

Individual Knowledge and Strategic Learning under the Institutional Transitions of the Common Pool Resource Providing: Evidence from China's Residence Communities¹⁾

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Abstract

Taking the Common Pool Resource (CPR here in after) in residence community as an example, this paper constructs variables to measure the endogenous relationship between individual knowledge, strategic cognition on the governance model of CPR and the institutional transitions. We define old strategy as “CPR should be dependent on government provision” in the planned system, while new strategy as “CPR should be provided by themselves who own and use it” in the market system. Then we use the field data to analyze that: (1) Individual knowledge on the governance model of CPR, the rate of owners who choose old strategy is significantly more than that choose new strategy we defined. (2) Dividing the owners into two kinds according to whether attempting to participating new strategy about the CPR, our test find that both kinds of owners' cognition degree of the new strategy is significantly less than that of the old strategy. Finally, we test how can heterogeneity, uncertainty and expectation affect individual knowledge on the CPR.

Keywords: institutional transitions; individual knowledge; strategic learning; collective goods provision

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1. Introduction

The transition from planned economy to market economy in China accelerates the change of social order. From the view of Austrian school, the governmental policies will be successful if the transition takes place firstly in people's ideas and spontaneous behaviors. On the contrary, people tend to not easily adjust their behaviors and expectation to adapt the new strategies and cognition in the transition. If the size of the nonadjustable people reaches to a threshold, there will be lock-in effect or path dependency.

In this era of fast transition causing political, economic and cultural reforms in China, people's behavior expectation is also in change. While the traditional acquaintance society has been disintegrated, the modern society abased upon contracts between anonymous strangers is still not mature. Taking the Common Pool Resource (CPR here in after) in residence community as an example, this paper constructs variables to measure the endogenous relationship between individual knowledge, strategic cognition on the governance model of CPR and the institutional transitions.

In the era of planned economy, CPRs were provided by government. After the government quitted from the provision of CPR, they are provided by individuals. But after the long history of planned economy, how do people adjust their strategies and expectation? Will the institutional transition converge to a new equilibrium?

2. Theoretical background

The institutional transition, including the emergency, growth and evolution of a new institution expands from two aspects: the establishment of individual's subjective knowledge and strategy learning interactions between individuals.

2.1 Institutional transition and the adjustment of individual cognition

We argue that institution is the way by which people learn and accumulate knowledge under uncertainties (fig.1 and fig.2). As common knowledge, institution can stabilize people's behavioral expectation, leading people to cooperate, exchange and negotiate under the common knowledge. Conversely, living in a specific system, individuals' preference, behavioral expectation and strategies are also adaptively changed, leading to a feedback loop.

The social and economic shock during the transition brings out greater uncertainty²⁾. It is not enough to overcome uncertainty only by the information. The understanding of information and uncertain circumstance is also necessary. Individuals have to update their knowledge to adapt uncertainty under specific circumstance since the traditional governance system accepted by all the social members cannot adapt the new change. Under uncertain circumstance, people do not have enough knowledge to expect their own and other's behavioral results. Therefore, under the increasing uncertainty, individuals must learn the new behavioral modes and solutions by try and error, imitations and innovations.

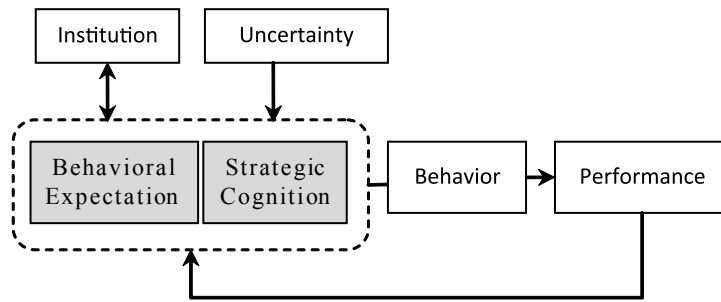


Fig.1 The relationship among individual behavioral expectation, strategic cognition and institution

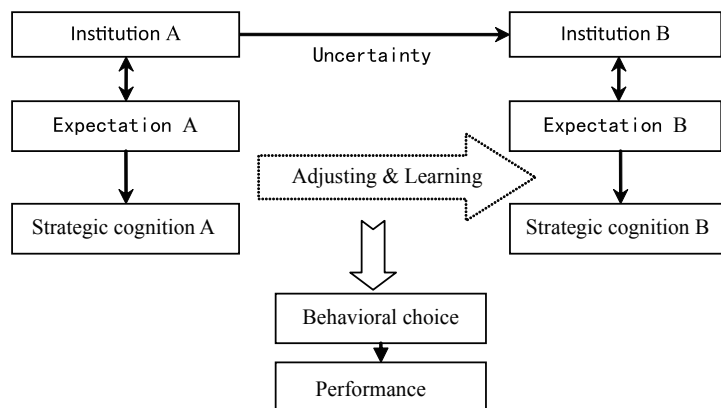


Fig.2 Individual behavioral adjusting & learning under institutional transition

2) F Knight divided the unknown results into uncertainty and risk. The uncertainty refers to the circumstance under which people know the possible results but do not know the probability distribution. The risk stands for the circumstance where people know the probability distribution but do not know which result will really happen. Under risk circumstance, agents with stable preference pursue the maximization of utility by accumulating information and factors. However, under uncertainty circumstance, people cannot know the expected utility, so they cannot make utility maximization decision.

Austrian school argues that transition takes place firstly in people's ideas and spontaneous behaviors. Corneo and Hans Peter Grtiner (2002) find that eastern European have greater preference for distributive policy than western European. Alesina and Glaeser (2004) discuss the origins of different beliefs and preferences of American and West European and analyze the influence of ideology to the distribution preference. In a research on the preference, belief and ideology of united Germany by Alesina and Fuchs-Schündeln (2007), they find that the policy preference of western and eastern German will converge after one or two generations.

2.2 The individual decision under the transition of collective goods governance

Since the transition beginning from the 1980s in China, government began to quit from many public service but still has the regulation power. Urban residents became the property owners after the urban housing system reform in 1990s. They began to provide the common facilities by themselves, no longer by the government. But residents hardly form the efficient cooperative mechanism to invest and maintain the common facilities. The failure of their CPR governance may due to two main reasons: the property owners' opportunistic behaviors and the lack of CPR governance knowledge under the market system.

Now government administrations let the residents provide the fund to employ the professional property management service to solve the problems but caused more conflicts. Based on the view of the matching of knowledge, expectation and institution, this paper tries to use the econometric analysis to reveal the logical relationship between property owners' expectation and CPR governance mechanism. Specifically, we try to answer the following questions below:

Firstly, will the portion of individuals depending on government provision of collective goods be significantly more than the individuals funding collective goods by negotiation? Is the portion different between those who have ever tried new strategies and those who have not? Secondly, since the cognition of new strategies is less clear than old ones, do individuals tend to depend on government provision of collective goods?

3. Empirical study

3.1 Data description

This survey was organized by the institute for applied economics at Nanjing University of Science and Technology and Nanjing Bureau of Technology Quality Supervision. The 60 samples include two parts, 44 residential districts that began to use elevators before 1998, while 16 residential districts where residents conflicted on the electronic elevators after 1998. In the field study, the rent rate of some residential districts is higher than 50%. So those ordinary tenants do not know about the public affairs in the residential districts. Therefore, we exclude those residential districts. And also, some residential districts do not allow investigation or do not

Tab.1 Data description

Variables	Questions	Options & Assignment operator
Experience of choosing New strategy (A)	Q2.5 Have you ever participated in the negotiation on the fund to solve the problem about the electronic elevators or any other public services in your community?	A. Propose and organize a negotiation (+2). B. Take part in actively (+1.5). C. Take part in (+1). D. Haven't take part in but provide money for the negotiation (+0.5). E. Neither participation nor provision (0).
Owners' knowledge on the governing model of CPR (K)	Q3.3 Although the property management services and electronic elevator maintaining units signed the contracts, many broken units still cost money. Who do you think have the responsibility for it?	A. The work unit (-1). B. The real estate developer (-1). C. The property management company (-1). D. Acquaintances (-0.5). E. The government (-1). F. Media and journalists (-1). G. Owners hold a consultation about the matter spontaneously (+1). H. I have no idea (0).
Cognition about new strategy (C)	Q4 If the fees must be paid by property owners, how do you think about the idea that the payment share should be decided by every own unit.	A. Yes, we should do it like this (+1). B. Yes, that's proper relatively (+0.5). C. I will try it (0). D. it is not very proper (-0.5). E. it's wrong, it should be regulated by the government (-1).
Expected payoff (E)	Q2.2 What do you think about the influential of those dysfunctions of electronic elevator to your ordinary life?	A. Very inconvenient most time (+2). B. Often (+1.5). C. Sometimes (+1). D. Seldom (+0.5). E. No influence (0).
Uncertainty (U)	Q5 Do you think that some residential owners will disobey the treaty on the fees payment?	A. Nobody will do that (0). B. Rarely (+0.5). C. Just sometime (1). D. Someone will (+1.5). E. Many people will (2). F. I have no idea (1).
Heterogeneity (H)	Q1.3 Do you think that the residents in your unit have great differences in occupation, income, education and habits?	A. Rarely (0); B. Sometime (+0.5). C. Like a general (1). D. Yes, there are(+1.5). E. Indeed (2). F. I have no idea (1).

provide exact information. After excluding those samples, the efficient samples are 30 residential districts.

The investigation includes two parts. One is to learn the general information about the residential districts by interviewing the property management service or property owners. The other one is the individual interview to residents. The sampling method is as follow: in every residential district one electronic elevator is selected, and then 30 survey sheets are sent to the 30 users of the electronic elevator. Finally, the number of efficient survey sheets is 521 in 29 residential districts. The cover rate is 57.89%.

In order to test the reliability of the survey, we interview 32 property owners in a residential district in Nanjing by stochastic sampling. The reliability analysis on 22 efficient survey results show that all the items in the survey's Cronbach's Alpha is 0.577. So the data are reliable.

Then we do the normal distribution test before the statistical and econometric analysis. The Z statistics by K-S test value show the data samples obey the normal distribution.

3.2 The property owners' knowledge of CPR governance: dependence on governments or self-cooperation?

Before the mandatory institutional transition, CPRs in residential districts were provided by governments. In 1990s, residents began to rely on their own fund to provide CPR. But how did their knowledge of CPR provision and governance adjust during the transition?

According to the investigation, the governance problems exist in every residential district. However, almost no meaningful collective actions have been taken to solve those problems. Accordingly, we will make statistical inference and hypothesis test based on the investigation. In the following empirical study, we call the residents' strategy to rely on governmental provision of CPR the old strategy, and call the provision strategy by self-negotiation and cooperation the new strategy. We regard property owners as new strategy agents if he/she answers that he/she has ever participated in the negotiation on fees payment share. Otherwise, we regard him/her as an old strategy agent.

The hypothesis tests are as follow:

H1 The portion of people depending on governmental provision of CPR is significantly higher than the portion of people negotiating on the provision of CPR.

H1.1 During the institutional transition, in the knowledge of the property owners' knowledge about CPR governance in the group of the individuals who have ever tried self governance, the portion who believe that collective goods provision should depend on government is significantly higher than those who think it is better to rely on self coordination and negotiation.

H1.2 During the institutional transition, in the knowledge of the property owners' knowledge about CPR governance in the group of the individuals who have never tried self governance, the portion who believe that collective goods provision should depend on government is significantly higher than those who think it is better to rely on self coordination and negotiation.

H1.3 During the institutional transition, the portion of those who believe that collective goods provision should rely on self coordination and negotiation in the group of the individuals who have ever tried self governance is significantly higher than the group of the individuals who have never tried self governance.

H2 The group in the institutional transition has a significantly higher cognition about the new self governance strategy and old strategy.

H2.1 The group having ever tried self governance strategy has a significantly higher cognition of new strategy than old strategy.

H2.2 During institutional transition, the group having ever tried self governance strategy has a significantly higher cognition of new strategy than old strategy.

H2.3 During institutional transition, the group having ever tried self governance strategy has a significantly higher cognition of new strategy than those who have never tried new strategy

In the 521 property owners in the 29 residential districts, 404 property owners have ever participated in the negotiation, while 117 other persons have not. We classify samples as following: among these 404, property owners who chose option assigned value +1 to Q3.3 (Tab.1) are selected into group I, while owners who

Tab.2 The hypothesis test results of the strategy knowledge distribution

Hypothesis	H1		H1.1		H1.2		Hypothesis	H1.3 (1)		Hypothesis	H1.3 (2)	
Variables	N	Mean	N	Mean	N	Mean	Variables	N	Mean	Variables	N	Mean
Group I	29	0.059	27	0.080	22	0.091	Group I	27	0.080	Group III	27	0.786
Group II	29	0.781	27	0.786	22	0.732	Group II	22	0.091	Group IV	22	0.732
T-Value	-17.08		-16.24		-7.38		T-Value	-0.20		T-Value	0.74	
P-Value	0.000		0.000		0.000		P-Value	0.839		P-Value	0.463	

chose options assigned value -1 enter group III. Among those 117, owners who chose option assigned value +1 to Q3.3 are selected into group II, while owners who chose options assigned value -1 enter group IV. Then we use minitab 14 for statistical analysis.

It is easily to see that H1, H1.1 and H1.2 are true but H1.3 is rejected in Tab.2. To sum up, we draw the conclusion 1.

Conclusion 1: No matter whether having ever tried new strategy to solve the CRP problems by self negotiation under market system, the portion of interviewees who believe that collective goods provision should depend on government is significantly higher than those who argue that collective goods should be provided and governed by self negotiation mechanism.

Tab.3 The hypothesis test results of new strategy cognition distribution

Hypothesis	H2		H2.1		H2.2		Hypothesis	H2.3 (1)		Hypothesis	H2.3 (2)	
Variables	N	Mean	N	Mean	N	Mean	Variables	N	Mean	Variables	N	Mean
Group I	29	0.0476	27	0.0596	22	0.110	Group I	27	0.0596	Group III	27	0.225
Group II	29	0.221	27	0.225	22	0.097	Group II	22	0.110	Group IV	22	0.097
T-Value	-4.23		-4.91		0.18		T-Value	-1.03		T-Value	2.32	
P-Value	0.000		0.000		0.862		P-Value	0.307		P-Value	0.024	

According to the results in Tab.3, the H2 should be rejected since the p-value of H2 test is lower than 0.05. So the cognition of new strategy is still significantly lower than old strategy.

The H2.1 should also be rejected because its p-value is lower than 0.05. So the cognition of new strategy is significantly lower than old strategy even in the group having ever tried new strategy.

The H2.2 test result shows there is no significant difference between those who have ever tried new strategy or not.

The H2.3 test tells that there is no difference between the residential districts that have tried new strategy or not.

Those above can be summarized as conclusion 2.

Conclusion 2: During the transition from planned economy to market economy, comparing the property owners' cognitive level of new and old strategies, the interviewees still tend to accept the traditional collective goods provision by government. Even if the interviewees are divided into two groups having tried new

strategy or not, both groups have lower cognition of new strategy.

3.3 The factor analysis of the property owners' knowledge about the governance

Here we analyze the individuals with or without new strategy experience by econometric model I and II respectively. The output variable, strategy knowledge, is a binary variable, 1 stands for that self negotiation and cooperation on collective goods provision, 0 stands for old strategy knowledge relying on governmental provision.

According to the results of model I in Tab.4, heterogeneity H has significantly negative correlation with uncertainty U and strategy knowledge K. And the new strategy experience A and expected payoff E have positive effect on new strategy cognition C and strategy knowledge K.

Model II explains the functional relationship of strategy knowledge K under the circumstance without new strategy experience. K has negative correlation with heterogeneity H and uncertainty U. New strategy cognition C has positive effect on strategy knowledge K. Generally speaking, the results are coherent with the theoretical prediction.

Tab. 4 Logit regression results

Independent variables	Model I		Model II	
	B	Wald	B	Wald
Heterogeneity (H)	- 0.716	2.219	- 1.900	1.974
Expected payoff (E)	0.042*	0.016	-	-
Experience of choosing new strategy (A)	1.197	18.900	-	-
Cognition about new strategy (C)	0.550	2.961	0.260	1.066
Uncertainty (U)	- 0.016*	0.001	- 0.508	0.120
Constant	- 2.529	10.028	- 1.600	0.943
χ^2	24.750		-	
Nagelkerke R ²	0.142		0.090	
Prediction accuracy	92.3%		97.4%	

note: "*" stands for significance at 5% level.

4. Concluding remarks

This paper obtains the following conclusions. Firstly, no matter whether having the new strategy learning experience, in the knowledge distribution of CPR governance among people, the dependence on governmental provision of collective goods is still dominant over self negotiation and governance. Secondly, during the transition from planned economy to market economy, the individuals still tend to accept the traditional collective goods provision by government. Thirdly, heterogeneity has significantly negative correlation with uncertainty and strategy knowledge. And the new strategy experience and expected payoff have significantly positive effect on new strategy cognition and strategy knowledge. Fourthly, strategy knowledge under the circumstance without new strategy experience has negative relationship with heterogeneity and uncertainty, while new strategy cognition has positive effect on strategy knowledge.

Institution, the sum of coordinative knowledge in human interaction, adjusts the social members' behaviors under the system and forms the expectation of others' behaviors. The social members in the transition are facing to the unprecedented uncertainty and ignorance that can only be reduced by try and error and learning game. According to our statistical test, the individual and social cognition are still in transition, far from the ideal state matching the open market system. It is necessary for government to provide a circumstance where the society can develop by individuals' innovation and learning.

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共享資源供給制度轉型中的個體知識與策略學習： 來自中國城市住宅社區的證據

章 平

選取住宅社區共享資源（公共池塘資源）這一集體物品的供給制度轉型為例，構造變數測度個體關於共享資源治理模式的知識和行動策略學習與制度轉型的內生關係：將計畫體制下個體“凡事依賴政府等外部主體解決”的策略定義為舊策略，將市場體制下“自我協商合作治理”的策略視為新策略，使用田野調查資料進行計量分析發現：第一，關於共享資源治理模式的知識，選擇依賴政府等外部主體供給集體物品的個體比例顯著高於選擇自治策略。第二，將群體分成嘗試過新策略和未曾嘗試新策略兩類，統計檢驗發現個體對於新策略行動認知程度仍然顯著低於舊策略。最後，本文檢驗了異質性、不確定性和損益預期等變數對個體策略知識的影響。

關鍵字：制度轉型 治理知識 策略學習 共享資源供給