership is career-incentivized, this measurement scheme is a good indicator to show how much the provincial leadership is willing to deliver better performance as a whole. **Figure 4-3** indicates the main independent variable of the analysis, the proportions of careerists in the provincial standing committee in selected provinces, including Hebei, Zhejiang, Hunan, Shaanxi, Jiangsu, Liaoning, Guangdong, and Sichuan. There is a fair amount of both within and between province variations in the figure. The curve of the lines is also seemingly random, which demonstrates that the proportion is exogenous to timing and location, which suggests the proportion of careerists can serve as an unbiased and fair treatment variable. Likewise, the proportions of dead-enders and rising-stars can also be calculated in the same way.

Figure 4-3: Proportions of Careerists for Selected Provinces

Figure 4-4: Proportions of Careerists by SMPC Positions from 1995 to 2015

At the same time, the types of each position in the provincial standing committee will also be examined in the analysis. Whether the party secretary or the governor of the province is a dead-ender, rising-star, or careerist is essential to be incorporated in identifying the effect of career incentives on economic growth. Since these two leaders have the greatest formal and informal decision-making authority in provincial leadership, it is possible that policy choices, which were seemingly decided by the collective leadership, could be substantially guided by the interests of these two supreme leaders. **Figure 4-4** is a summarization plot that shows how long each province has been governed by careerists throughout the entire period. In general, variations between provinces are sufficient across SMPC positions. For example,

while Zhejiang's governor is a careerist for most of the time period, Fujian has only 2 years of careerist governors (i.e. 10 percent of the entire 20 years). Regarding the rank-and-file members, provinces, such as Shanxi, Shaanxi, Hunan, Henan, and Guangdong, experience slightly lower average of careerists than other provinces throughout the period.

Acknowledgement

Chapter 4 contains material that has been submitted for publication as “Band of Rivals: Career Incentives, Elite Competition, and Economic Growth in China.” The dissertation author is the principal author of this work.

5. Empirical Evidence

To review, there are two features that this research incorporates in order to develop the existing promotion tournament theory in China. First is the conditional nature of bureaucratic incentives depending on career prospects (**Chapter 2-2**) and second is the collective nature of decision-making processes in Chinese provinces (**Chapter 2-3**). With the above distinct features, this chapter aims to provide empirical evidence for whether the career incentives of the Chinese provincial leadership, which are derived from individual career prospects estimated by the novel machine-learning techniques, are the primary driver of provincial policy outcomes, such as economic growth and intra-provincial regional inequality.

5-1. Hypothesis 1: Collective Career Incentives and Economic Growth in China

5-1-1. Hypothesis Building

Since Deng Xiaoping initiated economic reforms in 1978, economic growth has been the policy priority of the CCP leadership. Scholars argue that the emphasis on economic growth by the Chinese leadership stems from the political consideration that the CCP can gain implicit political legitimacy from the public by providing economic benefits (Desai, Olofsgård, and Yousef 2009; Zhao 2009; Zhu 2011). In order to maintain performance legitimacy, the Chinese central government sets up a long-term growth rate target once every five years of around seven percent and directs local governments to achieve the growth target (Naughton 2007). As a result, China has experienced spectacular economic growth for many decades. In **Figure 5-1**, China has sustained nearly double-digit growth rates from 1995 to 2015, which easily surpass those of other countries as well as the world average.

Scholars and experts in China studies have explored the institutional foundations of this Chinese economic success. The predominant theory is the meritocratic political selection system, suggesting that clearly designated career rewards on economic performance provide

strong incentives for local officials to compete with each other to generate high economic growth in order to acquire political advancement in the CCP hierarchy. By implementing a series of new cadre management policies that include economic indicators as one of the crucial criteria for promotions, the CCP leadership has invigorated its subnational agents to engage in the yardstick competition (Landry 2008; Whiting 2004). Consequently, it is widely reported that local governments in China exert enormous time and energy to construct infrastructures for economic growth (Oi 1999). Moreover, there are a fair amount of journalistic articles about “zhengji” (political achievement), a word used to describe Chinese local leaders’ endeavors to stimulate local economies in order to gain promotions (Duan and Wang 2006; He 2004; Wang 2013; Zhang 2015).

*Source: The World Bank, World Development Indicators

Figure 5-1: China’s GDP Growth Rates Compared to World

While it is well examined whether the central leadership promotes its subnational agents on the basis of their economic performance, the theory of meritocratic selection does not provide a clear-cut explanation on the relationship between promotion incentives and inter-jurisdictional competition. The performance-based selection scheme fairly motivates subnational officials to engage in generating economic growth in their jurisdictions. Yet, the main mechanism of economic growth is inter-jurisdictional competition among subnational

governments. Theoretically, individual promotion incentive is only a catalyst for yardstick competition, which essentially encourages local economic growth. Without political competition, the promotion incentives may not necessarily lead to economic growth in localities (Epplé and Zelenitz 1981; Maskin, Qian, and Xu 2000; Oates and Schwab 1988; Xu 2011).

*Source: The National Bureau of Statistics of China, China Statistical Yearbooks

Figure 5-2: China's GDP Growth Rates Disaggregated by Provinces

The extant literature focuses mainly on the center's viewpoint on whether the central leadership adopts the performance-based promotions. This approach tends to ignore the subnational perspective on the issue regarding how actively subnational officials are willing to comply with the centrally designed incentive structure. The meritocratic selection theory conveniently assumes that subnational agents are homogeneously affected by the promotion incentives designed by the central leadership. However, there is a possibility that each subnational official faces different levels of political competition in the promotion tournament. Consequently, the current theory can only explain the growth mechanism at the national level, as we observe in **Figure 5-1**. Although there is a theoretical account for the growth variations at the subnational level, mainly through the relationship between political competitions and economic outcomes, there has been no systematical approach to examine how the different levels of political competition among subnational officials result in different economic out-

comes in each locality. Without measuring the degree of effort that subnational officials would like to exert to develop local economies for promotion, it is challenging to correctly identify the effect of meritocratic selection on local economic growth.

This project seeks to clarify these puzzles by setting economic performance as an outcome and political competition as an explanatory variable. Especially, by measuring the levels of political competition subnational officials are facing in the promotion tournament, this study is designed to explain subnational variations in economic development. **Figure 5-2** shows that China's GDP growth rates for the past twenty years disaggregated by provinces. While the current theory only has an account for the pattern of the national mean (the bold red line, i.e. how China was able to achieve nearly double-digit growth rates), this project introduces an analytic tool to interpret the complicated patterns of the Chinese provinces (the colored lines, i.e. how some provinces could generate better economic performance than others). It vividly shows the complex and random patterns of subnational variations in economic growth. In other words, given that all subnational officials presumably face the same incentive structure designed by the center, how can we explain subnational variations in economic development even after controlling for inherent characteristics of the regions?

Ultimately, this project seeks to identify the growth mechanism at the subnational level by incorporating two important qualifications that the previous literature fails to include: first is the conditional nature of bureaucratic incentives depending on career prospects and second is the collective nature of decision-making processes in Chinese provinces. As discussed in **Section 2-2**, Chinese officials can be categorized into three groups depending on their career prospects: dead-enders, careerists, and rising-stars. This project links different types of officials in subnational leadership with the subnational economic outcomes.

Hypothesis 1-1a: A greater number of career-incentivized officials (i.e. careerists) in the provincial standing committee would lead to higher economic growth rates in the prov-

ince.

Hypothesis 1-1b: A greater number of dead-enders or rising-stars in the provincial standing committee would not lead to higher economic growth rates in the province.

Among Chinese subnational officials, this project examines the full list of the Standing Members of the Provincial-level Committees (SMPC) in order to explore the collective nature of the decision-making process in Chinese provinces. There are largely four ranks in the provincial standing committee: party secretary, governor, vice party secretary, and ordinary standing committee members. As we observe in **Section 2-3**, each SMPC has distinct domains for which they are responsible. Thus, examining only one or two top leaders, such as the party secretary and the governor, which is done by most of the previous research, is not sufficient to explain the full variations of policy outcomes of the provincial government. Instead, analyzing the entire members of the provincial standing committee is essential to precisely examine provincial economic outcomes.

Hypothesis 1-2: The career incentives of the SMPCs overall are better indicators to explain economic outcomes than those of the supreme leaders of the province.

5-1-2. Model Specification

Having introduced the building blocks of the predicted probabilities of promotion at the individual level and the aggregation of the collective career incentives, this project now conducts the main analysis of explaining the provincial economic growth in the context of the proportions of each type of the provincial standing committee members. Note that this project now turns to build a causation model to test the hypotheses by using the outcomes from the machine learning prediction model.

$$Y_{pt} = \beta_1 IV_{pt} + \delta X_{pt} + \alpha_p + \gamma_t + \varepsilon_{pt}$$

For empirical testing, the basic empirical model is a linear model with province and

year fixed effect. y_{pt} is a dependent variable, the real Gross Regional Product (GRP) growth rates of province p at time t . W_{pt} refers to independent variables constructed in the previous section (i.e. the proportions of careerists, dead-enders, and rising-stars in the provincial standing committees). X_{pt} contains province p 's economic and social variables that can potentially affect the economic growth rates of the provinces. There are population, primary sector GRP share, secondary sector GRP share, and lags of provincial government's revenues and expenditures. Economic variables are all log-transformed to control the scales and the exponential trends. Lags of the dependent variable are also included in the model to deal with autocorrelations. γ_t is a year fixed effect, and α_p is a provincial fixed effect. Both fixed effects are included to control unobservable heterogeneities across provinces and years. In [Appendix 5](#) and [Appendix 6](#), details on model validations and serial-correlation tests are explored.

5-1-3. Empirical Results

This project conducted two sets of empirical analysis derived from the proposed hypotheses. **Hypothesis 1** is the relationship between the proportions of each type of leader (i.e. careerists, dead-enders, and rising-stars) in the provincial standing committee and provincial economic growth rates. **Hypothesis 2** is to explore whether the above effects are dependent on the SMPC rankings (i.e. party secretary, governor, vice party secretary, and rank-and-file standing committee member). Note that the full regression table for the models used in this section is presented in [Appendix 7](#). First, **Figure 5-3** shows the coefficients of the proportions of each type in the provincial standing committees at 95% confidence interval. In the figure, the proportions of careerists have a significantly positive effect on the provincial economic growth rates. On the other hand, the coefficient of dead-enders implies that an increasing number of dead-enders in the provincial standing committee results in below-average economic growth. Surprisingly, rising-stars in the leadership have no effect on the economic

outcomes of their working provinces.

Figure 5-4 describes the effects of each type on economic growth in a much clear way. The fitted values of economic growth are increased as the proportion of careerists (blue line) is increased. As the share of careerists increases from 0.25 to 0.5, expected growth rate increases by approximately 2.5 percent. On the other hand, the line for dead-enders (red line) vividly shows the negative relationship, showing that expected growth rate decreases by almost 1.5 percent, as the proportion of dead-enders increases from 0.25 to 0.5. These outcomes are perfectly consistent with **Hypothesis 1**. Only career-incentivized SMPCs with insecure career prospects are willing to exert effort on provincial economic development in order to comply with the center's incentive system. If an official's career prospects are too poor, there would be no motivation to work hard to generate economic growth. Such officials in the leadership are harmful to local economies, as they only produce below-average economic growth. The black line in the right plot of **Figure 5-4** indicates the impact of rising-stars. As the proportion of rising-stars is increased, the slope of the line gradually shifts downward, but it is not statistically significant. This pattern shows that rising-stars only produce average-level economic growth.

Figure 5-3: Coefficients of Each Type on Economic Growth

Figure 5-4: The Relationship between Career Incentives and Economic Growth

The above empirical results consider the provincial standing committee as one identical group, presuming that each member of the committee can employ a similar level of authority on decision-making processes. In the next analysis, this project examines how the effects of leadership's career incentives differ depending on the formal ranks of the provincial standing committee. **Figure 5-5** indicates the coefficients of careerists by SMPC positions, such as party secretary (PS), governor (GOV), vice party secretary (VPS), and rank-and-file standing committee members (SC). In the plot, the effect of careerists becomes much stronger than that of careerists at the group-level, as we look at the coefficients of the rank-and-file standing committee members (SC). On contrary, the career incentives of the top-decision makers have no impact on provincial economic growth.

Table 5-1 describes the coefficients of every type of provincial standing committee members by each position. Basically, the table confirms that **Hypothesis 2**, whether the collective leadership is more influential in implementing economic policies than a handful of top decision makers. The empirical results demonstrate that only the proportions of careerist for the rank-and-file members show a strong correlation between career incentives and economic performance. In the second column, the negative coefficient of dead-enders for the rank-and-file members is slightly significant, which is identical to the results of the group-level analy-

sis, but the effect disappears when the model adopts provincial fixed effects.

Figure 5-5: Coefficients of Careerists by SMPC Positions

Contrary to the conventional wisdom, the career types of any other top rankings have no significant effect on provincial economic growth. As Landry, Lü, and Duan (2017) and Shih, Adolph, and Liu (2012) suggest, these findings imply that promotion decisions for these supreme leaders may be highly politicized. For further political advancement, party secretaries and governors essentially need to move to the central party or government organizations. Consequently, they may acknowledge that showing loyalty toward the central leadership or resorting to political affiliations is more important than developing local economies. On the other hand, it is intuitive that the rank-and-file members consider that displaying their abilities to facilitate local economies is a decisive factor in order to acquire promotions to higher positions at the provincial level.

Throughout the multiple testing on the effects of career incentives on economic performance, this project finds that the career incentives of the rank-and-file standing committee members are the primary driver for provincial economic development. In **Table 5-2**, this project further explores whether the main effects are different at different types of the top decision-makers. Each column means whether the party secretary or the governor of the province is a careerist, dead-ender, or rising-star. Are the career incentives of the rank-and-file mem-

bers on economic performance boosted or mitigated under a certain type of party secretary or governor? Across all different model specifications, most of the interaction variables indicate that there is no significant difference according to the types of the top leaders, while most of the rank-and-file coefficients remain significant.

Table 5-1: Effect of Each Type by SMPC Positions

	<i>Dependent variable:</i>					
	GRP Index					
	(1) Careerist	(2) Dead-end	(3) Rising-star	(4) Careerist	(5) Dead-end	(6) Rising-star
Rank-and-File	1.471*** (0.495)	-0.968* (0.532)	-1.484 (0.950)	1.591*** (0.506)	-0.829 (0.560)	-1.305 (0.896)
Party Secretary	0.008 (0.106)	-0.143 (0.113)	0.237 (0.211)	-0.037 (0.109)	-0.122 (0.120)	0.292 (0.214)
Governor	0.008 (0.109)	-0.059 (0.117)	0.165 (0.186)	0.110 (0.112)	-0.165 (0.124)	0.119 (0.192)
Vice Party Secretary	-0.061 (0.142)	0.076 (0.157)	0.031 (0.211)	-0.150 (0.144)	0.170 (0.163)	0.003 (0.218)
Year FE	YES	YES	YES	YES	YES	YES
Province FE	NO	NO	NO	YES	YES	YES
Observations	593	593	593	593	593	593
Adjusted R ²	0.508	0.505	0.508	0.354	0.347	0.356

Note:

*p<0.1 **p<0.05 ***p<0.01

An interesting exception is the dead-end governor in the fifth column and the eighth column. In the non-interaction model shown in the eighth column of **Appendix 7**, the coefficient of the rank-and-file careerists is significant, and that of the dead-end governor is not. However, once we insert the interaction term between careerist rank-and-file members and dead-end governor, the coefficients are changed. The rank-and-file effect becomes insignificant, and the governor effect and the interaction term turn to be statistically significant. If the rank-and-file standing committee members are working under a dead-end governor, they are more likely to reflect their interests in developing local economies than when they are working under a governor with mid or high career prospects. This result implies that the governor,

as the head of the provincial government, can exert a substantial amount of authority on provincial economic growth. Dead-end governors may allow the rank-and-file members to implement their own development policies, as the governors suffer from lack of incentives to perform their duties and responsibilities.

Table 5-2: Interaction Effects of Rank-and-File Careerists by Top Leaders' Types

	<i>Dependent variable:</i>								
	GRP Index								
	(1) Careerist	(2) Dead- ender	(3) Rising- star	(4) Careerist	(5) Dead- ender	(6) Rising- star	(7) Careerist	(8) Dead- ender	(9) Rising- star
SC_Careerist	1.470** (0.609)	1.776*** (0.608)	1.571*** (0.502)	1.937*** (0.605)	0.908 (0.624)	1.675*** (0.514)	1.776*** (0.684)	1.051 (0.692)	1.607*** (0.526)
Party Secretary	-0.147 (0.267)	-0.011 (0.281)	0.321 (0.524)				-0.153 (0.272)	0.011 (0.285)	0.356 (0.529)
Governor				0.369 (0.264)	-0.559** (0.275)	0.445 (0.469)	0.385 (0.267)	-0.595** (0.278)	0.469 (0.469)
SC*Party Secretary	0.328 (0.750)	-0.333 (0.778)	0.754 (1.592)				0.385 (0.769)	-0.503 (0.797)	0.793 (1.609)
SC*Governor				-0.869 (0.754)	1.311* (0.769)	-1.379 (1.539)	-0.921 (0.765)	1.466* (0.781)	-1.326 (1.539)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	617	617	617	597	597	597	597	597	597
Adjusted R ²	0.374	0.375	0.382	0.356	0.359	0.355	0.354	0.359	0.362
<i>Note:</i>							*p<0.1**p<0.05***p<0.01		

Overall, the effects of the rank-and-file members on provincial economic growth seem quite robust across the different models. However, the empirical results can be more convincing if we conduct additional robustness tests. One of the major methodological concerns is the statistical level of the confidence intervals for predicted probabilities of promotion when assigning the SMPC types. In **Section 3-3**, the analysis calculated the confidence intervals for predicted values at the 0.99 level, and categorized SMPCs into three groups by evaluating whether one's confidence interval overlaps the corresponding promotion threshold.

It is empirically plausible to choose 0.99 because 99% certainty on the future career outcomes is high enough to make inference on leaders' perception on their own career prospects. However, the number is still arbitrarily determined. The confidence levels are undeniably crucial because the entire empirical evidence is based on how we define officials who are not certain on their future careers. **Figure 5-6** deals with this issue by showing the coefficients of the rank-and-file careerists at different confidence levels. For both the theoretical and machine-learning models, the plot clearly illustrates that the coefficients remain strongly consistent at the conventional confidence levels ranging from 0.95 to 0.99.

Figure 5-6: Coefficients of Rank-and-File Careerists at Different Confidence Levels

Contrary to the conventional wisdom, the career incentives of the top decision-makers of the province, such as the party secretary and the governor, have no effect on the provincial economic growth. If the career incentives of the rank-and-file standing committee members are the main driver for economic development in localities, which positions among the rank-and-file standing committee members are most incentivized by the performance-based selection institution? This project further explores the main sources of economic growth within the collective decision-making body. Among the provincial standing committee members, the career incentives of subnational officials, such as Vice Governors (VGOV), the Party Secretary of Provincial Capital (CPS), and Party Secretaries of Sub-provincial and economically im-

portant Municipalities (SPS and MEM), are more incentivized and able to help generate growth than those in other provincial leadership positions, as observed in **Figure 5-7**.

Figure 5-7: Coefficients of SC Careerists on Economic Growth by SC Positions

These SMPC share the common traits. First, although the Chinese provincial leadership decides a variety of provincial affairs by consensus, there are officials whose roles are mainly designing, executing, and evaluating economic affairs (Bo 1996; Huang 2002). Vice governors, as the deputy governor of the province, are primarily in charge of economic affairs overall. The economic prosperity of the provincial capital, sub-provincial, and economically important municipalities is also closely related to provincial growth. Particularly, sub-provincial and economically important municipalities have been upgraded from the ordinary municipalities due to their importance in economic scales and impacts (Crane 1990; Naughton 1995).

Second, they are the future candidates of the provincial governor. Economic development has been the top priority of the CCP leadership, and therefore the governor, as the chief director of the provincial government, takes a responsibility for controlling and supervising the economic status of the province (Yang 2012; Zang 1991). It is reasonable to think

that the officials who have experience in economic affairs become a candidate for the next governor. In fact, many of party secretaries of economically successful municipalities have been consistently promoted to the governor position (Xu 2011). Other rank-and-file standing committee members, who mainly take charge of the party and social affairs, such as party organization, propaganda, or social security, are less affected by the provincial economic growth. While other members' overall performance is not easily captured by pure economic indicators, the positions specialized in economic growth are more incentivized by the performance-based promotion system.

5-2. Hypotheses 2: Collective Career Incentives and Investment Allocation in China

5-2-1. Hypothesis Building

What sorts of criteria that autocrats consider when they distribute resources? The existing literature on authoritarian stability has provided a convincing answer. Assuming the 'dictator's dilemma' where the more power dictators acquire, the higher the possibility of a coup, the current literature on authoritarianism explains that autocratic leaders distribute resources in response to internal or external threats. Bueno de Mesquita et al. (2004) show that dictators decide the targets of resource allocation depending on the size of possible coalitions. Acemoglu and Robinson (2009) propose that authoritarian regimes distribute resources to the general public in order to buy off popular support for the regime. As one of the channels through which dictators distribute their rents to their clients, a redistributive policy is used to strengthen elite cohesiveness against societal opposition or internal political rivalry (Boix and Svobik 2013). Autocratic leaders sometimes distribute to the poor people in order to expropriate from powerful preexisting elites (Albertus 2013).

Instead of viewing distribution as policies strategically adopted by the central autocrats for regime stability, authoritarian distribution in this project is framed as an unintended

consequence of subnational elite competitions. Local leaders in one-party regimes are competing with each other for limited rent-seeking opportunities and limited opportunities to show off to their superiors. Therefore, stronger local leaders dominate profitable sub-regions to maximize their promotion probabilities, while weaker local leaders are forced to choose less profitable targets to foster patron-client relationships with sub-provincial elites. These behaviors ultimately influence the level of regional redistribution. Provincial leadership composed of a larger number of strong and careerists is more likely to put more resources into the wealthier sub-regions, which aggravates inequality among sub-regions. On the contrary, provincial leadership composed of a larger number of weaker and low career prospect leaders is more likely to channel more resources to the poorer sub-regions. This pattern of allocation helps to reduce intra-provincial inequality and partially substitutes direct redistributive policies. Ultimately, this project explores how the unintended byproduct of elite competitions can supplement the inborn lack of government accountability in authoritarian regimes.

Table 5-3: Types of Subnational Officials and Investment Allocation Patterns

Category	Dead-ender	Careerist	Rising-star
Investment Amount	-	Promote More	Promote Less
Target Municipalities	Poorer	Wealthier	-

Table 5-3 shows hypotheses about the relationship between career incentives of provincial leaders and resource allocation in the province. Resource allocation within provinces is crucial in terms of local governance. Widening spatial gaps, fears of social unrest, and outcries from under-developed regions have propelled both policymakers and scholars to address regional inequality. Among provincial resources that have an impact on regional inequality, this project will focus on total fixed asset investment. Investment-driven growth is the main development strategy in China (Naughton 2007). According to the IMF, China's total investment as a share of nominal GDP is over 45% in 2015, which is substantially higher than that of other large developing countries such as Brazil (21%), Russia (20%), and India (34%)

(International Monetary Fund 2016). Investment is the largest portion of the Chinese economy overall. Under the highly decentralized system, local governments in China are able to affect local investment by controlling a variety of channels such as land sales, construction licenses, developmental zone establishment, and financial institutions (Montinola, Qian, and Weingast 1995; Xu 2011).

Some may doubt the government's ability to control investment because investment decisions are mostly made by individual firms in a free market economy. However, a transitional economy such as China has imperfect capital markets, and therefore, promoting investment is significantly affected by political factors (Huang 1999; Qin and Song 2009). Researchers on China's economy have pointed out numerous political factors driving investment decisions such as policy-induced investment, soft loans from the banking system, imbalance between performance and capital formation of the state-owned enterprises, and so on (Kornai 1980; Wang and Fan 2000; Zhang 2002; Zhang and Zou 1998). Along with the above studies, this project examines the role of high-ranking provincial officials and their career incentives, which affect investment allocation in the region. Fixed asset investment includes investment in mostly physical assets such as land, buildings, installations, machinery, technology, and roads, resources which can only be acquired with the government's explicit or implicit permission in China. In particular, real estate investment, which can only take place with local government permission, has accounted for over 50% - 60% of the total fixed investment since the data was first reported in 2004 (National Bureau of Statistics of China 2016). In summary, it is safe to assume that high-ranking provincial officials have enough capacity to channel investment to a certain part of the region.

When it comes to promoting fixed investment in the region, each type of provincial leader has a different motivation. First, careerists have a clear incentive to promote more investment and channel the investment to wealthier municipalities. Although scholarly works

remain inconclusive about the exact mechanisms of political advancement in China, we at least ascertain one fact that careerists are willing to impress their superiors with their capabilities. For provincial-level leadership, investment allocated to wealthier and developed municipalities is the most efficient option for careerists either to boost provincial growth or to maximize their personal rent. There is a trade-off between efficiency and equity with respect to regional resource allocation. Urbanized and rich sub-regions are generally considered more efficient targets because the regions have the higher marginal productivity of capital (Yamano and Ohkawara 2000).

In contrast, dead-enders are motivated to allocate investment in poorer and under-developed municipalities. Utilities of dead-enders are not dependent on their immediate career future because they are already excluded from the promotion process. For dead-enders, their welfare after government service is more important. They would build up patronage connection with actors lower down in the administrative hierarchy while still in leadership positions. It is well known that retired high-ranking officials still have some level of authority on business sectors through informal channels (Foster 2002; Hillman 2010; Kennedy 2005; Wank 1996). For example, it is common in China that retired high-ranking officials occupy the president positions of sub-provincial economic associations, which are supervised by government agencies where such officials served before retirement (Foster 2002). These economic associations play a mediator role in government-business relationships by establishing mutual commitments with the help of the retired officials involved in the associations (Deng and Kennedy 2010). However, patron-client exchanges between retired officials and business or industrial associations are a type of market transaction (Wank 1996). There is fierce competition in the post-career market for such potentially lucrative positions. Hence, provincial leaders should facilitate social and economic trusts first through their bureaucratic units.

Under-developed sub-regions provide suitable targets to foster post-retirement patron-

client ties. First, under-developed municipalities are less visible to central and provincial governments. Forming patron-client relationships may entail danger of corruption claims because it involves activities related to lobbying or bribery. Poorer and under-developed sub-regions endow fewer resources and generally have some distance from the provincial capital. There is relatively little spotlight from media coverage, party inspections, and official tours of the central leaders. Second, even though dead-enders are willing to formulate post-career connections with richer and more developed municipalities, they would be crowded out from those urban centers by other powerful officials in the provincial leadership, especially by careerists who have strong incentives to promote investment in such municipalities. Dead-enders are essentially lame duck politicians who have less influence than other officials due to their limited time horizon. Officials in wealthy cities know that and maybe less cooperative toward such officials in favor of those with a promising future. Officials in poorer localities may be more willing to accept any provincial level patronage available, even from someone who will leave office soon. In other words, powerful, careerists monopolize all the investment opportunities in wealthier sub-regions including provincial capitals. A vivid example is Qiu He, who was recently removed from the Yunnan Party Standing Committee due to corruption. Prior to his removal, he was notorious for using his connections in Beijing to prevent others from initiating new projects in, Kunming, the provincial capital (Southen Weekend 2015-3). Less powerful leaders in Yunnan had no choice but to allocate investment in less developed municipalities.

On the other hand, rising-stars are likely to promote less investment than low-prospect or careerists. They are expected to act like a conserver because the political stakes are too high. Local leaders with high career prospects are officials who are promising and destined to become high-ranking national leaders. They are cautious in engaging in massive investment projects because doing so may increase the chance of being charged on corruption claims.

The co-existence of dual economic systems during the transition period and the resulting institutional ambiguities create a number of grey areas involved in investment projects (McNally 2011; Sun 2004). Although officials do not commit economic crimes such as graft, bribe, fraud, and embezzlement, which are obviously illegal, they are still vulnerable to charges of corruption. Sometimes, culturally accepted ‘normal’ practices such as nepotism and favoritism in the process of investment promotion can be seen as abuses of power (He 2000). This grey corruption can be used by political opponents to attack the entire faction. In particular, minor claims on corruption can ruin an official’s career. In the 1980s, there was some kind of leniency on punishing corruptive behaviors. However, the punishment has been intensified since the 1990s (Interview). According to an interview with an anonymous official in the Central Commission for Discipline and Inspection (CCDI), a minor warning from the CCDI, even one that does not result in demotion or arrest, can halt one’s promotion path. Thus, rising-stars may not want to risk themselves by promoting massive investment projects, where there are perceivably numerous corruption opportunities.

5-2-2. Model Specification

Having introduced the building blocks of the predicted probability of promotion at the individual level and the aggregation of collective career incentives among provincial Standing Committee members, I proceed with the main analysis of explaining intra-provincial investment allocation patterns in the context of the proportions of each type of leader.

$$Y_{ijt} = \beta_1 IV_{it} + (\beta_2 IV_{it} + \beta_3) GRP_{ijt} + \delta X_{ijt} + \alpha_j + \gamma_t + \varepsilon_{ijt}$$

For empirical testing, this project adopted the Fixed Effect estimators. Y_{ijt} is a dependent variable, the total fixed asset investment per capita in municipal j in province i at time t . IV_{it} refers to independent variables constructed in the previous section (i.e. the proportions of the career-incentivized, the low-prospect, and the rising-stars in provincial Standing

Committees) for province i at time t . GRP indicates the quartiles of Gross Regional Product per capita of each municipal j at time t . There are four levels of quartiles (from the first quartile to the fourth quartile). The first quartile includes municipalities whose GRP per capita are located at the top 25% among the municipalities in the same province. In contrast, the fourth quartile is the bottom 25% among the municipalities in the same province. X_{ijt} contains municipal j 's control variables that can potentially affect the level of fixed asset investment. γ_t is year fixed effects, α_j is municipal fixed effects, and ε_{ijt} is error terms for each observation ijt .

Table 5-3 shows two hypotheses about the relationship between career incentives of provincial leadership and investment allocation within the province. In the empirical analysis, β_1 and β_2 are the core coefficients of interests. β_1 indicates the first row of **Table 5-3**, the overall investment amount changes, according to a unit change of independent variable (i.e. the proportions of each type of leader). By examining β_1 , we can test which type of leader is likely to promote more or less investment in the province. β_2 is an interaction term between GRP and independent variables, indicating the second row of **Table 5-3**. It is designed to estimate the impact of the proportions of each type of leader on GRP's coefficients on the investment amount. This means that the investment allocation target depends on municipal j 's GRP level. By looking at β_2 's sign (e.g. positive or negative), we can infer which type of leader is likely to target GRP higher municipalities or GRP lower municipalities.

5-2-3. Empirical Results

Table 5-4 presents the results on the effects of proportions of each type of leader on the overall investment amount in the province, defined as the coefficients of the independent variables (β_1) without interaction terms (β_2). The overall investment amount shows how much the average level of the municipal investment increases as the proportions of each type of leader increase. In the table, a one unit increase in the proportion of careerists leads to an

almost 12% increase (i.e. $\exp(0.113)=1.1196$) in investment on average. In other words, when the proportion of the careerists increases by 1%, the average municipal investment per capita increases by 0.113% (i.e. $\exp(0.00113)=0.001131$). On the contrary, if the proportion of the rising-stars increases by 1%, the average municipal investment per capita decreases by 0.17% (i.e. $1-\exp(0.00173)= -0.001728$). The proportion of the dead-enders also leads to an increase of the overall investment amount, but the effect is not statistically significant.

These results are consistent with the proposed hypotheses. Careerists in the provincial Standing Committee are willing to promote more investment in order to impress their superiors. The negative coefficient of the proportion of the rising-stars suggests that such a type of leader is likely to curb investment, due to possible corruption claims from massive investment projects. Provincial leaders with low career prospects have no effect on the average amount of municipal investment. Dead-enders are generally less capable than the other types of provincial leaders, in terms of investment promotion, because they are essentially lame duck politicians. They have limited authority on resources that affect the overall amount of investment, such as bank loans, public firms, foreign investment, and so on.

Table 5-4: Coefficients of Predictors on Overall Investment Amount

	<i>Dependent variable:</i>		
	Log Investment per capita		
	(1)	(2)	(3)
Proportion of Dead-enders	0.013 (0.034)		
Proportion of Careerists		0.105*** (0.033)	
Proportion of Rising-Stars			-0.142*** (0.036)
Year FE	YES	YES	YES
Observations	4482	4482	4482
Log Likelihood	-52.139	-47.035	-44.400
Note:	*p<0.1**p<0.05***p<0.01		

It is widely known that the Chinese banking sector is not totally independent from po-

litical factors (Pearson 2005; Podpiera 2006; Shen et al. 2009). However, at the same time, the banking sector is not the sector that the provincial government can manipulate at its will, especially after a series of reforms and deregulations (Chen, Skully, and Brown 2005). The government-business relationship in local economies has been increasingly regulated and controlled by the central government (Sheng, Zhou, and Li 2011). Although rising-stars have enough of an ability to direct or manage local financial institutions, they do not have a strong incentive to boost up the provincial investment, especially in the situation where promoting investment projects can be seen as an active involvement in rent-seeking activities. However, in the case of careerists, they need to make an effort to secure the next promotion. The returns of such risk-taking are higher than those of rising-stars.

Outsiders have limited information about who initiated massive investment projects in localities and who actually took charge of these projects. At the very least, a few media exposures on local massive investment projects give us a hint that officials who are located on the verge of promotion are actively engaged in the government-business relationship and started many investment projects in the locality. Bo Xilai in Dalian and Chongqing is an exemplar of this kind. The Reuters paper reported that although there was no direct evidence of any public financial links between Bo Xilai and his business allies, they observed that his business allies won a series of government contracts as he was continuously promoted to the higher position (Hornby 2012). No outsider can prove a direct relationship among politicians, financial institutions, and businessmen. However, the Bo Xilai's scandal debunked the pattern of public policies that careerists are willing to adopt.

Indeed, in this analysis, Bo Xilai is categorized as a career-incentivized leader in 2000, when he was a party secretary of Dalian. His predicted probability of promotion is only 102th out of 253 ordinary Standing Committee members in 2000. When he acquired the promotion to governor of Liaoning, he was categorized as a high-prospect leader (32th out of 173 Vice

Party Secretaries in 2001). Then, in 2011 when he was a party secretary of Chongqing, his ranking of predicted probability of promotion was only 16th out of 33 party secretaries. Among party secretaries, he is categorized as a career-incentivized leader. He needed to show off his ability more in order to obtain the politburo membership in the next central party congress. His massive investment projects were particularly booming at that time, when he was categorized as a career-incentivized leader (Yiu and Francis 2012). The outcome of this action was the elimination from the party, due to the corruption charges.

Table 5-5: Coefficients of Predictors on Investment Allocation

	<i>Dependent variable:</i>		
	Log Investment per capita		
	(1) Dead-enders	(2) Careerist	(3) Rising-star
Proportion (Q1)	-0.083 (0.052)	0.254*** (0.058)	-0.150*** (0.055)
Proportion*Q2	0.056 (0.070)	-0.138* (0.084)	0.044 (0.074)
Proportion*Q3	0.112 (0.072)	-0.238*** (0.086)	0.055 (0.075)
Proportion*Q4	0.235*** (0.070)	-0.254*** (0.084)	-0.059 (0.074)
Year FE	YES	YES	YES
Observations	4482	4482	4482
Log Likelihood	-51.681	-46.138	-48.372
<i>Note:</i>		*p<0.1**p<0.05***p<0.01	

However, in order to scrutinize investment amounts and allocations, we need to separate these overall effects by municipalities' wealth levels. Each type of leaders in provincial leadership may have heterogeneous motivations depending on the target's wealth. For example, the observed outcome of dead-enders in **Table 5-4** may result from their active promotion of investment in some regions but the inability to do the same in other regions. **Table 5-5** indicates the results of interaction variables (β_2) between the proportions of different types of officials (i.e. low-prospect, high-prospect, and careerists) and municipal's GRP per capita

quartiles (i.e. the first quartile to the fourth quartile). It is designed to identify the investment targets of provincial leadership depending on the GRP per capita levels of municipalities in order to answer whether a certain type of provincial leaders allocates more investment to wealthier municipalities or poorer municipalities. In the table, reference level is the first quartile of GRP, meaning that a group of municipalities whose GRP level is the top 25th percentile among municipalities in the province. The interaction variables demonstrate how much the slope of the reference level shifts depending on the changes in the GRP quartiles of municipalities within the province.

In the case of the proportion of careerists that is shown in the middle column, the coefficient for the first quartile is 0.254, meaning that one percentage increase in the career-incentivized leader's proportion causes 0.254% increase in investment in the top 25th percentile municipalities in terms of GRP per capita. Interaction variables show that the second quartile municipalities receive 0.123% (i.e. $\exp(0.254-0.138)=1.1229$) more investment with one percentage increase in the proportion of careerists; the third quartile municipalities only receive 0.016% (i.e. $\exp(0.254-0.238)=1.0161$) more investment; the fourth quartile receives nothing (i.e. $\exp(0.254-0.254)=1$). The empirical results show that careerists in provincial leadership are likely to channel most of the promoted investment into the wealthier sub-regions: the first and second quartile municipalities. As expected, relative amount of investment in poorer prefectures is significantly decreased under the control of careerists in the provincial leadership.

This pattern of investment allocation potentially aggravates the intra-provincial inequality level, as they distribute most of the resources into the richer and developed areas and allocate almost nothing to the poorer and under-developed areas. **Figure 5-8** highlights the differences in investment targets between the first quartile and the fourth quartile operated by careerists. As the proportion of career incentivized leaders increase in the provincial leader-

ship, the expected investment of the top 25th percentile is increasing rapidly, while there is no difference in the bottom 25th percentile municipalities. In the analysis, the rationale of careerists is making an effort to impress their central superiors in order to secure the next promotion. In terms of investment allocation, what these motivated leaders pursue is channeling their promoted investment projects in urban and developed areas. Allocating more investment in the top 25th percentile municipalities is advantageous for careerists to impress their superiors. The richer and developed sub-regions are more visible, more capital-efficient, and have more rent-seeking opportunities. The further research should be required to identify the exact mechanism (i.e. which explanations are most salient, when careerists allocate the promoted investments).

Figure 5-8: Investment in Top 25th and Bottom 25th Percentiles Cities (Careerists)

Although dead-enders do not affect the overall amount of investment in the province, the interaction analysis suggests that dead-enders promote more investment in poorer municipalities, while they promote slightly less investment in wealthier municipalities. In **Table 5-9**, the coefficients of the third and fourth quartiles are significantly higher than that of the reference level – the first quartile. One percentage increase in dead-enders in the provincial leadership leads to 0.16% (i.e. $\exp(-0.083+0.235)=1.164$) increases in investment PC in the bottom 25th percentile municipalities. As we see in **Figure 5-9**, the expected investment of the

fourth quartile (bottom 25th) in terms of municipality's GRP per capita significantly increases with a higher proportion of dead-enders in the leadership. On the other hand, the slope of the first quartile (top 25th) is negative, although not statistically significant at 95% confidence level.

Figure 5-9: Investment in Top 25th and Bottom 25th Percentiles Cities (Dead-enders)

This outcome is particularly interesting because it sheds light on the mechanisms of authoritarian redistribution. While careerists completely ignore the economic status of the bottom 25th percentile municipalities, dead-enders promote more investment in those regions. At the same time, dead-enders tend to reduce the level of investment in the top 25th percentile municipalities, although statistically not significant. This pattern of investment allocation helps to alleviate intra-provincial inequality between wealthier municipalities and poorer municipalities. Dead-enders are willing to provide more economic resources to the poorer sub-regions, while they cannot engage in investment projects in the wealthier sub-regions. In a way, gaps in the CCP's cadre incentives system on the margin alleviate regional inequality.

Figure 5-10: Investment in Top 25th and Bottom 25th Percentiles Cities (Rising-stars)

In the case of the proportion of rising-stars, only reference level, the top 25th percentile, is significant and other interaction terms are not significant. This suggests that provincial leaders with high career prospects have a tendency to reduce the overall investment levels and do not have a specific target in terms of GRP percentiles. Rising-stars would like to refrain from investing across all the sub-regions regardless of the levels of municipalities' wealth. They do not jeopardize their future career by launching massive investment projects with numerous grey-area corruption opportunities. In **Figure 5-10**, both the top 25th percentile and the bottom 25th percentile municipalities would experience drops in fixed asset investment as the proportion of rising-stars rises.

Acknowledgement

Chapter 5 contains material that has been submitted for publication as “Band of Rivals: Career Incentives, Elite Competition, and Economic Growth in China.” The dissertation author is the principal author of this work.

6. Conclusion

The main findings of this project suggest that the inconclusive debates on the existing meritocratic theories may result from the wrong identification strategies that neglect two important qualifications of the Chinese political system. First, the extant research fails to isolate subnational officials with strong career incentives from those who are alienated from political advancement. This project addresses this issue by explicitly posing that provincial officials even in the same bureaucratic level have different levels of career incentives in accordance with their own perceptions on career prospects. Second, scholars tend to improperly link provincial economic outcomes with the motivations of one or two supreme leaders of a province. However, analyzing all the members of the formal collective decision-making body, the provincial standing committee, is essential to explain policy outcomes of the provincial government. With these two unique features, this project argues that the proportion of the career-incentivized rank-and-file members in provincial leadership is the main driver for provincial economic growth.

However, further research needs to be conducted in order to better understand the decision-making mechanism within the rank-and-file standing committee members. Although the Chinese provincial leadership generally makes policy decisions by consensus, individual members of the provincial standing committee have distinct domains for which they are responsible. For example, vice governors are primarily in charge of overall economic social affairs. The director of propaganda department controls media apparatus, while the secretary of political and legal affairs commission is responsible for political stability and legal enforcement. It is possible that the effects of career incentives are different depending on the career specialties of each provincial standing committee member. In explaining the patterns of economic growth, career considerations of standing committee members whose main roles are designing, executing, and evaluating economic affairs can be more influential than those of

other members.

In this aspect, the machine learning model of this paper potentially makes meaningful contributions to many existing studies of the political economy of China, as the model measures the political source of socio-economic outcomes in localities. The provincial standing committee has formal and informal authority on virtually every aspect of provincial affairs, including economic and social development, propaganda and ideological control, mass organization direction, social and political unification, law enforcement, and personnel management at lower level administrations. By using this model that measures career incentives of provincial standing committee members, we can identify subnational variations of these issues. Previous studies on subnational policy implementation tend to over-simplify determinants of policy outcomes for the purpose of identifying the causal relations between political leaders and their policies. By taking into account heterogeneous incentives among provincial leaders, this political framework can outperform existing studies in predicting actual policy outcomes.

*Reference

- Abramowitz, Alan. 1975. "Name Familiarity , Reputation , and the Incumbency Effect in a Congressional Election." *Western Political Quarterly* 28(4): 668–84.
- Acemoglu, Daron, Georgy Egorov, and Konstantin Sonin. 2010. "Political Selection and Persistence of Bad Governments." *The Quarterly Journal of Economics* (November): 1511–75.
- Acemoglu, Daron, and James A. Robinson. 2009. *Economic Origins of Dictatorship and Democracy*. Cambridge University Press.
- Albertus, Michael. 2013. "Explaining Patterns of Redistribution Under Autocracy." In *Unpublished Work*,.
- Alesina, Alberto, and Guido Tabellini. 2007. "Bureaucrats or Politicians ? Part I : A Single Policy Task." *American Economic Review*.
- Altman, Douglas G., and J Martin Bland. 1994. "Diagnostic Tests 1: Sensitivity and Specificity." *British Medical Journal* 308(June): 1552–53.
- Bai, Ruixue. 2011. "The Role of the All China Federation of Trade Unions: Implications for Chinese Workers Today." *Journal of Labor and Society* 14(March): 19–39.
- Baum, Richard. 1992. "Political Stability in Post-Deng China : Problems and Prospects." *Asian Survey* 32(6): 491–505.
- Besley, Timothy. 2005. "Political Selection." *Journal of Economic Perspectives* 19(3): 43–60.
- Besley, Timothy, and Masayuki Kudamatsu. 2008. "Making Autocracy Work." *Institutions and Economic Performance* (020): 452–510.
- Blanchard, Olivier, and Andrei Shleifer. 2001. "Federalism With and Without Political Centralization: China Versus Russia." *IMF Staff Papers* 48.
- Blaydes, Lisa. 2010. *Elections and Distributive Politics in Mubarak's Egypt*. Cambridge University Press.
- Bo, Zhiyue. 2010. *China's Elite Politics : Governance and Democratization*. World Scientific.
- Bo, Zhiyue. 1996. "Economic Performance and Political Mobility: Chinese Provincial Leaders." *Journal of Contemporary China* 5(12): 135.
- . 2002. *Chinese Provincial Leaders: Economic Performance and Political Mobility Since 1949*. Armonk: M.E. Sharpe.
- . 2004. "The Institutionalization of Elite Management in China." In *Holding China Together: Diversity and National Integration in the Post-Deng Era*, eds. Barry Naughton and Dali L. Yang. Cambridge University Press.
- Boix, Carles, and Milan W. Svolik. 2013. "The Foundations of Limited Authoritarian Government: Institutions, Commitment, and Power-Sharing in Dictatorships." *The Journal of Politics* 75(2): 300–316.
- Brownlee, Jason. 2007. *Authoritarianism in an Age of Democratization*. Cambridge University Press.

- Buchanan, James M., and Gordon Tullock. 1962. *The Calculus of Consent: Logical Foundations of Constitutional Democracy*. University of Michigan Press.
- Bueno de Mesquita, Bruce, Alastair Smith, Randolph M. Siverson, and James D. Morrow. 2004. *The Logic of Political Survival*. Cambridge: The MIT Press.
- Burns, John P. 1989. *The Chinese Communist Party's Nomenklatura System: A Documentary Study of Party Control of Leadership Selection, 1979-1984*. M.E. Sharpe.
- . 1994. "Strengthening Central Ccp Control of Leadership Selection: The 1990 Nomenklatura." *The China Quarterly* 138: 458–91.
- Cai, Hongbin, and Daniel Treisman. 2006. "Did Government Decentralization Cause China's Economic Miracle?" *World Politics* 58(04): 505–35.
- Cai, Rupeng. 2014. "解密中组部." *Zhongguoxinwenzhougan*.
- CCP. 1979. "关于建国以来党的若干历史问题的决议 Guanyu Jianguoyilai Dangde Ruogan Lishi Wentide Jueyi."
- . 1980. "党和国家领导制度的改革 Dangheguojia Lingdaozhidude Gaige."
- . 1982. "中国共产党章程 Zhongguogongchandangzhangcheng (Constitution of the Communist Party of China)."
- . 1984. "向中央备案的干部职务名单 Xiangzhongyangbeiande Ganbuzhiwumingdan."
- . 1985. "关于党的地方各级代表大会若干具体问题的暂行规定 Guanyu Dangdedifanggejidiaobiaodahui Ruoganjutiwentide Zanxingguiding (Provincial Decisions on Several Issues on Local Party Committees)."
- . 1990. "中共中央管理的干部职务名称表 Zhonggongzhongyang Guanlide Ganbuzhiwu Mingchengbiao."
- . 1996. "中国共产党地方委员会工作条例(试行) (Regulations Governing CCP Local Committee (Provisions))."
- . 2004. "关于加强党的执政能力建设的决定 Guanyu Jiaqiang Dangdezhizhengnengli Jianshedejueding."
- . 2006. "关于认真做好今明两年省、自治区、直辖市党委换届工作的通知 Guanyu Renzhenzuohao Jinmingliangnian Shengzizhiquzhixiashi Dangwei Huanjie Gongzuodetongzhi."
- . 2007. "关于实行党委常委分工负责制有关问题的试行意见 Guanyu Shixing Dangweichangwei Fengongfuzezhi Youguanwentide Shixingyijian."
- . 2008. "关于修订中共中央管理的干部职务名称表的通知 Guanyu Xiuding Zhonggongzhongyang Guanlideganbu Zhiwumingchengbiaodetongzhi."
- . 2012. "中国共产党章程 Zhongguogongchandangzhangcheng (Constitution of the Communist Party of China)."
- . 2015. "中国共产党统一战线工作条例(试行) zhongguogongchandang

- Tongyizhanxian Gonzuotiaoli (Provisional Regulations Governing the United Front Work).”
- . 2016. “中国共产党地方委员会工作条例 (Regulations Governing CCP Local Committee).”
- Central Committee. 1995. “Dangzheng Lingdao Ganbu Xuanba Renyong Gongzuo Zanxingtiaoli (Provisional Regulations on the Selection, Promotion, and Employment of Party and Government Leading Cadres).”
- Central Organization Department. 1979. *Guanyu Shixing Ganbu Kaohe Zhidu de Yijian (Opinion on Implementing the System of Check on Cadres)*.
- . 1988. *Xian (Shi, Qu) Dangzheng Liangdao Ganbu Niandu Gongzuo Kaohe Fang'an (Trial Program of the Annual Check on the Work of Leading Party and Government Cadres in Counties (Cities, Districts))*.
- Chakraborty, Ranajit, Calyampudi Radhakrishna Rao, and Pranab Kumar Sen. 2012. *Handbook of Statistics: Bioinformatics in Human Health and Heredity*. Handbook o. Newnes.
- Chen, Jie. 2004. Stanford University Press *Popular Political Support in Urban China*. Wiley-Blackwell.
- Chen, Jie, and Bruce J. Dickson. 2010. *Allies of the State : China's Private Entrepreneurs and Democratic Change*. Harvard University Press.
- Chen, Jie, and Yang Zhong. 2002. “Why Do People Vote in Semicompetitive Elections in China ?” *Journal of Politics* 64(1): 178–97.
- Chen, Xiaogang, Michael Skully, and Kym Brown. 2005. “Banking Efficiency in China: Application of DEA to Pre- and Post-Deregulation Eras: 1993-2000.” *China Economic Review* 16(3): 229–45.
- Chen, Ye, Hongbin Li, and Li-An Zhou. 2005. “Relative Performance Evaluation and the Turnover of Provincial Leaders in China.” *Economics Letters* 88(3): 421–25.
- Chevalier, Judith and Ellison, Glenn. 1999. “Career Concerns of Mutual Fund Managers.” *The Quarterly Journal of Economics* 114(2): 389–432.
- Chien, S, and L Zhao. 2007. “Cross-Regional Cadre Transfer and Local Economic Development: Evidence from Jiangsu, China.”
- Choi, Eunkyong. 2012. “Patronage and Performance: Factors in the Political Mobility of Provincial Leaders in Post-Deng China.” *The China Quarterly* 212: 965–81.
- Christensen, Tom, Lisheng Dong, and Painter Martin. 2008. “Administrative Reform in China's Central Government — How Much 'learning from the West'?” *International Review of Administrative Sciences* 74(3): 351–71.
- Chu, Chaoxin. 2014a. “党委常委排序到底有啥讲究.” 新观察.
- . 2014b. “广东多地纪委书记排名前移 广州纪委书记移一位.” 南方都市报.
- . 2015. “谁有资格 ‘入常’ 党委常委排序有啥讲究.” 南方都市报.

- Crane, George T. 1990. *The Political Economy of China's Special Economic Zones*. ME Sharpe.
- Cui, Shixin. 2007. "党委书记权力究竟有多大?" *People's Daily*.
- Cui, Wunian. 2003. *Wode 83 Ge Yue (My 83 Months)*. Hong Kong: Ko Man Publishing Co.
- Deng, Guosheng, and Scott Kennedy. 2010. "Big Business and Industry Association Lobbying in China: The Paradox of Contrasting Styles." *China Journal* (63): 101–25.
- Deng, Xiaoping. 1980. *Dang He Guojia Lingdao Zhidu de Gaige (Reforms on the Institution of Party and Government Leading Cadres)*.
- Desai, Raj M., Anders Olofsgård, and Tarik M. Yousef. 2009. "The Logic of Authoritarian Bargains." *Economics & Politics* 21(1): 93–125.
- Dewatripont, Mathias, Ian Jewitt, and Jean Tirole. 1999. "The Economics of Career Concerns, Part I: Comparing Information Structures." *The Review of Economic Studies* 66(1): 183–98.
- Dickinson, Bruce J. 2016. *Dictator's Dilemma: The Chinese Communist Party's Strategy for Survival*.
- Dillon, Michael. 2016. "Majorities and Minorities in China." *Ethnic and Racial Studies* 39(12): 2079–90.
- Dittmer, Lowell, and Yu-Shan Wu. 1995. "The Modernization of Factionalism in Chinese Politics." *World Politics* 47(04): 467–94.
- Donaldson, John A. 2011. *Small Works: Poverty and Economic Development in Southwestern China*. Cornell University Press.
- Dong, Lisheng, T. Christensen, and M. Painter. 2010. "A Case Study of China's Administrative Reform: The Importation of the Super-Department." *The American Review of Public Administration* 40(2): 170–88.
- Duan, Huaqia, and Rongke Wang. 2006. "Lun Zhengjigongchengde Zonghezhi (The Comprehensive Administration of Achievement Project)." *Journal of Anhui Electrical Engineering Professional Technique College* 11(2): 31–35.
- Edin, Maria. 2003. "State Capacity and Local Agent Control in China: CCP Cadre Management from a Township Perspective." *The China Quarterly* 173(4): 35–52.
- Epple, Dennis, and Allan Zelenitz. 1981. "The Implications of Competition among Jurisdictions: Does Tiebout Need Politics?" *Journal of Political Economy* 89(6): 1197.
- Evans, Peter B. 1995. *Embedded Autonomy: States and Industrial Transformation*. Princeton University Press.
- Evans, Peter B., and James E. Rauch. 1999. "Bureaucracy and Growth : A Cross-National Analysis of the Effects of 'Weberian' State Structures on Economic Growth." *American Sociological Review* 64(5): 748–65.
- Fan, Ke. 2016. "Representation of Ethnic Minorities in Socialist China." *Ethnic and Racial Studies* 39(12): 2091–2107.
- Fewsmith, Joseph. 1996. "Institutions, Informal Politics, and Political Transition in China."

- Asian Survey* 36(3): 230–45.
- . 2008. *China since Tiananmen*. Cambridge University Press.
- Fiorina, Morris. 1977. *Congress: Keystone of the Washington Establishment*. Yale University Press.
- Forster, Keith. 1984. “The Reform of Provincial Party Committees in China : The Case of Zhejiang.” *Asian Survey* 24(6): 618–36.
- Foster, Kenneth W. 2002. “Embedded within State Agencies: Business Associations in Yantai.” *The China Journal* 47: 41–65.
- Gandhi, Jennifer, and Adam Przeworski. 2007. “Authoritarian Institutions and the Survival of Autocrats.” *Comparative Political Studies* 40(11): 1279–1301.
- Geddes, Barbara. 2005. “Why Parties and Elections in Authoritarian Regimes?” In *Annual Meeting of the American Political Science Association*,.
- Gibbons, Robert, and Kevin J. Murphy. 1992. “Optimal Incentive Contracts in the Presence of Career Concerns : Theory and Evidence.” *Journal of Political Economy* 100(3): 468–505.
- Gilli, Mario, Yuan Li, and Jiwei Qian. 2016. *Logrolling under Fragmented Authoritarianism: Theory and Evidence from China*.
- Guo, Gang. 2009. “China’s Local Political Budget Cycles.” *American Journal of Political Science* 53(3): 621–32.
- Guyon, Isabelle, and André Elisseeff. 2003. “An Introduction to Variable and Feature Selection.” *Journal of Machine Learning Research (JMLR)* 3(3): 1157–82.
- Haggard, Stephan. 1990. *Pathways from the Periphery: The Politics of Growth in the Newly Industrialized Countries*. Cornell University Press.
- He, Tieying. 2004. “Zhengjigongcheng Jiedu (Pursuing China’s Political Achievement Projects).”
- He, Zengke. 2000. “Corruption and Anti-Corruption in Reform China.” *Communist and Post-Communist Studies* 33(2): 243–70.
- Heilmann, Sebastian, and Elizabeth J. Perry. 2011. *Mao’s Invisible Hand: The Political Foundations of Adaptive Governance in China*. Harvard University Asia Center.
- Hillman, Ben. 2010. “Factions and Spoils: Examining Political Behavior within the Local State in China.” *China Journal* (64): 1–18.
- Holmström, Bengt. 1999. “Managerial Incentive Problems: A Dynamic Perspective.” *The Review of Economic Studies* 66(1): 169–82.
- Hornby, Lucy. 2012. “The Parallel Rise of China’s Bo Xilai and a Business Ally.” *Reuters*.
- Hsiung, Pingchun. 2001. “The Outsider within and the Insider without: A Case Study of Chinese Women’s Political Participation.” *Asian Perspective* 25(4): 213–37.
- Huang, Jing. 2000. *Factionalism in Chinese Communist Politics*. Cambridge University Press.
- Huang, Yasheng. 1995. “Administrative Monitoring in China.” *The China Quarterly* 143:

828–43.

- . 1996. “Central-Local Relations in China during the Reform Era: The Economic and Institutional Dimensions.” *World Development* 24(4): 655–72.
- . 1999. *Inflation and Investment Controls in China: The Political Economy of Central-Local Relations during the Reform Era*. Cambridge University Press.
- . 2002. “Managing Chinese Bureaucrats: An Institutional Economics Perspective.” *Political Studies* 50(1): 61–79.
- International Monetary Fund. 2016. *IMF Cross Country Macroeconomic Statistics*.
- Jacobson, Gary C. 1989. “Strategic Politicians and the Dynamics of U.S. House Elections, 1946–86.” *American Political Science Review* 83(3).
- Jacobson, Gary C., and Samuel Kernell. 1983. *Strategy and Choice in Congressional Elections*. Yale University Press.
- Jia, Ruixue, Masayuki Kudamatsu, and David Seim. 2015. “Political Selection in China: The Complementary Roles of Connections and Performance.” *Journal of European Economic Association*.
- Jiang, Junyan, and Muyang Zhang. 2015. *Friends with Benefits : Patronage Politics and Distributive Strategies in China*.
- Jin, Hehui, Yingyi Qian, and Barry R. Weingast. 2005. “Regional Decentralization and Fiscal Incentives: Federalism, Chinese Style.” *Journal of Public Economics* 89(9–10): 1719–42.
- Jin, Shuilu. 2017. “河南7名副省长最新分工确定.” *Sohu*.
- Jing, Yue. 2014. “党委 ‘五人小组’ 系列特稿之三：专职副书记的晋升路.” *People’s Daily*.
- Keller, Franziska Barbara. 2016. “Moving beyond Factions: Using Social Network Analysis to Uncover Patronage Networks among Chinese Elites.” *Journal of East Asian Studies* 16(1): 17–41.
- Kennedy, Scott. 2005. *The Business of Lobbying in China*. Harvard University Press.
- Kiselycznyk, Michael., and Phillip Charles Saunders. 2010. *Assessing Chinese Military Transparency*. National Defense University Press.
- Kornai, Janos. 1980. *Economics of Shortage*. Elsevier Science Ltd.
- Kostka, Genia, and Xiaofan Yu. 2015. “Career Backgrounds of Municipal Party Secretaries in China: Why Do So Few Municipal Party Secretaries Rise from the County Level?” *Modern China* 41(5): 467–505.
- Kou, Chien Wen, and Wen Hsuan Tsai. 2014. “‘Sprinting with Small Steps’ towards Promotion: Solutions for the Age Dilemma in the Ccp Cadre Appointment System.” *China Journal* 71(71): 153–71.
- Kuran, Timur. 1991. “Now out of Never: The Element of Surprise in the East European Revolution of 1989.” *World Politics* 44(1): 7–48.

- Landry, Pierre F. 2003. "The Political Management of Mayors in Post-Deng China." *Copenhagen Journal of Asian Studies* (17): 31–58.
- . 2008. *Decentralized Authoritarianism in China*. Cambridge University Press.
- Landry, Pierre F., Xiaobo Lu, and Haiyan Duan. 2017. "Does Performance Matter? Evaluating Political Selection Along the Chinese Administrative Ladder." *Comparative Political Studies*: 001041401773007.
- Lantz, Brett. 2015. *Machine Learning with R*. Packt Publishing.
- Lenin, Vladimir. 1906. "Report on the Unity Congress of the Russian Social Democratic Labour Party."
- Li, Aiwu. 2014. "着力加强专职副书记队伍建设." *People's Daily*.
- Li, Cheng. 2000. "China in 1999: Seeking Common Ground at a Time of Tension and Conflict." *Asian Survey* 40(1): 112–29.
- . 2002. "Hu's Followers: Provincial Leaders with Backgrounds in the Youth League." *China Leadership Monitor* 3(1): 1–11.
- . 2008. "Ethnic Minority Elites in China's Party-State Leadership: An Empirical Assessment." *Brookings*.
- Li, Hongbin, and Li-An Zhou. 2005. "Political Turnover and Economic Performance: The Incentive Role of Personnel Control in China." *Journal of Public Economics* 89(9–10): 1743–62.
- Li, Kecheng. 2013. "'一正两副' 省委专职副书记." *Fenghuang Zhouban*.
- Lieberthal, Kenneth. 2004. *Governing China : From Revolution through Reform*. W.W. Norton.
- Lieberthal, Kenneth G., and David M. Lampton. 1992. *Bureaucracy, Politics, and Decision Making in Post-Mao China*. University of California Press.
- Lieberthal, Kenneth, and Michel Oksenberg. 1988. *Policy Making in China: Leaders, Structures, and Processes*. Princeton University Press.
- Liu, Derek Tai-wei. 2014. *The Effects of Political Institutions in China : Evidence from the Mandatory Retirement Age at the Provincial Level*.
- Liu, Jun. 2015. "Qiuhe Muhou Kaifangshang: Waihao Chengjianjiaofu (Qiuhe Nicknamed City-Builder)." *Southern Weekend*.
- Lust-Okar, Ellen. 2006. "Elections under Authoritarianism: Preliminary Lessons from Jordan." *Democratization* 13(3): 456–71.
- Magaloni, Beatriz. 2006. *Voting for Autocracy: Hegemonic Party Survival and Its Demise in Mexico*. Cambridge University Press.
- . 2008. "Credible Power-Sharing and the Longevity of Authoritarian Rule." *Comparative Political Studies* 41(4–5): 715–41.
- Magaloni, Beatriz, and Ruth Kricheli. 2010. "Political Order and One-Party Rule." *Annual Review of Political Science* 13(1): 123–43.

- Manion, Melanie. 1993. *Retirement of Revolutionaries in China: Public Policies, Social Norms, Private Interests*. Princeton University Press.
- Manion, Melanie, Michel Oksenberg, and Bohdan Harasymiw. 1985. "The Cadre Management System, Post-Mao: The Appointment, Promotion, Transfer and Removal of Party and State Leaders." *The China Quarterly* 102(04): 203.
- Mann, Thomas E., and Raymond E. Wolfinger. 1980. "Candidates and Parties in Congressional Elections." *American Political Science Review* 74(3): 617–32.
- Maskin, Eric, Yingyi Qian, and Chenggang Xu. 2000. "Incentives, Information, and Organizational Form." *The Review of Economic Studies* 67(2): 359–78.
- Maskin, Eric, and Jean Tirole. 2004. "The Politician and the Judge: Accountability in Government." *American Economic Review* 94(4): 1034–54.
- Mcgregor, James. 2010. Global Regulatory Cooperation Project *China's Drive for Indigenous Innovation A Web of Industrial Policies*.
- McGuire, Martin C., and Mancur Olson. 1996. "The Economics of Autocracy and Majority Rule: The Invisible Hand and the Use of Force." *Journal of Economic Literature* 34(1): 72–96.
- McNally, Christopher a. 2011. "China's Changing Guanxi Capitalism: Private Entrepreneurs between Leninist Control and Relentless Accumulation." *Business and Politics* 13(2).
- Meyer, David, Victor C. Shih, and Jonghyuk Lee. 2016. "Factions of Different Stripes: Gauging the Recruitment Logics of Factions in the Reform Period." *Journal of East Asian Studies* 16(01): 43–60.
- Miller, Alice. 2008. "The CCP Central Committee's Leading Small Groups." *Chinese Leadership Monitor* (26): 1–21.
- . 2011. "The Politburo Standing Committee under Hu Jintao." *China Leadership Monitor* (35): 1–9.
- Miller, H. Lyman. 2003. "Hu Jintao and the Party Politburo." *China Leadership Monitor* (9): 1–12.
- Miller, Nicholas R. 1977. "Logrolling, Vote Trading, and the Paradox of Voting: A Game-Theoretical Overview." *Public Choice* 30(1): 51–75.
- Montinola, Gabriella, Yingyi Qian, and Barry R Weingast. 1995. "Federalism, Chinese Style: The Political Basis for Economic Success in China." *World Politics* 48: 50–81.
- Morris, Stephen. 2001. "Political Correctness." *Journal of Political Economy* 109(2): 231–65.
- Moser, Robert G. 2001. "The Effects of Electoral Systems on Women's Representation in Post-Communist States." *Electoral Studies* 20(54): 1–6.
- Mullainathan, Sendhil, and Jann Spiess. 2017. "Machine Learning: An Applied Econometric Approach." *Journal of Economic Per* 31(2): 87–106.
- Nathan, Andrew J. 1973. "A Factionalism Model for CCP Politics." *The China Quarterly* 53: 34–66.
- . 2003. "Authoritarian Resilience." *Journal of Democracy* 14(1): 6–17.

- National Bureau of Statistics of China. 2016. "National Data." <http://www.stats.gov.cn/tjsj/> (August 30, 2016).
- Naughton, Barry. 1995. *Growing Out of the Plan: Chinese Economic Reform 1978-1993*. Cambridge University Press.
- . 2007. *The Chinese Economy: Transitions and Growth*. The MIT Press.
- Ngok, Kinglun, and Guobin Zhu. 2007. "Marketization, Globalization and Administrative Reform in China: A Zigzag Road to a Promising Future." *International Review of Administrative Sciences* 73(2): 217–33.
- O'Brien, Kevin J., and Lianjiang Li. 1999. "Selective Policy Implementation in Rural China." *Comparative Politics* 31(2): 167–86.
- Oates, Wallace E., and Robert M. Schwab. 1988. "Economic Competition among Jurisdictions: Efficiency Enhancing or Distortion Inducing?" *Journal of Public Economics* 35(3): 333–54.
- Oi, Jean C. 1999. *Rural China Takes off: Institutional Foundations of Economic Reform*. University of California Press.
- Oksenberg, Michel. 2001. "China's Political System: Challenges of the Twenty-First Century." *The China Journal* (45).
- Olken, Benjamin A., and Rohini Pande. 2012. "Accessed Corruption in Developing Countries." *MIT Annual Reviews* 4: 479–509.
- Opper, Sonja, Victor Nee, and Stefan Brehm. 2015. "Homophily in the Career Mobility of China's Political Elite." *Social Science Research* 54: 332–52.
- Pan, Jennifer. 2013. "Measuring the Goals and Incentives of Local Chinese Officials." (917).
- Pearson, Margaret M. 2005. "The Business of Governing Business in China: Institutions and Norms of the Emerging Regulatory State." *World Politics* 57(2): 296–322.
- People's Daily. 2006. "'Zhongzubu Fachu 'Guanyu Jinyibu Jiaqiang Xian (Shi, Qu, Qi) Dang Zheng Zhengzhi Duiwu Jianshe de Yijian'" (Central Organization Department Issued 'Opin- Ion on Further Strengthening the Building of the Group of Party AndGovernment Leaders OfCounties, Cit.'" *People's Daily*.
- . 2018. "党的建设辞典 Dangdejianshecidian." *dangdejianshecidian*.
- Persson, Petra, and Ekaterina Zhuravskaya. 2015. "The Limits of Career Concerns in Federalism: Evidence from China." *Journal of the European Economic Association* 14(2).
- Podpiera, Richard. 2006. "Progress in China's Banking Sector Reform: Has Bank Behavior Changed?" *IMF Working Paper* 06: 1.
- Powell, Simon. 1992. *Agricultural Reform in China: From Communes to Commodity Economy, 1978-1990*. Manchester University Press.
- Pye, Lucian W. 1981. *The Dynamics of Chinese Politics*. Gunn & Hain Incorporated.
- Qian, Haoping. 2011. "各地推行 '一正两副' 模式 副书记分工相差大." *Nanfang*

Zhoumo.

- Qian, Yingyi, and Barry R. Weingast. 1996. "China's Transition to Markets: Market-Preserving Federalism, Chinese Style." *The Journal of Policy Reform* 1(2): 149–85.
- . 1997. "Federalism as a Commitment to Preserving Market Incentives." *Journal of Economic Perspectives* 11(4): 83–92.
- Qian, Yingyi, and Chenggang Xu. 1993. "The M-Form Hierarchy and China's Economic Reform." *European Economic Review* 37(2): 541–48.
- Qin, Duo, and Haiyan Song. 2009. "Sources of Investment Inefficiency: The Case of Fixed-Asset Investment in China." *Journal of Development Economics* 90(1): 94–105.
- Riker, William H, and Steven J Brams. 1973. "The Paradox of Vote Trading." *The American Political Science Review* 67(4): 1235.
- Rosen, Stanley. 1995. "Women and Political Participation in China." *Pacific Affairs* 68(3): 315–.
- Saich, Tony. 2001. *Tony Saich Governance and Politics of China*. Macmillan International Higher Education.
- Sautman, Barry. 1998. "Preferential Policies for Ethnic Minorities in China: The Case of Xinjiang." *Nationalism and Ethnic Politics* 4(1–2): 86–118.
- Shambaugh, David L. 2002. *Modernizing China's Military : Progress, Problems, and Prospects*. University of California Press.
- Shen, Yan, Minggao Shen, Zhong Xu, and Ying Bai. 2009. "Bank Size and Small- and Medium-Sized Enterprise (SME) Lending: Evidence from China." *World Development* 37(4): 800–811.
- Sheng, Shibin, Kevin Zheng Zhou, and Julie Juan Li. 2011. "The Effects of Business and Political Ties on Firm Performance: Evidence from China." *Journal of Marketing* 75(1): 1–15.
- Shih, Victor C. 2008. *Factions and Finance in China*. Cambridge University Press.
- Shih, Victor C., Christopher Adolph, and Mingxing Liu. 2012. "Getting Ahead in the Communist Party: Explaining the Advancement of Central Committee Members in China." *American Political Science Review* 106(01): 166–87.
- Shih, Victor C., and Jonghyuk Lee. 2017. "CCP Leadership Database."
- . 2018. "Locking in Fair Weather Friends: Assessing the Fate of Chinese Communist Elite When Their Patrons Fall from Power." *Party Politics*.
- Shih, Victor, and Jonghyuk Lee. 2018. *Predicting Authoritarian Selections: Theoretical and Machine Learning Predictions of Politburo Promotions for the 19th Party Congress of the Chinese Communist Party*.
- Shih, Victor, Wei Shan, and Mingxing Liu. 2010. "Gauging the Elite Political Equilibrium in the CCP: A Quantitative Approach Using Biographical Data." *China Quarterly* 201(201): 79–103.
- Shirk, Susan L. 1993. *The Political Logic of Economic Reform in China*. University of

- California Press.
- . 2010. “The Decline of Virtuocracy in China.” In *Class and Social Stratification in Post-Revolution China*, Cambridge University Press.
- . 2013. “Can China’s Political System Sustain Its Peaceful Rise?” *SITC Research Briefs* 4.
- . 2014. “The Domestic Context of Chinese Foreign Security Policies.” In *The Oxford Handbook of the International Relations of Asia*, Oxford University Press.
- Su, Fubing. 2006. “Gender Inequality in Chinese Politics: An Empirical Analysis of Provincial Elites.” *Politics & Gender* 2(02): 143–63.
- Su, Xing. 2016. “省长副省长们的工作分工，有些啥门道？.” *Fenghuang Zhougan*.
- Sun, Yan. 2004. *Corruption and Market in Contemporary China*. Cornell University Press.
- Svolik, Milan W. 2012. *The Politics of Authoritarian Rule*. Cambridge University Press.
- Tai-wei Liu, Derek. 2010. *Central Control vs. Decentralization in Authoritarian Systems: Career Incentives and Public Goods Provision in China*.
- Teiwes, Frederick C. 1990. *Politics at Mao’s Court: Gao Gang and Party Factionalism in the Early 1950s*. M.E. Sharpe.
- Teiwes, Frederick C. 2001. “Normal Politics with Chinese Characteristics.” *The China Journal* 45: 69–82.
- Tullock, Gordon. 1970. “A Simple Algebraic Logrolling Model.” *American Economic Review* 60(3): 419–26.
- . 1987. *Autocracy*. Springer.
- Velez, Digna R. et al. 2006. “A Balanced Accuracy Function for Epistasis Modeling in Imbalanced Datasets Using Multifactor Dimensionality Reduction.” *Genetic epidemiology* 30(8): 718–27.
- Wade, Robert. 2004. *Governing the Market : Economic Theory and the Role of Government in East Asian Industrialization*. Princeton University Press.
- Walder, Andrew G. 2006. “The Party Elite and China’s Trajectory of Change.” In *The Chinese Communist Party in Reform*, eds. Kjeld Erik Brodsgaard and Yongnian Zheng. New York: Routledge.
- Walder, Andrew G., Bobai Li, and Donald J. Treiman. 2000. “Politics and Life Chances in a State Socialist Regime : Dual Career Paths into the Urban Chinese Elite.” *American Sociological Review* 65(2): 191–209.
- Wang, Qun. 2010. “Administrative Reform in China : Past, Present, and Future.” *Southeast Review of Asian Studies* 32: 100–119.
- Wang, X., and G. Fan. 2000. *Sustainability of China’s Economic Growth*. Economic Science Press.
- Wang, Xikun. 2013. “Zhengji Yu Zhengjigongcheng Bianxi (Differentiation Politics from Political Achievement Projects).” In *Sanjiang Forum*.

- Wang, Yuhua, and Carl Minzner. 2015. "The Rise of the Chinese Security State." *China Quarterly* 222: 339–59.
- Wank, David L. 1996. "The Institutional Process of Market Clientelism: Guanxi and Private Business in a South China City." *The China Quarterly* 147: 820–838.
- Weber, Max. 1962. "Bureaucracy." In *Essays in Sociology*, eds. H. H. Gerth and Wright C. Mills. Oxford University Press.
- Weingast, Barry R. 1995. "The Economic Role of Political Institutions : Market-Preserving Federalism and Economic Development." *Journal of Law, Economics, & Organization* 11(1): 1–31.
- Whiting, Susan H. 2004. "The Cadre Evaluation System at the Grass Roots: The Paradox of Party Rule." In *Holding China Together: Diversity and National Integration in the Post-Deng Era*, Cambridge University Press.
- Whyte, Martin King. 2010. *Myth of the Social Volcano : Perceptions of Inequality and Distributive Injustice in Contemporary China*. Stanford University Press.
- Wintrobe, Ronald. 2000. *The Political Economy of Dictatorship*. New York: Cambridge University Press.
- Witten, Ian H., Eibe Frank, Mark A. Hall, and Christopher J. Pal. 2016. *Data Mining : Practical Machine Learning Tools and Techniques*. Morgan Kaufmann.
- Wu, Guoguang, and Helen Lansdowne. 2013. *Zhao Ziyang and China's Political Future*. Routledge.
- Xi, Tianyang, Yang Yao, and Muyang Zhang. 2015. "Competence versus Incentive : Evidence from City Officials in China." : 1–32.
- Xu, Chenggang. 2011. "The Fundamental Institutions of China's Reforms and Development." *Journal of Economic Literature* 49(4): 1076–1151.
- Yamano, Norihiko, and Toru Ohkawara. 2000. "The Regional Allocation of Public Investment: Efficiency or Equity?" *Journal of Regional Science* 40(2): 205–29.
- Yang, Dali L. 2012. *Beyond Beijing: Liberalization and the Regions in China - Dali L. Yang - Google Books*. Routledge.
- Yang, Kaifeng. 2007. "China's 1998 Administrative Reform and New Public Management: Applying a Comparative Framework." *International Journal of Public Administration* 30(12–14): 1371–92.
- Yao, Yang. 2016. *The Anatomy of Chinese Selectocracy*. ed. The National School of Development. Peking University.
- Yiu, Karson, and Enjoli Francis. 2012. "The Mysterious Saga of China's Bo Xilai." *ABC News*.
- Yu, Yongding. 2010. "China's Response to the Global Financial Crisis." CASS.
- Zang, Xiaowei. 1991. "Provincial Elite in Post-Mao China." *Asian Survey* 31(6): 512–25.
- Zhang, J. 2002. "Growth, Capital Formation and Technological Choice: Why Has China's Economic Growth Rate Been Declining?" *China Econmic Quarterly* 1: 301–38.

- Zhang, Jinyun. 1993. "The Women's Federation and the Participation of Women in Politics." *Chinese Law & Government* 26(5): 64–77.
- Zhang, Jun, and Yuan Gao. 2008. "Term Limits and Rotation of Chinese Governors: Do They Matter to Economic Growth?" *Journal of the Asia Pacific Economy* 13(3): 274–97.
- Zhang, Tao, and Heng-fu Zou. 1998. "Fiscal Decentralization, Public Spending, and Economic Growth in China." *Journal of Public Economics* 67: 221–40.
- Zhang, Yang. 2015. *Local Government and Politics in China: Challenges from Below*. Routledge.
- Zhao, Dingxin. 2009. "The Mandate of Heaven and Performance Legitimation in Historical and Contemporary China." *American Behavioral Scientist* 53.
- Zhao, Xiaobin, and Li Zhang. 1999. "Decentralization Reforms and Regionalism in China: A Review." *International Regional Science Review* 22(3): 251–81.
- Zhong, Yang. 2003. *Local Government and Politics in China: Challenges from Below*. M.E. Sharpe.
- Zhu, Yuchao. 2011. "'Performance Legitimacy' and China's Political Adaptation Strategy." *Journal of Chinese Political Science* 16(2): 123–40.

*Appendix

A1. Variable Description

Name	Measurement	T ¹	M ²
Age	Year – Birth Year	O	21
Age2	(Age) ²		21
Age over 60-65	Whether age is over 60, 61, 62, 63, 64, and 65	O	7
Age quartile	Age quartile (from 1 st to 4 th) among the SMPCs in the same rank and in the same year		21
Education	0=High Below; 1=High or Tech; 2=College; 3=Post-graduate		21
BAmajor	College Major: 1=Humanity; 2=Social Science; 3=Science; 4=Engineering; 5=ETC		21
Gender	Whether male or female		7
Ethnicity	Whether Han or minority		7
Native	Whether born in the currently working province		18
Ptime	The number of years since joining the CCP	O	21
Ptime2	(Ptime) ²		21
Tenure	The number of years in the current SC position		21
Tenure2	(Tenure) ²		21
Tenure over 5	Whether Tenure is over 5 years	O	20
Tenure over 10	Whether Tenure is over 10 years		7
Central Exp.	Whether had ever worked in the central departments	O	11
PLA Exp.	Whether had ever worked in the People's Liberation Army	O	7
CYL Exp.	Whether had ever worked in the Communist Youth League	O	16
Central Exp. in 20	Whether had worked in the central departments in the first 20 years of Ptime		9
PLA Exp. in 20	Whether had worked in the People's Liberation Army in the first 20 years of Ptime		7
CYL Exp. in 20	Whether had worked in the Communist Youth League in the first 20 years of Ptime		7
Party Exp.	Whether had ever worked in CCP organizations, including mass organizations		7
Gov. Exp.	Whether had ever worked in governments (e.g. center; province; prefecture; county)		10
Organ. Exp.	Whether had ever worked in central or provincial organization department		21
Propa. Exp.	Whether had ever worked in central or provincial propaganda department		8
Secre. Exp.	Whether had ever worked as a central or provincial secretariat		14
Vgov. Exp.	Whether had ever worked as a vice governor in a province		20
Coast Exp.	Whether had ever worked in the coastal party of China (e.g. Jiangsu; Zhejiang; Fujian; Shandong; Guangdong)		8
Work Prov Exp.	Whether had ever worked in a certain province (31 provinces of China)		7~9
Business Exp.	Whether had ever worked in state or private enterprises		7
Econ. Exp.	Whether had ever worked in economy-related departments (e.g. development, audit, bank, finance, commerce, trade, technology, construction, supervision, production, quality control, custom, electricity, electronics, industrial relation, tax, oil, machinery, information technology, tourism, coal, railroad, aerospace, aeronautics, resource, environment, agriculture, three-gorgeous, transportation, south-to-north water diversion).		20
Security Exp.	Whether had ever worked in security-related departments (e.g. public security, law and politics, social stability, state security, court, procuratorate, handling cult issues, fighting against evil forces, Tibetan coordi-		7

	nation, Xinjiang coordination, anti-corruption, Falun-dafa control, anti-pornography)		
Civil Exp.	Whether had ever worked in civil-affair departments (e.g. civil affairs, labor and social security, education, university, culture, sports, religion, healthcare, academic degrees, aging population, women and children, family planning, ethnicity, disabled, human rights, writers, scientists, Red-cross, disaster reduction, flood control, drug, language, cultural heritage, earthquake, climate, AIDS, mutual support between the military and civilian sectors)		14
CC Year	N th year of the central party congress from the 11 th to 18 th party congress	O	21
Position	Rank of SMPC (e.g. PS; GOV; VPS; SC)	O	21
SC Position	SC positions (e.g. VGOV; DIC; PLC; OR; PR; SG; CPS; SPS; MR; ETC)	O	21
N of Transfer	The number of positions held before (central or provincial positions)	O	21
N of Transfer ²	(N of Transfer) ²	O	21
Dis. Rank	The provincial rankings of geographical distance from Beijing		21
GDP Rank	The provincial rankings of GDP per capita		
GDP Rank ₉₄	The provincial rankings of GDP per capita in 1994		
Municipality	Whether the working province is a Directly-controlled Municipality (e.g. Beijing; Tianjin; Shanghai; Chongqing)	O	7
Autonomous	Whether the working province is an Autonomous Region (e.g. Inner Mongolia, Guangxi, Tibet, Ningxia, Xinjiang)	O	7
Western	Whether the working province is located in the Western part of China (e.g. Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Qinghai)		7
Coastal	Whether the working province is located in the Coastal part of China (e.g. Jiangsu, Zhejiang, Fujian, Shandong, Guangdong)		10
Central	Whether the working province is located in the Central part of China (e.g. Hebei, Henan, Shanxi, Hubei, Hunan, Anhui, Jiangxi)		7
North-eastern	Whether the working province is located in the North-Eastern part of China (e.g. Liaoning, Jilin, Heilongjiang)		9
Degree	Degree Centrality with the Central and Provincial Committee members		21
Between	Betweenness Centrality with the Central and Provincial Committee members		21
Closeness	Closeness Centrality with the Central and Provincial Committee members		21
Degree.W	Weighted Degree Centrality with the Central and Provincial Committee members		21
Between.W	Weighted Betweenness Centrality with the Central and Provincial Committee members		21
Closeness.W	Weighted Closeness Centrality with the Central and Provincial Committee members		21
W. PSG	Whether had worked with the current PSG (Party Secretary-General) in the same ministerial level unit at the same time for over one year	O	7
W. PSC	Whether had worked with the current PSC (Politburo Standing Committee Members) in the same ministerial level unit at the same time for over one year	O	9
W. Polit.	Whether had worked with the current Politburo members in the same ministerial level unit at the same time for over one year		19
W. Organ.	Whether had worked with the current head of the Central Organization Department in the same ministerial level unit at the same time for over one year		12
W. Premier	Whether had worked with the current Premier in the same ministerial level unit at the same time for over one year		7
W. V. Premier	Whether had worked with the current Vice Premier in the same ministerial level unit at the same time for over one year		7

W. Secret	Whether had worked with the current First-rank Secretariat in the same ministerial level unit at the same time for over one year		7
W. NPC	Whether had worked with the current chairman of the National People's Congress in the same ministerial level unit at the same time for over one year		7
W. NPPCC	Whether had worked with the current chairman of the National People's Political Consultative Conference in the same ministerial level unit at the same time for over one year		8
W. CDIC	Whether had worked with the current secretary of the Central Commission for Discipline Inspection in the same ministerial level unit at the same time for over one year		7
W. P. PSG	Whether had worked with the previous PSG in the same ministerial level unit at the same time for over one year		7
W. P. PSC	Whether had worked with the previous PSC in the same ministerial level unit at the same time for over one year		12
W. P. Polit.	Whether had worked with the previous Politburo members in the same ministerial level unit at the same time for over one year		14
W. I. PSG	Whether had worked with the incoming PSG in the same ministerial level unit at the same time for over one year		7
W. I. PSC	Whether had worked with the incoming PSC in the same ministerial level unit at the same time for over one year		15
W. I. Polit.	Whether had worked with the incoming Politburo members in the same ministerial level unit at the same time for over one year		16
B. PSG	Whether born in the same province with the current PSG	O	9
B. PSC	Whether born in the same province with the PSC	O	12
B. Polit.	Whether born in the same province with the current Politburo members		16
B. Organ.	Whether born in the same province with the current head of the Central Organization Department		
B. Premier	Whether born in the same province with the current Premier of the State Council		7
B. V. Premier	Whether born in the same province with the current Vice Premier of the State Council		7
B. Secret	Whether born in the same province with the current First-rank Secretariat		7
B. NPC	Whether born in the same province with the current chairman of the National People's Congress		7
B. NPPCC	Whether born in the same province with the current chairman of the National People's Political Consultative Conference		9
B. CDIC	Whether born in the same province with the current secretary of the Central Commission for Discipline Inspection		7
B. P. PSG	Whether born in the same province with the previous PSG		7
B. P. PSC	Whether born in the same province with the previous PSC		15
B. P. Polit.	Whether born in the same province with the previous Politburo members		17
B. I. PSG	Whether born in the same province with the incoming PSG		8
B. I. PSC	Whether born in the same province with the incoming PSC		21
B. I. Polit.	Whether born in the same province with the incoming Politburo members		17
B. Pref. PSG	Whether born in the same prefecture with the current PSG		
B. Pref. PSC	Whether born in the same prefecture with the current PSC		
B. Pref. Polit.	Whether born in the same prefecture with the current Polit.		
B. W. PSG	Whether had worked in the birth province of the current PSG	O	7
B. W. PSC	Whether had worked in the birth province of the current PSC	O	7
B. W. Polit.	Whether had worked in the birth province of the current Politburo members		
U. PSG	Whether graduated from the same university with the current PSG	O	
U. PSC	Whether graduated from the same university with the current Politburo	O	

	Standing Committee members		
U. Polit.	Whether graduated from the same university with the current Politburo members		
U. Organ.	Whether graduated from the same university with the current head of the Central Organization Department		
U. Premier	Whether graduated from the same university with the current Premier		
U. V. Premier	Whether graduated from the same university with the current Vice Premier		
U. Secret	Whether graduated from the same university with the current First-rank Secretariat		
U. NPC	Whether graduated from the same university with the current chairman of the National People's Congress		
U. NPPCC	Whether graduated from the same university with the current chairman of the National People's Political Consultative Conference		
U. CDIC	Whether graduated from the same university with the current secretary of the Central Commission for Discipline Inspection		
U. P. PSG	Whether graduated from the same university with the previous PSG		
U. P. PSC	Whether graduated from the same university with the previous PSC		
U. P. Polit.	Whether graduated from the same university with the previous Politburo members		
U. I. PSG	Whether graduated from the same university with the incoming PSG		
U. I. PSC	Whether graduated from the same university with the incoming PSC		
U. I. Polit.	Whether graduated from the same university with the incoming Politburo members		
Deng	Whether had worked under Deng Xiaoping		7
Tsinghua	Whether obtained a BA degree from Tsinghua university	O	7
Peking	Whether obtained a BA degree from Peking university		7
Party School	Whether obtained a BA degree from the Central Party School		7
Elite Univ.	Whether obtained a BA degree from the Top 5 th universities (e.g. Peking, Tsinghua, People, Fudan, Shanghai Jiaotong)		8
Princeling	Whether an offspring of the Central Committee member	O	7
Shanghai	Whether had ever worked in the Shanghai municipality	O	
Pat PSG Promo	Whether the connected PSC member is promoted to the next PSG		7
Pat PSC Promo	Whether the connected Politburo member is promoted to the next PSC		16
Pat Polit. Promo	Whether the connected Central Committee member is promoted to the next Politburo		
Pat PSG Retired	Whether the connected PSG is retired in the next Party Congress		7
Pat PSC Retired	Whether the connected PSC member is retired in the next Party Congress		9
Pat Polit. Retired	Whether the connected Politburo member is retired in the next Party Congress		12
Pat Arrested	Whether the connected PSC or Politburo member is arrested or under investigation		7
GRP IDX	Average Gross Regional Product growth rates during SMPC's tenure	O	
GRP 1 IDX	Average Primary Gross Regional Product growth rates during SMPC's tenure		
GRP 2 IDX	Average Secondary Gross Regional Product growth rates during SMPC's tenure		
GRP 3 IDX	Average Tertiary Gross Regional Product growth rates during SMPC's tenure		
GRP PC IDX	Average Primary Gross Regional Product per capita growth rates during SMPC's tenure		
Revenue IDX	Average provincial revenue growth rates during SMPC's tenure	O	
Expenditure IDX	Average provincial expenditure growth rates during SMPC's tenure		
Investment IDX	Average fixed asset investment growth rates during SMPC's tenure		
Public IDX	Average provincial public good provision growth rates during SMPC's tenure (e.g. education, healthcare, pension, culture, and sports govern-		

	ment expenditures)		
N of Teacher IDX	Average the numbers of primary teachers growth rates during SMPC's tenure		

**Note: ¹ selected for the theoretical model ² how many times selected for each year's predictions estimated by the machine-learning model from 1995 to 2015 (max: 21)*

A2. Data

All the biographical and career information of individual subnational officials in the following analysis comes from the CCP Elite Database (Shih and Lee 2017). The database contains over 4500 CCP cadres, including all the Central Committee members from the 1st Party Congress to the 18th Party Congress, and over 2400 Standing Members of the Provincial Party Committees (SMPC) from 1976 to 2016, with extensive biographical and career data, including age, gender, ethnicity, county-level birthplace, education level, university alma maters, year of entering and retiring the CCP, work experience prior to becoming a CCP member, revolutionary and purged background, and all the job trajectories that each cadre had experienced from the time the cadre joined the party. In particular, the database encompasses exceptionally comprehensive career data, as it can virtually identify thousands of different organization affiliations, including 645 party, 550 governments, 394 military, and 77 social organizations in addition to 2411 administrative units and 1040 universities. Overall, we can track all of the ranks of the positions that individual officials had held during their tenures, totaling over 13500 job specifications per year.

The economic variables used in this project are provincial-level economic and social indicators, including Gross Regional Product (GRP) Index, GRP per capita, overall revenues and expenditures, and population. The data were compiled by the author from many different sources: *China Statistical Yearbooks* published by the National Bureau of Statistics of China, *Statistical Material for Prefectures, Cities, and Counties national wide* published by the Ministry of Finance of China, *China Premium Database* available by CEIC, and *China Data Center* at the University of Michigan. This project excludes Tibet and Xinjiang from the analysis because the regions are idiosyncratic in terms of ethnic makeup, major historical events, and institutionalized central subsidies to these jurisdictions.

A3. ROC Curves of Machine Learning Processes

Party Secretary: 0.723

Governor: 0.772

Vice Party Secretary: 0.706

The Rank-and-File: 0.825

Final AUC Plots: Means of 5-fold CV Test Sets

A4. Threshold Examples

A5. Model Validations

A6. Autocorrelation Testing with ACF Plots

A7. Full Regression Table of the Main Empirical Analysis

	<i>Dependent variable:</i>											
	GRP Index											
	(1) Career- ist	(2) Dead- Ender	(3) Rising- Star	(4) Career- ist	(5) Dead- Ender	(6) Rising- Star	(7) Career- ist	(8) Dead- Ender	(9) Rising- Star	(10) Career- ist	(11) Dead- Ender	(12) Rising- Star
1. Overall	1.078*** (0.405)	-0.950** (0.447)	-0.513 (0.722)									
2. Position												
Rank-and-File				1.591*** (0.506)	-0.829 (0.560)	-1.305 (0.896)						
PS				-0.037 (0.109)	-0.122 (0.120)	0.292 (0.214)						
GOV				0.110 (0.112)	-0.165 (0.124)	0.119 (0.192)						
VPS				-0.150 (0.144)	0.170 (0.163)	0.003 (0.218)						
3. Interaction												
SC_Careerist							1.551*** (0.503)	1.535*** (0.502)	1.569*** (0.499)	1.776*** (0.684)	1.051 (0.692)	1.607*** (0.526)
PS							-0.034 (0.109)	-0.136 (0.118)	0.294 (0.213)	-0.153 (0.272)	0.011 (0.285)	0.356 (0.529)
GOV							0.094 (0.111)	-0.129 (0.122)	0.101 (0.191)	0.385 (0.267)	-0.595** (0.278)	0.469 (0.469)
SC*PS										0.385 (0.769)	-0.503 (0.797)	0.793 (1.609)
SC*GOV										-0.921 (0.765)	1.466* (0.781)	-1.326 (1.539)
Population	-0.475 (1.162)	-0.265 (1.172)	-0.655 (1.179)	-0.412 (1.217)	-0.336 (1.233)	-0.991 (1.224)	-0.432 (1.216)	-0.388 (1.219)	-0.448 (1.204)	-0.391 (1.219)	-0.398 (1.221)	-0.489 (1.206)
GRPPC	1.665** (0.763)	1.793** (0.767)	1.604** (0.772)	1.706** (0.785)	1.441* (0.801)	1.759** (0.790)	1.730** (0.785)	1.591** (0.791)	1.724** (0.778)	1.726** (0.788)	1.491* (0.796)	1.673** (0.782)
L1.Exp.	0.800 (0.679)	0.684 (0.685)	0.927 (0.690)	0.887 (0.697)	0.943 (0.708)	0.903 (0.702)	0.909 (0.695)	0.929 (0.696)	0.939 (0.690)	0.969 (0.697)	1.052 (0.699)	0.981 (0.692)
L1.Rev.	-1.041* (0.531)	-1.069** (0.532)	-1.136** (0.533)	-0.966* (0.539)	-0.879 (0.546)	-1.017* (0.539)	-1.018* (0.538)	-0.945* (0.541)	-1.096** (0.534)	-1.057* (0.540)	-0.996* (0.543)	-1.113** (0.535)
L1.GRP IDX	0.529*** (0.034)	0.532*** (0.034)	0.541*** (0.034)	0.521*** (0.036)	0.528*** (0.036)	0.524*** (0.036)	0.519*** (0.036)	0.517*** (0.036)	0.515*** (0.035)	0.520*** (0.036)	0.517*** (0.036)	0.514*** (0.036)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	617	617	617	593	593	593	597	597	597	597	597	597
Adjusted R ²	0.372	0.369	0.365	0.354	0.347	0.356	0.355	0.357	0.363	0.354	0.359	0.362

Note:

*p<0.1**p<0.05***p<0.01