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2010—2021

TOPSIS



$$\frac{q_{ct}}{dt} = 1 - q_t \frac{c}{d} \frac{P_{ct}}{P_{dt}} \frac{1}{1-\delta} \frac{A_{ct-1}}{A_{dt-1}}$$

1

$j \in \{c, d\} \quad \partial \in (0, 1) \quad \delta_j$

$$\frac{\Pi_c^*}{\Pi_d^*} > \frac{\Pi_c}{\Pi_d}$$

2.

①

②

2

3.

③

④

3

1.

$$grwoth_{it} = \lambda_t + \beta_1 green_{it} + \beta_2 gov_{it} + \beta_3 isu_{it} + \beta_4 inve_{it} + u_{it} + V_{it} + e_{it} \quad 2$$

i t

1 2 3 4

 $u_{it} \quad V_{it}$ e_{it}

①

2023 7

②

2015 31 11

③

ESG

2023 22

④

2016 1

$$growth_{it} = a_0 + a_1 X_{it} \times I(Y_{it} \leq \theta_1) + a_2 X_{it} \times I(Y_{it} \leq \theta_2) + \dots + a_m X_{it} \times I(Y_{it} > \theta_m) + a_{m+1} control_{it} + e_{it} \quad 3$$

$$Y_{ij} = \frac{X_{ij} - \text{Min}X_{ij}}{\text{Max}X_{ij} - \text{Min}X_{ij}}$$

$$Y_{ij} = \frac{\text{Min}X_{ij} - X_{ij}}{\text{Max}X_{ij} - \text{Min}X_{ij}}$$

$$e_j = -\frac{\sum_{i=1}^P P_{ij} \ln p_{ij}}{\ln m}$$

$$w_j = \frac{1 - e_j}{\sum_{j=1}^n (1 - e_j)}$$

$$Z_j = w_j \quad 1 \times n \times Y$$

$$Z_j^+ = (Z_1^+, Z_2^+, Z_3^+, \dots, Z_n^+)$$

$$Z_j^- = (Z_1^-, Z_2^-, Z_3^-, \dots, Z_n^-)$$

$$D_i^+ = \sqrt{\sum_{j=1}^n (Z_j^+ - Z_{ij})^2} \quad D_i^- = \sqrt{\sum_{j=1}^n (Z_j^- - Z_{ij})^2}$$

$$C_i = \frac{D_i^-}{D_i^+ + D_i^-}$$

 C_i

[0,1]

2.

2023

2018



2sls				L.green			
3.				1			
2018				2018			
growth	green	Ingrowth	Ingrowth	green1	green2	green3	green4
4.				TOPSIS			
(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
growth	Ingrowth	growth	growth	growth	growth	growth	growth
green	0.0629*	0.2435*		green1	0.0278***		
	(1.7910)	(1.7862)			(3.1398)		
Ingrowth			0.0444***	green2		0.0472***	
			(3.8693)			(3.7458)	
yes	yes	yes	yes	green3			0.0910***
_cons	0.1968***	-1.6379***	0.2843***				(3.4664)
	(14.0648)	(-25.9226)	(12.7267)	green4			0.0044
N	240	360	360				(0.3912)
R2	0.957	0.949	0.943	yes	yes	yes	yes
year fe	yes	yes	yes	_cons	0.2121***	0.2144***	0.1742***
area fe	yes	yes	yes		(14.1598)	(14.4315)	(8.9336)
	.*	**	***	N	360	360	360
		0.1	0.05	adj. R2	0.944	0.942	0.943
			0.01	year fe	yes	yes	yes
				area fe	yes	yes	yes
					.*	**	***
						0.1	0.05
							0.01

4

10

1%



growth 0.2305
growth 0.303

0.6871 1% (isu) isu 2.4657 0.3351

2010 2021 30 TOPSIS

1

2

3

Ab
rol,
yst
d