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Principal Factors Affecting China Zero Environmental Risk: Behavior and Area Angle

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Abstract: The purpose of this study is to find principal factors affecting CZER (China Zero Environmental Risk) from behavior and area angle and the related advice can help people to solve environmental problems. So, in this study the factors' selection, contribution and sequence by correlation, regression and principal component analysis, etc. were studied from behavior and area angle, which is different from the present work only studying individual behavior or individual area. To make sure this study applicable, data were collected by case study and such norms as KMO (KMO refers to Kaiser-Meyer-Olkin Measure of Sampling Adequacy), etc., were abided by. By this study, principal factors from behavior angle can be ordered by contribution as follows: Production action, market management, living waste disposal, public management, living action and production waste disposal. Principal factors from area angle can be ordered by contribution as follows: Neimenggu, Jiangxi, Shanghai, Qinghai, Zhejiang and Shaanxi. And the related advice is as follows: First, strict surveillance on production of waste from such behaviors as enterprise production and human living action by market management and public management, etc. Secondly, great encouragement to technological innovations friendly with the environment in waste disposal. And thirdly different emphasis of management in different areas, such as natural resources deterioration in Neimenggu and Qinghai, food quality and farming pollution in Jiangxi, industry pollution and water pollution in Shanghai and Zhejiang and pollution of resources excavation and refinement in Shaanxi, etc.

Key words: CZER, principal factors, selection, contribution, sequence

INTRODUCTION

Risk management of project financing was studied before, Liu (2010, 2012), one of the main factors is environmental risk. Environmental risk usually refers to such things as groundwater contamination, soil contamination by hazardous substances, air pollution, or even pollution of lakes or streams, etc. By result, environmental risk is composed of two related elements: The consequences that are realized if a bad event actually does happen and the ones that aren't realized if a bad event doesn't happen. As to the former, it is called as Actual Environmental Risk (AER) and as to the latter, it is called as Zero Environmental Risk (ZER), so China actual environmental risk can be abbreviated as CAER and China zero environmental risk as CZER. Here, CZER will be the study emphasis and emphasis will be especially placed on the principal factors affecting CZER.

The present studies mainly focus on assessment of environmental risk, precaution measures and emergency response technology (Li *et al*., 2012; Zhou *et al*., 2011, 2012; Bengtsson and Torneman, 2009), etc. and no special studies were found on Zero Environmental Risk (ZER) and on China Zero Environmental Risk (CZER), let alone on the principal factors affecting CZER. Because of the emphasis on the principal factors affecting CZER (i.e., principal factors preventing China environmental risk from happening) in this study, the present studies of different preventive measures against environmental risks and their influences should be reviewed. Firstly, current research mainly focuses on such individual behaviors respectively as less production of waste, waste disposal and related management, etc. The examples of the above study are on less production of waste in Potassium Perchlorate producing (Wang and Ding, 2010) and Phosphoric Acid producing (Zheng, 2009), waste disposal and related policy design (Kraft, 2000), hazardous waste policy (Smith and Desvousges, 1988), public participation (Branch and Bradbury, 2006), etc., but no comprehensive studies were found on all the behaviors together, which are against environmental risks. Secondly, current research mainly focuses on individual areas or provinces, respectively. The examples of the above research are on western China (Xie, 2009), Tianjin port of China (Shao and Ju, 2009), Shandong province of China (Yuan *et al*., 2008), etc., but no comprehensive studies were found on all the areas or provinces together in China. So in this study comprehensive studies should necessarily be carried out, first on all the behaviors together (it can be called behavior angle) and secondly on all the areas or provinces together (it can be called area angle).

MATERIALS AND METHODS

Behavior angle

Definition: To study principal factors, which affect CZER from behavior angle, all the behaviors can be classified into human actions and natural causes. The former refer to such actions as technological innovations, etc., which can prevent environmental risk and the latter refer to such substances, which don't bring hazard to people in nature, or were thought to be without environmental risk by scientists according to their knowledge (Scott, 2005), etc. Human actions are further classified into production, living, waste disposal, Government surveillance, public management and market management, etc. So, the variables can be designed as follows:

Dependent variable: China zero environmental risk. Let CZER be China zero environmental risk.

Independent variables: Natural cause: Let hnc1 be natural cause. Production action: Let hp2 be production action. Living action: Let hl3 be living action. Production waste disposal: Let hprd4 be production waste disposal. Living waste disposal: Let hlrd5 be living waste disposal. Government surveillance: Let gg6 be Government surveillance. Public management: Let pg7 be public management. Market management: Let mg8 be market management.

Area angle

Definition: As to the study on principal factors affecting CZER from the area angle, all the thirty-four provincial or quasi-provincial districts in China are included and given serial number one by one, so the variables can be designed as follows:

Dependent variable: China zero environmental risk. Let CZER be China zero environmental risk.

Independent variables: Jiangsu: Let js1 be Jiangsu. Beijing: Let bj2 be Beijing. Chongqing: Let cq3 be Chongqing. Qinghai: Let qh4 be Qinghai. Fujian: Let fj5 be Fujian. Gansu: Let gs6 be Gansu. Guangdong: Let gd7 be Guangdong. Guangxi: Let gx8 be Guangxi. Guizhou: Let gz9 be Guizhou. Hainan: Let hain10 be Hainan. Hebei: Let heb11 be Hebei. Heilongjiang: Let hlj12 be Heilongjiang. Henan: Let henan13 be Henan. Hubei: Let hub14 be Hubei. Neimenggu: Let nmg15 be Neimenggu. Jilin: Let jl16 be Jilin. Liaoning: Let ln17 be Liaoning. Ningxia: Let nx18 be Ningxia. Shaanxi: Let shaanx19 be Shaanxi. Shandong: Let sd20 be Shandong. Shanghai: Let shh21 be Shanghai. Shanxi: Let shanx22 be Shanxi. Sichuan: Let sc23 be Sichuan. Tianjin: Let tj24 be Tianjin. Xizang: Let xz25 be Xizang. Xinjiang: Let xj26 be Xinjiang. Yunnan: Let yn27 be Yunnan. Zhejiang: Let zj28 be Zhejiang. Taiwan: Let tw29 be Taiwan. Aomen: Let aom30 be Aomen. Xianggang: Let xg31 be Xianggang. Hunan: Let hunan32 be Hunan. Anhui: Let anh33 be Anhui. Jiangxi: Let jx34 be Jiangxi.

Data source and variables' scores: Data are collected by case studies mainly through Southern Weekend from October 22, 2009 to April 29, 2010 and from May 12, 2011 to August 25, 2011. Data from May 6, 2010 to May 7, 2011 are missing because there were no detailed reports in Southern Weekend during this period. And the two periods above are further classified into six study periods with two weeks as one study period. To reflect the actual happening of CZER (i.e., China environmental risk has been prevented), CZER can equal to 1 for every period. To reflect the influence of each variable, it can equal to 1 if it's in operation, otherwise it can equal to 0.

Methods: Here, regression analysis is used to find correlations and coefficients between dependent variables and independent variables from both behavior angle and area angle and principal component analysis is used to find principal factors' contribution and order them in sequence by their contribution.

For convenience of study, such basic regression models are developed as follows:

Basic regression model for behaviors:

$$CZER=\alpha+\alpha_1\times hnc1+\alpha_2\times hp2+\alpha_3\times hl3+\alpha_4\times hprd4+\alpha_5\times hlrd5+\alpha_6\times gg6+\alpha_7\times pg7+\alpha_8\times mg8+\delta \quad (1)$$

Note in the above equation, α is constant, α_i are regression coefficients and ä is residual term for the model of behaviors.

Basic regression model for areas:

$$CZER = \gamma+\gamma_1\times js1+\gamma_2\times bj2+\gamma_3\times cq3+\gamma_4\times qh4+\gamma_5\times fj5+\gamma_6\times gs6+\gamma_7\times gd7+\gamma_8\times gx8+\gamma_9\times gz9+\gamma_{10}\times hain10+\gamma_{11}\times heb11+\gamma_{13}\times henan13+\gamma_{14}\times hub14+\gamma_{15}\times nmg15+\gamma_{17}\times ln17+\gamma_{18}\times nx18+\gamma_{19}\times shaanx19+\gamma_{20}\times sd20+\gamma_{21}\times shh21+\gamma_{22}\times shanx22+\gamma_{23}\times sc23+\gamma_{24}\times tj24+\gamma_{25}\times xz25+\gamma_{26}\times xj26+\gamma_{27}\times yn27+\gamma_{28}\times zj28+\gamma_{29}\times tw29+\gamma_{31}\times xg31+\gamma_{32}\times hunan32+\gamma_{33}\times anh33+\gamma_{34}\times jx34+\beta \quad (2)$$

Note in the above equation, γ is constant, γ_k are regression coefficients and β is residual term for the model of areas.

RESULTS AND DISCUSSION

Correlations between dependent variables and independent variables

Correlations between CZER and independent variables for behaviors: According to Table 1, CZER is positively correlated with all the behaviors.

Correlations between CZER and independent variables for areas: According to Table 2, CZER is positively correlated with all the areas.

Regression analysis and selection of principal factors

Result of regression for behaviors: The factors entering the model.

According to Table 3, such behaviors as production action (hp2), living action (hl3), production waste disposal (hprd4), living waste disposal (hlrd5), public management (pg7) and market management (mg8) are the factors, which actually affect CZER.

The model with the entered factors.

According to Table 4, the model with the entered factors for behaviors is as follows:

$$CZER = -6.42E^{-16}+0.25\times hp2+0.75\times hl3+0.75\times hprd4-1.25\times hlrd5+2.221E^{-16}\times pg7+0.5\times mg8 \quad (3)$$

Note in the equation above, CZER is positively correlated with such behaviors as production action, living action, production waste disposal, public management and market management but negatively with such behavior as living waste disposal.

Result of regression for areas: The factors entering the model.

According to Table 5, such areas as Qinghai (qh4), Neimenggu (nmg15), Shaanxi (shaanx19), Shanghai (shh21), Zhejiang (zj28) and Jiangxi (jx34) are the factors, which actually affect CZER.

The model with the entered factors.

According to Table 6, the model with the entered factors for areas is as follows:

$$CZER = -1.6E^{-16}+0.25\times qh4+0.333\times nmg15+0.667\times shaanx19+4.524E^{-17}\times shh21+0.333\times zj28+0.333\times jx34 \quad (4)$$

Note in the equation above, CZER is positively correlated with all the areas including Qinghai, Neimenggu, Shaanxi, Shanghai, Zhejiang and Jiangxi.

Selection and analysis of principal factors

Selection of principal factors: As seen in the two models above, first, such six factors as production action (hp2), living action (hl3), production waste disposal (hprd4), living waste disposal (hlrd5), public management (pg7) and market management (mg8) are entered for behaviors. And secondly such six factors as Qinghai (qh4), Neimenggu (nmg15), Shaanxi (shaanx19), Shanghai (shh21), Zhejiang (zj28) and Jiangxi (jx34) are entered for areas. What stated above indeed attracts further attention.

Table 1: Correlations between CZER and independent variables for behaviors

	Behaviors	hnc1[a]	hp2[b]	hl3[c]	hprd4[d]	hlrd5[e]	gg6[f]	pg7[g]	mg8[h]
CZER	Pearson correlation	0.167	0.540	0.354	0.548	0.417	0.408	0.167	0.320
	Sig. (2-tailed)	0.721	0.211	0.437	0.203	0.352	0.364	0.721	0.484

a: hnc1 refers to natural cause, b: hp2 refers to production action, c: hl3 refers to living action, d: hprd4 refers to production waste disposal, e: hlrd5 refers to living waste disposal, f: gg6 refers to Government surveillance, g: pg7 refers to public management and h: mg8 refers to market management

Table 2: Correlations between CZER and independent variables for areas

	CZER[a]	
Areas	Pearson correlation	Sig. (2-tailed)
js1[b]	0.560	0.191
bj2[c]	0.258	0.576
cq3[d]	0.222	0.632
qh4[e]	0.167	0.721
fj5[f]	0.211	0.650
gs6[g]	0.240	0.604
gd7[h]	0.354	0.437
gx8[i]	0.167	0.721
gz9[j]	0.167	0.721
hain10[k]	0.167	0.721
heb11[l]	0.258	0.576
henan13[m]	**0.354**	**0.437**
hub14[n]	0.230	0.619
nmg15[o]	0.222	0.632
ln17[p]	0.258	0.576
nx18[q]	**0.167**	**0.721**
shaanx19[r]	**0.354**	**0.437**
sd20[s]	**0.354**	**0.437**
shh21[t]	0.283	0.538
shanx22[u]	**0.258**	**0.576**
sc23[v]	0.311	0.497
tj24[w]	**0.167**	**0.721**
xz25[x]	0.240	0.604
xj26[y]	0.167	0.721
yn27[z]	**0.258**	**0.576**
zj28[aa]	0.320	0.484
tw29[bb]	0.167	0.721
xg31[cc]	0.258	0.576
hunan32[dd]	0.240	0.604
anh33[ee]	0.320	0.484
jx34[ff]	0.167	0.721

a: CZER refers to China zero environmental risk, b: js1 refers to Jiangsu, c: bj2 refers to Beijing, d: cq3 refers to Chongqing, e: qh4 refers to Qinghai, f: fj5 refers to Fujian, g: gs6 refers to Gansu, h: gd7 refers to Guangdong, i: gx8 refers to Guangxi, j: gz9 refers to Guizhou, k: hain10 refers to Hainan, l: heb11 refers to Hebei, m: henan13 refers to Henan, n: hub14 refers to Hubei, o: nmg15 refers to Neimenggu, p: ln17 refers to Liaoning, q: nx18 refers to Ningxia, r: shaanx19 refers to Shaanxi, s: sd20 refers to Shandong, t: shh21 refers to Shanghai, u: shanx22 refers to Shanxi, v: sc23 refers to Sichuan, w: tj24 refers to Tianjin. x: xz25 refers to Xizang, y: xj26 refers to Xinjiang, z: yn27 refers to Yunnan, aa: zj28 refers to Zhejiang, bb: tw29 refers to Taiwan, cc: xg31 refers to Xianggang, dd: hunan32 refers to Hunan, ee: anh33 refers to Anhui, ff:. jx34 refers to Jiangxi

Table 3: Behavior variables entered by regression between CZER and independent variables for behaviors

Model[a]	Variables entered	Variables removed	Method
1	mg8[b]		Enter
	hl3[c]		
	hp2[d]		
	pg7[e]		
	hprd4[f]		
	hlrd5[g]		

a: Dependent variable: CZER, b: mg8 refers to market management, c: hl3 refers to living action, d: hp2 refers to production action, e: pg7 refers to public management, f: hprd4 refers to production waste disposal, g: hlrd5 refers to living waste disposal and for hlrd5, Tolerance = 0.000 limits reached

Table 4: Coefficients by regression between CZER and independent variables for behaviors

		Unstandardised coefficients		Standardised coefficients
Model[a]		B	Std. error	Beta
1	**Constant**	**$-6.42E^{-16}$**	**0.000**	
	hp2[b]	0.250	0.000	1.080
	hl3[c]	0.750	0.000	1.061
	hprd4[d]	0.750	0.000	1.369
	hlrd5[e]	-1.250	0.000	-2.500
	pg7[f]	$2.221E^{-16}$	0.000	0.000
	mg8[g]	0.500	0.000	1.041

a: Dependent variable: CZER, b: hp2 refers to production action, c: hl3 refers to living action, d: hprd4 refers to production waste disposal, e: hlrd5 refers to living waste disposal, f: pg7 refers to public management, g: mg8 refers to market management

Table 5: Areas variables entered by regression between CZER and independent variables for areas

Model[a]	Variables entered	Variables removed	Method
1	jx34[b]		Enter
	shh21[c]		
	nmg15[d]		
	qh4[e]		
	zj28[f]		
	shaanx19[g]		

a: Dependent variable: CZER, b: jx34 refers to Jiangxi, c: shh21 refers to Shanghai, d: nmg15 refers to Neimenggu, e: qh4 refers to Qinghai, f: zj28 refers to Zhejiang, g: shaanx19 refers to Shaanxi and for shaanx19, Tolerance = 0.000 limits reached

Table 6: Coefficients by regression between CZER and independent variables for areas

		Unstandardised coefficients		Standardised coefficients
Model[a]		B	Std. error	Beta
1	**Constant**	**$-1.60E^{-16}$**	**0.000**	
	qh4[b]	0.250	0.000	1.000
	nmg15[c]	0.333	0.000	1.000
	shaanx19[d]	0.667	0.000	0.943
	shh21[e]	$4.524E^{-17}$	0.000	0.000
	zj28[f]	0.333	0.000	0.694
	jx34[g]	0.333	0.000	0.330

a: Dependent variable: CZER, b: qh4 refers to Qinghai, c: nmg15 refers to Neimenggu, d: shaanx19 refers to Shaanxi, e: shh21 refers to Shanghai, f: zj28 refers to Zhejiang, g: jx34 refers to Jiangxi

Analysis of principal factors' influences

Overview: According to the correlation analysis and regression analysis above, there are positive correlation between the factors (except living waste disposal for behaviors) and CZER.

Table 7: KMO[a] and Bartlett's test on suitability of component analysis between CZER and independent variables for behaviors

Kaiser-Meyer-olkin measure of sampling adequacy		0.702
Bartlett's test of sphericity	Approx. Chi-square	18.762
	df[b]	15.000
	Sig.[c]	0.225

a: KMO refers to Kaiser-Meyer-olkin measure of sampling adequacy, b: df refers to degree of freedom, c: Sig. refers to significance level

Table 8: KMO[a] and Bartlett's test on suitability of component analysis between CZER and independent variables for areas

Kaiser-Meyer-olkin measure of sampling adequacy		0.516
Bartlett's test of sphericity	Approx. Chi-square	5.562
	df[b]	15
	Sig.[c]	0.986

a: KMO refers to Kaiser-Meyer-olkin measure of sampling adequacy, b: df refers to degree of freedom, c: Sig. refers to significance level

Detailed analysis for living waste disposal for behaviors: First, it should be positively correlated with CZER because more technological innovations friendly with the environment and higher-efficient disposal of waste should lead to CZER happening (Roberts and Weale, 1991). Secondly perhaps technological innovations not friendly with the environment and improper disposal of waste for other factors lessened living waste disposal's good function (England, 1988), so living waste disposal is negatively correlated with CZER.

Principal Factors' contribution and Sequence

Suitability of the variables for component analysis: According to Table 7 and 8, Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) is bigger than 0.5, so the variables are suitable for principal component analysis.

Extraction of principal components: According to Table 9, the contribution of the first component is 68.607%, the second 16.598%, the third 7.794%, the fourth 3.253%, the fifth 3.111% and the sixth 0.638%. All the first five components can explain 99.362% of variance.

In one word, the first five components can explain 99.362% of variance, so it's enough to choose these five components to reflect most of the variance.

According to Table 10, the contribution of the first component is 37.002%, the second 25.586%, the third 18.875%, the fourth 8.364%, the fifth 6.142% and the sixth 4.031%. All the six components can explain 100% of variance.

In one word, all the six components can explain 100% of variance, so these six components should be chosen to reflect the variance.

Ordering principal factors by their contributions: Before ordering principal factors by their contributions, Component Matrix and Rotated Component Matrix should first be analyzed.

Table 9: Total variance explained by component analysis for behaviors

Component[a]	1	2	3	4	5	6
Initial eigenvalues						
Total	4.116	0.996	0.468	0.195	0.187	0.038
Variance of (%)	68.607	16.598	7.794	3.253	3.111	0.638
Cumulative (%)	68.607	85.205	92.999	96.252	99.362	100.000
Extraction sums of squared loadings						
Total	4.116	0.996	0.468	0.195	0.187	0.038
Variance of (%)	68.607	16.598	7.794	3.253	3.111	0.638
Cumulative (%)	68.607	85.205	92.999	96.252	99.362	100.000
Rotation sums of squared loadings						
Total	1.505	1.270	1.190	1.069	0.913	0.054
Variance of (%)	25.083	21.165	19.829	17.812	15.214	0.897
Cumulative (%)	25.083	46.248	66.077	83.889	99.103	100.000

a: Extraction method: Principal component analysis

Table 10: Total variance explained by component analysis for areas

Component[a]	1	2	3	4	5	6
Initial eigenvalues						
Total	2.220	1.535	1.132	0.502	0.369	0.242
Variance of (%)	37.002	25.586	18.875	8.364	6.142	4.031
Cumulative (%)	37.002	62.588	81.463	89.827	95.969	100.000
Extraction sums of squared loadings						
Total	2.220	1.535	1.132	0.502	0.369	0.242
Variance of (%)	37.002	25.586	18.875	8.364	6.142	4.031
Cumulative (%)	37.002	62.588	81.463	89.827	95.969	100.000
Rotation sums of squared loadings						
Total	1.039	1.032	1.027	1.020	1.002	0.880
Variance of (%)	17.323	17.199	17.123	16.996	16.694	14.665
Cumulative (%)	17.323	34.522	51.645	68.641	85.335	100.000

a: Extraction method: Principal component analysis

Table 11: Component matrix by component analysis between CZER and independent variables for behaviors

	Component[a]					
Variables	1	2	3	4	5	6
hlrd5[b]	0.944	0.277	0.003	0.012	-0.071	-0.161
mg8[c]	0.922	-0.004	0.206	0.064	-0.310	0.079
hprd4[d]	0.921	0.053	-0.061	-0.370	0.085	0.041
pg7[e]	0.860	-0.157	0.381	0.143	0.264	0.015
hp2[f]	0.825	0.158	-0.502	0.183	0.077	0.050
hl3[g]	-0.326	0.931	0.153	0.011	0.047	0.040

a: Extraction method: Principal component analysis and 6 components extracted, b: hlrd5 refers to living waste disposal, c: mg8 refers to market management, d: hprd4 refers to production waste disposal, e: pg7 refers to public management, f: hp2 refers to production action, g: hl3 refers to living action

Table 12: Rotated component matrix by component analysis for behaviors

	Component[a]					
Variables	1	2	3	4	5	6
hp2[b]	0.916	0.245	0.187	-0.090	0.239	-0.004
mg8[c]	0.325	0.794	0.403	-0.150	0.278	-0.022
hlrd5[d]	0.558	0.564	0.388	0.079	0.402	0.230
pg7[e]	0.236	0.357	0.844	-0.202	0.253	0.018
hl3[f]	-0.054	-0.065	-0.122	0.987	-0.059	0.005
hprd4[g]	0.436	0.360	0.338	-0.128	0.741	0.010

a: Extraction method: Principal component analysis, Rotation method: Varimax with Kaiser Normalization, Rotation converged in 6 iterations, b: hp2 refers to production action, c: mg8 refers to market management, d: hlrd5 refers to living waste disposal, e: pg7 refers to public management, f: hl3 refers to living action, g: hprd4 refers to production waste disposal

Table 13: Component matrix by component analysis between CZER and independent variables for areas

	Component[a]					
Variables	1	2	3	4	5	6
shaanx19[b]	0.882	-0.219	0.042	-0.069	-0.246	0.327
shh21[c]	0.760	0.279	-0.180	0.542	-0.001	-0.134
zj28[d]	0.364	0.776	-0.294	-0.224	0.336	0.126
jx34[e]	0.476	-0.641	0.440	0.015	0.411	-0.015
qh4[f]	-0.501	-0.451	-0.640	0.253	0.156	0.220
nmg15[g]	-0.505	0.441	0.639	0.298	0.044	0.229

a: Extraction method: Principal component analysis, 6 components extracted, b: Shaanx19 refers to Shaanxi, c: shh21 refers to Shanghai, d: zj28 refers to Zhejiang, e: jx34 refers to Jiangxi, f: qh4 refers to Qinghai, g: nmg15 refers to Neimenggu

Table 14: Rotated component matrix by component analysis for areas

	Component[a]					
Variables	1	2	3	4	5	6
nmg15[b]	0.955	-0.103	-0.107	-0.149	-0.036	-0.204
j×34[c]	-0.105	0.952	0.045	-0.092	-0.186	0.195
shh21[d]	-0.112	0.047	0.939	-0.121	0.208	0.214
qh4[e]	-0.148	-0.094	-0.119	0.950	-0.165	-0.156
zj28[f]	-0.037	-0.188	0.202	-0.167	0.945	0.030
shaan×19[g]	-0.282	0.263	0.278	-0.208	0.038	0.854

a: Extraction method: Principal component analysis, Rotation method: Varimax with Kaiser Normalization and Rotation converged in 6 iterations, b: nmg15 refers to Neimenggu, c: jx34 refers to Jiangxi, d: shh21 refers to Shanghai, e: qh4 refers to Qinghai, f: zj28 refers to Zhejiang, g: shaanx19 refers to Shaanxi

According to Table 11 and 12, Component Matrix can reflect principal factors' initial loadings and Rotated Component Matrix can make us see the difference between their loadings more easily and clearly. The first component (i.e., production component) including production action (hp2) contributes 68.607% (Table 9). The second component (i.e., living waste disposal and management component) including market management (mg8) and living waste disposal (hlrd5) contributes 16.598% (Table 9). The third component (i.e., public management component) including public management (pg7) contributes 7.794% (Table 9). The fourth component (i.e., living action component) including living action (hl3) contributes 3.253% (Table 9). The fifth component (i.e., production waste disposal component) including production waste disposal (hprd4) contributes 3.111% (Table 9). And they all contribute 99.362% (Table 9).

Seen from the analysis above, principal factors can be ordered by contribution as follows: Production action (hp2), market management (mg8), living waste disposal (hlrd5), public management (pg7), living action (hl3) and production waste disposal (hprd4).

According to Table 13 and 14, Component Matrix can reflect principal factors' initial loadings and Rotated Component Matrix can make us see the difference between their loadings more easily and clearly. The first component (i.e., Neimengu component) including Neimenggu (nmg15) contributes 37.002% (Table 10). The second component (i.e., Jiangxi component) including

Jiangxi (jx34) contributes 25.586% (Table 10). The third component (i.e., Shanghai component) including Shanghai (shh21) contributes 18.875% (Table 10). The fourth component (i.e., Qinghai component) including Qinghai (qh4) contributes 8.364% (Table 10). The fifth component (i.e., Zhejiang component) including Zhejiang (zj28) contributes 6.142% (Table 10). The sixth component (i.e. Shaanxi component) including Shaanxi (shaanx19) contributes 4.031% (Table 10). And they all contribute 100%.

Seen from the analysis above, principal factors can be ordered by contribution as follows: Neimenggu (nmg15), Jiangxi (jx34), Shanghai (shh21), Qinghai (qh4), Zhejiang (zj28) and Shaanxi (shaanx19).

CONCLUSION

From behavior angle, by regression analysis, it has been known that such six factors as production action (hp2), living action (hl3), production waste disposal (hprd4), living waste disposal (hlrd5), public management (pg7) and market management (mg8) are principal factors influencing CZER. By component analysis, it has been known that such five components as production component, living waste disposal and management component, public management component, living action component and production waste disposal component are principal components influencing CZER: Production component including production action (hp2) contributes 68.607%. Living waste disposal and management component including market management (mg8) and living waste disposal (hlrd5) contributes 16.598%. Public management component including public management (pg7) contributes 7.794%. Living action component including living action (hl3) contributes 3.253%. Production waste disposal component including production waste disposal (hprd4) contributes 3.111%. It has also been known that principal factors can be ordered by contribution as follows: Production action (hp2), market management (mg8), living waste disposal (hlrd5), public management (pg7), living action (hl3) and production waste disposal (hprd4).

From area angle, by regression analysis, it has been known that such six factors as Qinghai (qh4), Neimenggu (nmg15), Shaanxi (shaanx19), Shanghai (shh21), Zhejiang (zj28) and Jiangxi (jx34) are principal factors influencing CZER. By component analysis, it has been known that such six components as Neimenggu component, Jiangxi component, Shanghai component, Qinghai component, Zhejiang component and Shaanxi component are principal components influencing CZER: Neimengu component including Neimenggu (nmg15) contributes 37.002%. Jiangxi component including Jiangxi (jx34) contributes 25.586%. Shanghai component including Shanghai (shh21) contributes 18.875%. Qinghai component including Qinghai (qh4) contributes 8.364%. Zhejiang component including Zhejiang (zj28) contributes 6.142%. And Shaanxi component including Shaanxi (shaanx19) contributes 4.031%. It has also been known that principal factors can be ordered by contribution as follows: Neimenggu (nmg15), Jiangxi (jx34), Shanghai (shh21), Qinghai (qh4), Zhejiang (zj28) and Shaanxi (shaanx19).

In one word, CZER has been affected mainly by behavior factors and area factors. And the related advice is as follows: First, strict surveillance on production of waste from such behaviors as enterprise production and human living action by market management and public management (Branch and Bradbury, 2006), etc. Secondly, great encouragement to technological innovations friendly with the environment in waste disposal (Roberts and Weale, 1991). And thirdly different emphasis of management in different areas, such as natural resources deterioration in Neimenggu and Qinghai, food quality and farming pollution in Jiangxi, industry pollution and water pollution in Shanghai and Zhejiang and pollution of resources excavation and refinement in Shaanxi, etc. Of course, such themes as incongruity of some factors' influences between correlation analysis and regression analysis, etc., still needs further study.

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