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Article

Adopt or Not and Innovation Variation: A Dynamic Comparison Study of Policy Innovation and Diffusion Mechanisms

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ABSTRACT *Policy innovation and diffusion literature mainly focuses on the decision to adopt a new policy, while ignoring the differences among new policies. This study divides the decision-making process of policy innovation diffusion into two phases: in the "innovate or not" phase, governments make the decision to adopt or reject the new policy, while "how to innovate" is the process by which governments formulate specific content for the new policy. A dynamic comparative analysis finds that effects of internal determinants and diffusion mechanisms vary during these two phases and that internal determinants moderate the effects of diffusion mechanisms.*

Keywords: policy innovation diffusion; innovate or not; how to innovate; enterprise annuity; comparative analysis; China

Introduction

The extant policy innovation diffusion literature focuses relatively exclusively on adopting decisions (adopt or not) (for an exception, see Yi et al. 2018), yet neglects the variations among the innovations adopted (Berry and Berry 2014). Innovation adoption decision making as a process, however, requires a certain amount of time, and instantaneous adoption is rare (Rogers 2003). This study, therefore, compares the adoption decisions and variations simultaneously, in order to provide a more nuanced comprehension of the rationales and mechanisms of this process. Specifically, we divide policy

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innovation adoption into two decision-making phases, namely "innovate or not" and "how to innovate". In the "innovate or not" phase, to deal with the uncertainty associated with policy innovations, diffusion mechanisms are expected to play a more prominent role than the contextual characteristics do in governmental decision making, as experiments in other jurisdictions could substitute for those within their own jurisdictions. In the "how to innovate" phase, other than a simple announcement of adoption, a governmental entity has to assign specific content to the innovation adopted. In this case, contextual ambiguity in decision making may magnify the impact of contextual characteristics via the moderating effect of participation, preferences, and organization. This signals a growing impact of contextual characteristics in the "how to innovate" phase, both on innovation adoption decision making and on diffusion mechanisms.

The empirical analysis focuses on the tax exemption policy for enterprise annuities in China. From 1997 to 2008, 31 provincial governments in China issued their local tax exemption policies for enterprise annuities, with discounting rates ranging from 4 per cent to 12.5 per cent. In the "innovate or not" phase, a dichotomous variable (coded "0" for no innovation, "1" for innovation) measures the adoption with a discrete time hazard model. In the "how to innovate" phase, based on the different discounting rates (4, 5, 6, 8.3, and 12.5 per cent), ordinal variables (0, 1, 2 or 0, 1, 2, 3) measure the levels of innovation with an ordered logit model. The results show that (1) in the "innovate or not" phase, one diffusion mechanism – social construction – plays a significant role in affecting the probabilities of adopting the tax exemption policies for enterprise annuities. As for the internal determinants, out of the nine interaction terms between contextual characteristics within the jurisdictions and diffusion mechanisms investigated, three of them have a significant impact on governmental decision making, and there are significant variations among the time lagged effects of different diffusion mechanisms. (2) In the "how to innovate" phase, social construction again contributes to the variations in the discounting rates. Out of the nine interaction terms between contextual characteristics within jurisdictions and diffusion mechanisms, three of them have a significant impact on governmental decision making. Specifically, in regions with larger pension gaps, all diffusion mechanisms have a relatively strong impact. Again, there are significant variations among the time lagged effects of different factors. The above results indicate that in the "how to innovate" phase, the effect of internal determinants declines. Here, public demand influences governmental decision making on policy innovation decision making, and indirectly moderates the effect of diffusion mechanisms.

The current study makes three contributions:

1. The study divides policy innovation decision making into two phases, namely "innovate or not" and "how to innovate", and compares the effects of internal determinants and of diffusion mechanisms in the two phases. Disentangling the dynamics and nuances in these two phases through a comparative lens helps to inform both practitioners and scholars of the varying mechanisms of different factors in different policy decision-making phases, and thus facilitates the design and implementation of policy instruments towards becoming more efficient and effective.
2. The study finds an indirect role of public demand in the policy decision-making process of the Chinese local government. Previous studies have highlighted the potential of public demand in improving public policy and service delivery (Edler

and Georghiou 2007). This study extends the literature by identifying an alternative role of public demand in governmental policy making at the local level, which contributes to a more in-depth understanding of Chinese local government policy making.

3. The study finds a robust impact of one diffusion mechanism – social construction – on both the adoption and variation of provincial tax exemption policies for enterprise annuities in China. The finding verifies the role of social construction in the policy process proposed by previous studies (e.g. Schneider and Ingram 1993) in the Chinese context and likewise contributes to a broader understanding of constructions in the policy process research from a comparative perspective.

Literature Review

Internally, the adoption of a policy innovation is determined by factors including political, economic, and social characteristics within the jurisdiction of the adopting entities, indicating the governmental organizations' internal adjustment to the external stimuli (Rihoux 2006). For instance, factors including fiscal capacity of local government, partisan dominance of governmental branches, legislative professionalism, ideological positions, population size, intergovernmental relations, interest groups, demographic characteristics, and public demand are found to be influential in shaping governmental decisions about adopting policies at the local level (see Berry and Berry 1990; Shipan and Volden 2008; McCann et al. 2015; Ma 2015; Zhu and Zhang 2015). Externally, horizontal and/or vertical mechanisms play an important role, where horizontal determinants are learning, competition, and imitation (Volden et al. 2008) and vertical mechanisms can generally be categorized into two types: top-down and bottom-up diffusions.

Though studies on policy innovation and diffusion have been compiled in the literature, we argue that it takes on new relevance and importance through a dynamic, comparative lens. First, most studies use a dichotomous variable to measure policy innovation, focusing exclusively on the adoption of innovations and ignoring the levels and depth (Berry and Berry 2014). In studies that do notice the limitations inherent in a dichotomous measurement, however, differentiating their work from those that focus on policy implementation can be challenging, as levels of innovation remain unmeasured. Besides, most studies take a static perspective in analyzing policy innovations, thus leaving the dynamics within policy innovation decision making understudied. Yet policy innovation decision making is a complex process, and effects of different diffusion mechanisms may vary accordingly at different stages. We therefore argue that a static analysis fails to capture the dynamics of innovation decision making. In addition, comparison is key to theory building and testing in policy studies, as dynamics cascade in different policy arenas with a variety of combinations of time, spaces, contexts, and themes (Geva-May 2002; Peters et al. 2018). By digesting such complex intersectionality we can expect knowledge and expertise that contributes to a more holistic understanding of the essence of policy studies. While viewing policy innovation diffusion through a comparative lens is certainly not new (see Allen et al. 1999; Dean 2017), we believe that it contributes new insights by comparing two phases within a policy decision-making process. As such, disentangling the nuances of the two phases from a comparative approach helps to shed light on the "black box" of governmental innovation adoption, so that lessons can be drawn for both policy scholars and practitioners.

Two Phases of Policy Diffusion Decision Making

Comparing the two phases in policy innovation decision making requires two conditions for the dependent variable. First, there should be significant variation between each decision maker's adoption of innovation longitudinally. Second, significant variations should also exist among specific policies adopted by different decision makers. Regarding the first point about longitudinal variation, it took 11 years for the tax exemption policy for enterprise annuities to spread among provincial governments in China, and different provinces offer different discounting rates, which enables us to analyze the dynamics of policy innovation and diffusion. Enterprise annuity encourages enterprises to provide additional payments for employees supplementary to their basic pensions on a voluntary basis. Tax exemption acts as a key policy instrument in promoting the annuity system among enterprises. In 1997, Shanghai, Sichuan, and Zhejiang introduced their tax exemption policies for enterprise annuities. In 2000, the Chinese central government implemented pilot programs in Liaoning and other regions. In 2003, the State Administration of Taxation announced the "Notice of the State Taxation Administration on the Relevant Income Tax Issues That Need to Be Clarified for the Implementation of the Enterprise Accounting Rules", which was the first time that a state ministry approved provincial governments to develop their own tax exemption policies for enterprise annuities. Since then, the policy has spread across the country, and 11 provinces, including Anhui, Hebei, Shandong, and Yunnan, have introduced their own tax exemption policies. This highlights the important role of central government's policy preference in local governments' adoption of enterprise annuities even though they have policy autonomy. This role can be attributed to the resources that the central government possesses to support local governments' policy innovation.

To continue the description of the diffusion process of tax exemption policies for enterprise annuities, in 2004 the Ministry of Human Resources and Social Security (MOHRSS) enacted the "Trial Measures for Enterprise Annuity" and "Measures for the Management of Enterprise Annuity Funds". In 2005, the MOHRSS announced the first batch of enterprise annuity fund management institutions, indicating the state's official supervision of enterprise annuities through institutional access. In the same year, the MOHRSS announced the Notice on Relevant Issues concerning the Recordation of the Enterprise Annuity Plans and Fund Management Contracts, which signals China's formal entry into the recordation of the enterprise annuity era. Here, we can see that the years 2004 and 2005 serve as a milestone in the development of enterprise annuities by the Chinese central government. In light of this, Hunan, Hainan, and Shaanxi introduced their tax exemption policies in 2005 and eight other provincial governments, including Beijing, Gansu, and Chongqing, followed in 2006, which represents the end of the diffusion of tax exemption policy for enterprise annuities across the country. In 2007 and 2008, the Tibet Autonomous Region and Henan introduced their policies, respectively. By then, all 31 provincial jurisdictions in China had adopted the tax exemption policy for enterprise annuities.

Second, the discounting rate varies among different provinces. Of all 31 provinces, 15 (50 per cent) adopted the rate of 4 per cent. Nine (30 per cent) of them adopted 5 per cent. Chongqing and the Tibet Autonomous Region adopted 6 per cent. Tianjin adopted 8 per cent. Jiangsu and Shanxi adopted 8.3 per cent. Hubei adopted 12.5 per cent. Two provincial governments adjusted their discounting rates, Jiangxi from 4 per cent in 2004

to 8.3 per cent in 2006 and Jilin from 4 per cent in 2004 to 6 per cent in 2007. Longitudinally, except for the four provinces that introduced their policies before 2000 with the same discounting rates of 5 per cent, when the policies were introduced is not significantly correlated with their discounting rates. This can be explained by the local governments' autonomy in deciding their discounting rates.

Here we can see that the adoption of tax exemption policy for enterprise annuities and the formulation of discounting rates are in effect two phases in the policy diffusion decision-making process, yet the extant literature fails to address them in a more holistic manner. A careful evaluation incorporating and comparing the two phases within a unified analytical framework is thus necessary. Further, the existing studies focus relatively exclusively on the impact of internal determinants on the adoption of tax exemption policy for enterprise annuities, leaving factors outside jurisdictions understudied. In fact, decision making in local government may be at least partially influenced by the central government, other local governments, and other societal mechanisms. Without considering all of these factors, the comprehension of the rationale behind governmental decision making may be incomplete. As such, this analysis seeks to explain the mechanisms behind the innovation and diffusion of tax exemption policy for enterprise annuities in China. Both the internal determinants and the external diffusion mechanisms are addressed simultaneously. The internal determinants include factors representing the public demand (the dependency rate and income gap), as well as factors indicating governments' capability to innovate (fiscal capability). Diffusion mechanisms include learning, competition, and social construction.[1]

Internal Determinants

The reform of the basic pension insurance system as well as the development of enterprise annuities in China are driven by the nation's growing aging population. For a local government, a higher level of aging population suggests a heavier fiscal burden on basic pension systems (Bongaarts 2004) as well as the need for pension reforms (Brooks 2005). In this case, developing enterprise annuities may help release the burden by increasing the substitution rate, and thus government may be willing to facilitate such development. In general, the level of aging population is measured by the dependency rate. Here, we argue that provinces with higher dependency rates would be more willing to introduce tax exemption policies and to adopt higher discounting rates to facilitate the development of enterprise annuities:

H1-1: Provinces with higher dependency rates are more likely to adopt tax exemption policies for enterprise annuities.
H1-2: Provinces with higher dependency rates are more likely to adopt higher discounting rates in tax exemption policies for enterprise annuities.

The institutional as well as positional differences lead to a huge gap in average pensions between retirees from enterprises and those from state organs. The inherent redistributive nature of enterprise annuities as a welfare policy indicates its potential to address such inequality (Moene and Wallerstein 2001). With the additional payment from enterprise annuities for their retirees, while holding constant the payment for state organ

retirees,[2] it is expected that the pension gap between those two groups could be reduced. In this case, we argue that provinces with larger pension gaps between retirees of enterprises and state organs may be more willing to introduce tax exemption policies and to adopt higher discounting rates to facilitate the development of enterprise annuities:

H2-1: Provinces with larger pension gaps between retirees of enterprises and of state organs are more likely to adopt tax exemption policies for enterprise annuities.
H2-2: Provinces with larger pension gaps between retirees of enterprises and of state organs are more likely to adopt higher discounting rates in tax exemption policies for enterprise annuities.

Adopting tax exemption policies for enterprise annuities will possibly shrink the tax revenues of local governments. Provinces with higher levels of fiscal capability may have better buffering capacities in dealing with tax loss. Especially in the long run, tax exemption policies for enterprise annuities may actually raise the local saving rates and reduce labor cost (Yong Cai and Cheng 2014). In this case, tax revenues of local governments may be increased, and governments with higher levels of fiscal capability may thus be more willing to adopt such policies. For provinces with lower levels of fiscal capability, however, due to the rigidity of governmental expenditure, the potential loss from tax exemption may further increase their perceived costs. Despite the potential growth in tax revenues, governmental decision makers may value the current loss more, and thus give up tax exemption policies:

H3-1: Provinces with higher levels of fiscal capability are more likely to adopt tax exemption policies for enterprise annuities.
H3-2: Provinces with higher levels of fiscal capability are more likely to adopt higher discounting rates in tax exemption policies for enterprise annuities.

Diffusion Mechanisms

Governments learn from one another to help with their decision making on innovation adoption as experiences of those early adopters can be seen as experiments upon which governments can decide if such policies would be successful for them (Shipan and Volden 2008). Learning is measured by the proportion of provinces that have already adopted tax exemption policies across the country (Zhang 2014).

H4-1: The higher the proportions of provinces that have adopted tax exemption policies across the country, the greater the likelihood of a province adopting tax exemption policies for enterprise annuities.
H4-2: The higher the proportion of provinces that have adopted tax exemption policies across the country, the greater the likelihood of a province adopting higher discounting rates in tax exemption policies for enterprise annuities.

Intergovernmental competition is assumed to be positively associated with policy innovation adoption decision making as governments would compete against their peers by improving their performance in public goods and service delivery (Berry and Berry 1990; Walker 2006). This is because citizens can vote with their feet by moving to jurisdictions with better public services to maximize their personal utility (Tiebout 1956). Competition is measured by the proportion of governments geographically proximate to a given province that have adopted tax exemption policies divided by the total number of neighboring governments (Shipan and Volden 2008).

H5-1: The higher the proportion of neighboring provinces that have adopted tax exemption policies, the greater the likelihood of a province adopting tax exemption policies for enterprise annuities.
H5-2: The higher the proportions of neighboring provinces that have adopted tax exemption policies, the greater the likelihood of a province adopting higher discounting rates in tax exemption policies for enterprise annuities.

Social construction may be operating in this context as well. Academic research and policy making have a longstanding interactive relationship (Weiss 1977). The role of scientific inquiry proves particularly strong in the age of evidence-based policy making (Sanderson 2002). When scholars' attention on enterprise annuities grows, policy makers may thus focus more on the same topics and potentially act on them as scholarly concentration represents available knowledge resources for policy makers (Damanpour 1991).

H6-1: The number of social constructions of tax exemption policies for enterprise annuities is positively related to the likelihood of a province adopting tax exemption policies for enterprise annuities.
H6-2: The number of social constructions of tax exemption policies for enterprise annuities is positively related to the likelihood of a province adopting higher discounting rates in tax exemption policies for enterprise annuities.

Data and Methods

Data

The sample utilized in this study draws from 31 provinces in China between 1997 and 2008. The data regarding the policy issue dates and the associated initial discounting rates of tax exemption policies were collected from the Human Resources and Social Security Departments' websites of each province, the China Legal Knowledge Integrated Database (CLKD), and pkulaw (Peking University Law) database. The data on social construction was collected from a China National Knowledge Infrastructure (CNKI) search. The data on population and economic conditions in different provinces was collected from the *China Population and Employment Statistics Yearbook* and the *China Labor Statistics Yearbook*. Regarding the reasoning behind the timeframe of data selected, in 1997 Shanghai, Sichuan, and Zhejiang first introduced their tax exemption policies for enterprise annuities; thus the sample starts

in 1997. In 2008, Henan introduced its tax exemption policy as the last of all 31 provinces in China. In the same year, the Ministry of Finance announced a nationwide unified tax exemption policy, so 2008 is set as the end of the sample. Here, Qinghai did not provide a specific discounting rate when introducing its tax exemption policy.[3] For this reason, Qinghai is included in the "innovate or not" phase but not in the "how to innovate" phase.

Variables

Two dependent variables are investigated in this analysis:

1. Innovation adoption, which represents the probability of a province's adoption of tax exemption policy for enterprise annuities in a given year. This variable is measured with a dichotomous variable (coded "1" for the variable "$\text{Adoption}_{n,t}$" when province n adopts its tax exemption policy for enterprise annuities in year t; otherwise coded "0"). Data for provinces after adoption were removed from the sample as the hazards became 0 afterwards (assuming the adoption occurs only once).
2. Innovation implementation, which represents the discounting rates adopted by provincial governments. Here we define levels of innovation implementation as an ordinal variable. The level of innovation implementation of a province is coded as "0" before the adoption. After the adoption, we differentiate the level of innovation implementation into two categories (coded "1" when the discounting rate is 4 per cent; coded "2" when the discounting rate is 5 per cent or higher). Here the discounting rate of 4 per cent functions as the threshold since the pilot programs launched by the Chinese central government in 2001 took the discounting rate of 4 per cent, and also due to the fact that the unified discounting rate announced by the Ministry of Finance in 2008 was 4 per cent.

In measuring internal determinants, the dependency rate is measured by the ratio of population aged 65 or older to the working-age population aged 15–64 in each province. The higher the dependency rate is, the heavier the fiscal burden on the basic pension system. The income gap is measured by the ratio of the average amount of per capita income of government organs and that of government-sponsored institutions to the per capita income of enterprises in each province. A higher ratio indicates a larger income gap. Fiscal capability is measured by the ratio of deficit (fiscal expenditure minus fiscal income) to fiscal expenditure (Berry and Berry 1990). The lower the ratio is, the stronger the fiscal capability of a provincial government is.

In measuring diffusion mechanisms, learning is measured by the proportion of provinces that have already adopted tax exemption policies. Competition is measured by the proportion of neighboring provinces that have adopted tax exemption policies. As for Hainan, though it does not border any provinces on land, it does share a seaboard with Guangdong. In this case, those two provinces are considered as neighboring units. The mechanism of social construction is measure by the (log-transformed) number of articles found in the *China Academic Journal* database at CNKI each year on the topic of "enterprise annuities" and/or "supplementary pension system". All independent variables are lagged for one period. Two control variables are governmental size and local

economic condition of each province operationalized by the log-transformed population in 10,000 and log-transformed GDP per capita, respectively. Control variables are lagged for one period as well (see Appendix Table A1).

Methods

In analyzing innovation adoption, an event history analysis (EHA) model is utilized due to the binary nature of the dependent variable (innovation versus non-innovation) (Long and Freese 1997). This is the approach typically chosen in recent years for policy innovation diffusion studies as it incorporates both internal and external determinants of the adoption units (see Berry and Berry 1990; Mooney 2001; Zhu and Zhang 2015). To analyze levels of innovation, an ordered logit model is specified due to the inherent ordinal nature of the dependent variable, and ordered logit models provide an accessible and robust approach to analyzing ordinal responses (here, levels of innovation implementation) (Long and Freese 1997). Yet a successful application of both modeling approaches (discrete choice models) requires satisfaction of the independence of irrelevant alternatives (IIA) assumption, which implies that addition of a new alternative will not change the ratio of likelihoods of the initial choices (Hausman and McFadden 1984). As such, the Hausman–McFadden test was applied to both lines of the research and the results suggest no violations of the IIA assumption (see Appendix Table A2). Also, different coding methods were utilized in analyzing levels of innovation implementation to show the robustness of the results (see Appendix Table A3). In addition to the direct impacts of internal determinants and diffusion mechanisms, the temporal and conditional nature of the diffusion mechanisms are investigated as well.

Findings

Descriptive Statistics

Table 1 displays the descriptive statistics for all variables. In innovation implementation, Qinghai was removed as it did not provide a specific discounting rate when introducing

Table 1. Descriptive statistics

Variables	*N*	Mean	SD	Variables	*N*	Mean	SD
Dependent variable				Dependent variable			
Innovation adoption	238	0.1303	0.3373	Levels of innovation	228	0.1974	0.5397
Internal determinants				Internal determinants			
Dependency rate	238	0.1024	0.0207	Dependency rate	228	0.1011	0.0199
Pension gap	238	1.1248	0.1492	Pension gap	228	1.1252	0.1520
Fiscal capability	238	0.4859	0.1960	Fiscal capability	228	0.4859	0.2001
Population size	238	3.4320	0.4201	Population size	228	3.4315	0.4290
GDP per capita	238	3.8485	0.2405	GDP per capita	228	3.4613	0.4620
Diffusion mechanisms				Diffusion mechanisms			
Learning	238	0.1925	0.1814	Learning	228	0.1997	0.1844
Competition	238	0.1947	0.2417	Competition	228	0.1958	0.2458
Social construction	238	3.0688	1.1033	Social construction	228	3.0572	1.0969

Table 2. Regression results for innovation adoption

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Internal determinants					
Dependency rate	1758546	0.0000194	2730500	2.91e-14	4.11e-10
	(0.96)	(−0.61)	(0.90)	(−1.64)	(−1.02)
Pension gap	4.61866	72.62619*	4.590362	46.65321	67.57305
	(0.85)	(2.03)	(0.85)	(1.86)	(1.89)
Fiscal capability	18353.03***	6.976373	20367.11***	0.0462656	0.1835474
	(4.28)	(0.67)	(3.58)	(−0.94)	(−0.49)
Diffusion mechanisms					
Learning		13746.43***			460.431
		(3.63)			(1.65)
Competition			0.9252302		0.0444185
			(−0.07)		(−1.67)
Social construction				9.270459	5.878985**
				(4.61)	(3.01)
Control variables					
Population size	17.76961***	9.855702*	18.0795***	5.755114	8.843527*
	(3.44)	(2.40)	(3.31)	(1.82)	(2.14)
GDP per capita	1948.102***	11.50774	2034.45***	0.7767659	0.7232449
	(4.20)	(1.14)	(3.97)	(−0.11)	(−0.14)
Constants	3.62e-22***	5.01e-12*	2.67e-22***	7.17e-07	6.05e-08
	(−4.87)	(−2.28)	(−4.47)	(−1.22)	(−1.36)
Regression statistics					
Log likelihood	−63.161036	−54.616087	−63.158797	−48.860514	−46.773452
LR Chi2	37.74	54.83	37.74	66.34	70.51
df	6	7	7	7	9
BIC	158.3184	146.5612	163.6466	135.0501	141.5414
Pseudo R2	0.2300	0.3342	0.2300	0.4044	0.4298
N	207	207	207	207	207

Note: z statistics in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

its tax exemption policy, which likewise leads to a smaller sample size compared to that of innovation adoption.

Innovation Adoption

Table 2 displays the regression results for innovation adoption. Model 1, the baseline model, includes all three internal determinants and two control variables. For Models 2 through 4, we introduce one diffusion mechanism at a time to the baseline model. Model 5 includes all the internal determinants and diffusion mechanisms. In Model 1, out of the three internal determinants, the only statistically significant variable is *Fiscal capability.* In Model 5, when all factors are considered, only *Social construction* shows a statistically significant impact on the likelihood of innovation adoption. Specifically, on average, for each unit of increase in the number of articles found in the *China Academic Journal* database on the topic of "enterprise annuities" and/or "supplementary pension system", the odds of adopting tax exemption policy for enterprise annuities increase by a factor of 5.88. In this case, the higher the number of social constructions of tax exemption policies for enterprise annuities, the more likely that a province adopts tax exemption policies for enterprise annuities (H6-1 is supported). To further articulate the nuances of innovation adoption, we evaluate and compare the magnitudes of the average marginal effects of each independent variable at their means based on the results of Model 5 (Table 3). The results indicate the significant impacts of each independent variable on the instantaneous likelihood of adopting tax exemption policy for enterprise annuities at their means. For instance, one unit increase in *Social construction* would lead to a 6.74 per cent increase in the probability of innovation adoption for a province with every variable held at its average level (Long and Freese 1997). A more meaningful way to interpret the results in Table 5 is to compare the relative magnitudes of each independent variable's marginal effect. Here we can see that, for an "average" province, *Dependency rate* has the greatest influence on the decision on adoption of tax exemption policy for enterprise annuities. Put differently, among all independent variables investigated, a relatively larger aging population has the greatest power to push an "average" provincial government towards adopting tax exemption policies for enterprise annuities.

Innovation Implementation

Table 4 displays the regression results for innovation implementation. Model 6, the baseline model, includes all three internal determinants and two control variables. For Models 7 through 9, we introduce one diffusion mechanism at a time to the baseline model. Model 10 includes all the internal determinants as well as all the diffusion mechanisms. In Model 6, similar to results of innovation adoption, the only statistically significant variable is *Fiscal capability.* In Model 10, when all factors are considered, again only *Social construction* shows a statistically significant impact on innovation implementation (levels of innovation). Specifically, on average, for each unit of increase in the number of articles found in the *China Academic Journal* database on the topic of "enterprise annuity" and/or "supplementary pension system", the odds of adopting a higher level of discounting rate increases by a factor of 3.68. As such, the higher the number of social constructions of tax exemption policies for enterprise annuities, the

Table 3. Average marginal effects of variables on likelihood of innovation adoption

	Dependency rate	Pension gap	Fiscal capability	Learning	Competition	Social construction
Innovation adoption	0.1456549***	0.1251138***	0.1374428***	0.0965954***	0.145027***	0.0674287**
	(7.15)	(6.78)	(7.41)	(3.78)	(8.32)	(3.01)

Note: z statistics in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 4. Regression results for innovation implementation

Variables	Model 6	Model 7	Model 8	Model 9	Model 10
Internal determinants					
Dependency rate	1.84e+09	898.7541	4730.243	0.0016623	0.0078845
	(1.35)	(0.40)	(0.49)	(−0.36)	(−0.26)
Pension gap	4.372337	12.09072	7.934906	14.2377	13.12636
	(0.96)	(1.57)	(1.32)	(1.67)	(1.61)
Fiscal capability	358.919***	13.02195	59.98947*	0.8528632	0.9694577
	(3.41)	(1.29)	(2.14)	(−0.07)	(−0.01)
Diffusion mechanisms					
Learning		42.28424***			0.8204075
		(3.44)			(−0.10)
Competition			5.32862		0.7477941
			(1.90)		(−0.23)
Social construction				3.421054***	3.67992***
				(4.36)	(3.32)
Control variables					
Population size	4.349328*	2.457055	3.091078	1.590363	1.615895
	(2.29)	(1.35)	(1.70)	(0.69)	(0.70)
GDP per capita	16.41167*	1.795195	6.881249	0.3389425	0.3446259
	(2.35)	(0.45)	(1.56)	(−0.76)	(−0.75)
cut 1	24.70***	13.09	19.01**	5.994	6.386
	(3.70)	(1.80)	(2.69)	(0.79)	(0.82)
cut 2	25.52***	14.00	19.85**	6.953	7.342
	(3.81)	(1.92)	(2.81)	(0.91)	(0.95)
Regression statistics					
Log likelihood	−100.6293	−94.4994	−98.8772	−88.3469	−88.27099
df	7	8	8	8	10
BIC	239.264	232.4335	241.1892	220.1285	230.8354
Pseudo R2	0.0816	0.1376	0.0976	0.1937	0.1944
N	228	228	228	228	228

Note: z statistics in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

more likely that a province would adopt a higher discounting rate (H6-2 is supported). In a similar manner to the results above, we calculate the average marginal effects (AMEs) of each independent variable at their means as well as based on the results of Model 10 (Table 5). Here we can see that, for an "average" province, right before the adoption, *Social construction* has the greatest influence on its adoption of a higher discounting rate. After adoption, however, *Competition* has the greatest power to push an "average" provincial government towards adopting a higher discounting rate.

As the dependent variable "Levels of innovation" is ordinal, two additional coding approaches are used to test the robustness of the above regression results: (1) we assign 0 to observations before their adoption, 1 to observations with a discounting rate of 4 per cent, 2 to observations with a discounting rate of 5 per cent, and 3 to observations with discounting rates higher than 6 per cent (Model 11); (2) we assign 0 to observations before their adoption, 1 to observations with a discounting rate of 4 per cent, 2 to observations with discounting rates of 5 or 6 per cent, and 3 to observations with discounting rates higher than 8 per cent (Model 12). The results indicate a robust effect

Table 5. Average marginal effects of variables on likelihood of innovation implementation

	Dependency rate	Pension gap	Fiscal capability	Learning	Competition	Social construction
Innovation implementation = 0	0.870066***	0.8758244***	0.8716676***	0.8695068***	0.8686685***	0.9221747**
	(42.74)	(44.88)	(42.90)	(28.72)	(38.21)	(43.03)
Innovation implementation = 1	0.0661021***	0.0642118***	0.0656429***	0.0660251***	0.0661342***	0.0461504**
	(4.18)	(4.14)	(4.18)	(4.06)	(4.20)	(3.20)
Innovation implementation = 2	0.063832***	0.0599637***	0.0626895***	0.0644681***	0.0651973***	0.0316749**
	(4.13)	(4.16)	(4.05)	(2.68)	(3.55)	(2.77)

Note: z statistics in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 6. Conditional effects

		Learning	Competition	Social construction
Innovation adoption	Dependency rate	1.362522	3.34e+12	0.2726662
		(0.00)	(0.47)	(−0.09)
	Pension gap	1.09e+35**	5.50e+10**	1894.833*
		(2.84)	(2.59)	(2.41)
	Fiscal capability	1.998017	0.0175669	0.5229063
		(0.09)	(−0.71)	(−0.40)
Levels of innovation	Dependency rate	9.325	7.770	2.139
		(0.91)	(0.92)	(1.34)
	Pension gap	3.420**	2.890***	0.588**
		(3.18)	(3.81)	(2.94)
	Fiscal capability	1.667	1.082	0.0928
		(1.86)	(1.42)	(0.58)

Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. The above variables are lagged for one period.

of Social construction on levels of innovation against different coding approaches (see Appendix Table A3).

Conditional Nature of Diffusion Mechanisms

Table 6 displays the conditional effects of the three diffusion mechanisms. Here, interaction terms between each of the three internal determinants and each of the three diffusion mechanisms were introduced one at a time to Model 5 and Model 10, respectively. In innovation adoption, the interaction terms between *Pension gap* and *Learning*, *Competition*, and *Social construction* are all significantly positive, which suggests that provinces with larger gaps between pensions of retirees of government organs and government-sponsored institutions and retirees of enterprises are more likely to be influenced by national trends, neighboring jurisdictions, and number of social constructions of innovation adoption. This likewise applies to the interaction term between *Population size* and *Learning*, which suggests that provinces with larger populations are more likely to be influenced by the national trend in adopting tax exemption policy for enterprise annuities. In innovation implementation, the three positive and statistically significant interaction terms between the three variables *Learning*, *Competition*, and *Social construction* and the variable *Pension gap*, respectively, suggests that provinces with larger gaps between pensions of retirees of government organs and government-sponsored institutions and retirees of enterprises are more likely to be influenced by national trends, neighboring jurisdictions, and number of social constructions of levels of innovation, aligning with the results in the innovation adoption phase.

Discussion

This analysis yields a more in-depth understanding of the diffusion mechanisms behind decision making on policy innovation through a comparative lens. Though the existing literature has identified a multitude of factors with potential impacts on the diffusion of

policy innovations, their foci nevertheless are limited by a relatively exclusive emphasis on adoption, while ignoring the variations among the policy innovations adopted. Such an incomplete coverage may not only lack explanatory power in addressing the differences among various innovations, but also impede the theoretical development of the field. For instance, can we use diffusion mechanisms to investigate levels of innovation? If so, what would be the difference(s) compared to the rationale behind explaining adoption of innovations, assuming the two are different? In light of this, the current analysis divides the decision-making process of policy innovation into two phases: "innovate or not" is the process by which governments make the decision to adopt or reject a new policy, and "how to innovate" is the process by which governments formulate specific content for the new policy adopted. For innovation adoption, following the classic research approach in policy innovation and diffusion, we use a dichotomous variable and an EHA to investigate the impacts of internal determinants within jurisdictions and of diffusion mechanisms on governmental decision making. For innovation implementation, based on the natural differences reflected in tax exemption policies for enterprise annuities in China, we use ordinal variables and an ordered logit model approach, again exploring the impacts of internal determinants within jurisdictions and of diffusion mechanisms on governmental decision making.

The findings suggest that, first, diffusion mechanisms, social constructions in particular, influence both innovation adoption and innovation implementation. Such impacts are mediated by internal determinants and tend to last over time. This suggests the long-standing impact of academic studies on both policy innovation adoption and policy content specification decision making of Chinese local governments. Second, though the roles of diffusion mechanisms remain the same in the two phases, their relative strengths vary. Specifically, in the "innovate or not" phase, when all factors are considered, the dependency rate has the greatest impact on a province's decision on adoption of tax exemption policy for enterprise annuities, indicating the role of public demands in governments' decision making. In the "how to innovate" phase, however, competition becomes the greatest power to push an "average" provincial government towards adopting a higher discounting rate. This highlights the role of intergovernmental competition in the formulation of specific policy content of governments' decision making. Specifically, this can be attributed to the fact that local governments may compete against each other with better policy and public service delivery in the presence similar programs (Tiebout 1956).

This analysis likewise contributes to the understanding of how local government in China responds to public demand. Some scholars argue that the motivation of the Chinese local government to address public demand is somewhat limited under its current political system. For instance, the policy innovation and diffusion literature has identified a relatively stronger impact of diffusion mechanisms over that of internal determinants (Ma 2013). Likewise, policy implementation studies find that local governments tend to emphasize personal and/or departmental interest over public demand (O'Brien and Li 1999; Cai 2004). With growing economic development in recent years, however, the Chinese government has been improving its performance in areas including Medicare, social insurance, housing, education, environment, and transportation. Therefore, in this case, arguing that local government in China is failing to respond to public demand might be somewhat biased. To address this, the study divides the

decision-making process of policy innovation and diffusion into two phases: "innovate or not" and "how to innovate", respectively. The results show that, in the "how to innovate" phase, one internal determinant – the dependency rate – does have the greatest impact on a province's decision on adoption of tax exemption policy for enterprise annuities. Yet their impact reduces in the "how to innovate" phase. This may be due to the fact that policy content formulation requires analytical expertise and experience, which might be indicated by the significant role of academic studies in this phase. Additionally, intergovernmental competition likewise contributes to the adoption of a higher discounting rate, indicating the impact of intergovernmental relations on local public policy design in China. The above findings show that a relatively exclusive focus on "innovate or not" will yield biased conclusions and a comparative approach is necessary to provide a more holistic explanation.

This study also adds value to the literature by explaining the regional variation in the tax exemption policy for enterprise annuities across China. From 1997 to 2008, provinces in China introduced their tax exemption policies for enterprise annuities. Great variations, however, exist among such policies. In this study, we address both innovation adoption and policy variations by looking into internal determinants and diffusion mechanisms simultaneously. The findings show that *social construction* affects both the adoption of tax exemption policies for enterprise annuities and the associated discounting rates. In terms of marginal effects, the dependency rate shows the strongest impact on the decision of innovation adoption while competition shows the strongest impact on the decision of discount rate specification. Such results contribute to explaining the regional variations in tax exemption policy for enterprise annuities across China so that a more holistic comprehension of the decision-making process at the provincial government level in policy diffusion can be expected.

Conclusion

In this study, we divided the decision-making process of policy innovation and diffusion into two phases: "innovate or not" and "how to innovate", respectively. By drawing on the case of tax exemption policy for enterprise annuities in China, we looked into the mechanisms behind policy innovation and diffusion in the two phases. The results indicate that difference in these mechanisms exists between the two phases. In the "innovate or not" phase, internal determinants show a relatively stronger impact on governmental decision making, as well as some conditional effects on the impact of diffusion mechanisms, but such impact can be expected to downscale in the "how to innovate" phase. Through a comparative lens, we investigated the roles of diffusion mechanisms in the two phases and provided a more in-depth understanding of policy innovation and diffusion by showing how local government in China responds to public demand, as well as the regional variations in China's tax exemption policy for enterprise annuities.

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Notes

1. Note that mandate from the central government is not considered given that the central government's one-time announcement does not vary longitudinally and its impact on all provincial governments can thus be seen as identical.
2. The annuity system was introduced to government organs and government-sponsored institutions on October 1, 2014.
3. The Opinions of the Qinghai People's Government on Improving the Basic Pension System for Enterprise Employees (No. 13 [2006] Qinghai People's Government).

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Appendix

Table A1. Correlations among independent variables.

	Dependency rate	Pension gap	Fiscal capability	Population size	GDP per capita	Learning	Competition	Social construction
Dependency rate	1.0000							
Pension gap	0.1448	1.0000						
Fiscal capability	−0.5689	0.0743	1.0000					
Population size	0.3359	−0.2369	−0.4927	1.0000				
GDP per capita	0.5499	0.2084	−0.4805	−0.0448	1.0000			
Learning	0.2082	0.0477	0.2520	−0.1278	0.4153	1.0000		
Competition	0.2261	0.0484	0.2872	−0.0490	0.1885	0.7403	1.0000	
Social construction	0.2536	0.1228	0.2602	−0.1056	0.4507	0.8707	0.6379	1.0000

Table A2. Hausman–McFadden test for the irrelevant alternatives assumption

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Hausman–McFadden test Prob>chi2	0.1921	0.1708	0.2848	0.0682	0.5007	0.5749	0.3386	0.5298	0.0992	0.2328

Table A3. Robustness tests

Variables	Model 11	Variables	Model 12
Internal determinants			
Dependency rate	−2.910	Dependency rate	−3.353
	(−0.15)		(−0.18)
Pension gap	2.489	Pension gap	2.860
	(1.58)		(1.80)
Fiscal capability	0.0496	Fiscal capability	−0.289
	(0.02)		(−0.12)
Population size	0.652	Population size	0.492
	(0.96)		(0.72)
GDP per capita	−1.105	GDP per capita	−1.521
	(−0.78)		(−1.05)
Diffusion mechanisms			
Learning	0.0507	Learning	0.349
	(0.03)		(0.18)
Competition	−0.710	Competition	−0.542
	(−0.57)		(−0.44)
Social construction	1.319***	Social construction	1.312***
	(3.34)		(3.33)
1(4%)	6.990	1(4%)	5.120
	(0.91)		(0.66)
2(5%)	7.939	2(5–6%)	6.066
	(1.03)		(0.78)
3(>5%)	9.444	3(>6%)	7.160
	(1.23)		(0.92)
/sigma2_u	1.08e-31	/sigma2_u	4.72e-32
	(0.00)		(0.00)
Regression statistics			
Log likelihood	−96.7996	Log likelihood	−97.48665
df	11	df	11
BIC	253.322	BIC	254.6961
N	228	*N*	228

Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.