Influence of “Two Mountains” Bases Policy on Green Economic Development

QIN, Bingtao
Business School, University of Shanghai for Science and Technology

GE, Yuehui
Business School, University of Shanghai for Science and Technology

GE, Liming
School of Urban and Regional Science, Shanghai University of Finance and Economics

YU, Yongwei
Business School, University of Shanghai for Science and Technology

他

https://doi.org/10.5109/6796266

出版情報：九州大学大学院農学研究院紀要. 68 (2), pp.199-210, 2023-09. 九州大学大学院農学研究院
バージョン：
権利関係：

J. Fac. Agr., Kyushu Univ., **68** (2), 199–210 (2023)

Influence of "Two Mountains" Bases Policy on Green Economic Development

Bingtao QIN[1], Yuehui GE[1], Liming GE[2], Yongwei YU[1], Gan LIN[1], Yoshifumi TAKAHASHI* and Mitsuyasu YABE

Laboratory of Environmental Economics, Division of Agricultural and Resource Economics,
Department of Agricultural and Resource Economics, Faculty of Agriculture,
Kyushu University, Fukuoka 819–0395, Japan
(*Received May 10, 2023 and accepted May 18, 2023*)

"Lucid Waters and Lush Mountains Are Invaluable Assets" Policy (hereinafter referred to as "Two Mountains" Bases Policy) is put forward to address the question of how green economic development can be achieved. China implemented the "Two Mountains" Bases Policy in 2016 trying to establish bases verified and evaluated for pilot projects in which way Bases get policy support and government funds from the Ministry of Ecology and Environment of the People's Republic of China. This study empirically analyzed the impact of Bases on green economic development using propensity score matching – differences in different methods and panel data from 2010 – 2019 concluding 2510 areas from the whole country. The benchmark regression results show that Bases enhanced both ecological protection and economic development which remains true after a series of robustness tests. The mechanism analysis results show that the government's ecological compensation, the level of economic development, and industrial structure promote the development of "Two Mountains". Heterogeneity analysis shows that the effect of Bases varies with different geographical locations, ocean locations, and the types of development of "Two Mountains". Bases in the East area and Coastal area work well as well as Bases in the "Lucid Waters and Lush Mountains" leading type area. This study focuses the empirical research on the Bases at the county level, enriches the relevant literature on the practice of the "Two Mountains" Bases Policy, and provides theoretical support and policy enlightenment for the practical significance of promoting the construction of ecological civilization of socialism with Chinese characteristics.

Key words: Green Economic Development, Propensity Score Matching – Differences in Differences, "Two Mountains" Bases Policy

INTRODUCTION

"Lucid waters and lush mountains are also gold and silver mountains" was put forward by Xi Jinping, General Secretary of China, during his visit to Anji County, Zhejiang Province in August 2005 (hereinafter referred to as "Two Mountains" Bases Policy). "Lucid Waters and Lush Mountains" is a metaphor that refers to the environment as well as "Gold and Silver Mountains" refers to economic development. As revealed by the theory of Landscape Ecology (2000) and the Environmental Kuznets Curve of Grossman and Krueger (1995), there is an inverted U–shaped relationship between economic development and ecological environmental protection, which can be both realized under certain conditions. The "Two Mountains" Bases are the platform to practice the concept which emphasizes the mutual transformation and feedback of "Two Mountains" achieving the goal of protecting "Lucid Waters and Lush Mountains" by regulating environmental pollution and improving ecological conditions. To implement the concept, Anji became the first pilot county to practice the theory of "Lucid Waters and Lush Mountains are also Gold and Silver Mountains" in 2016 and was awarded as the first batch of practical innovation bases by the Ministry of Ecology and Environment of the People's Republic of China in 2017, along with other 12 counties and districts. This study addresses the question of how to put the theory into practice and whether the base has achieved sustainable development of the environment and economy.

The Ministry of Ecology and Environment of the People's Republic of China informed the ecological and environmental departments of each province, city, and district to recommend a candidate area for the "Two Mountains" Base. During the selection, experts and relevant departments will be invited to participate in the verification and evaluation. The local departments need to make their declarations on the national management platform for ecological civilization demonstration and construction, on which the proposed list should be publicized, accepting supervision and reporting. The counties and districts that have been awarded as the "Two Mountains" Bases should continue to build and achieve more results within three years. Those that fail to meet the standards will be warned or revoked. For the areas that have won the titles of "Two Mountains" Bases, certain financial incentives will be given through special funds for the ecological environment, as well as some preferential policies at the same time.

Scholars have carried out a wealth of research on the ecological economy. To evaluate the ecological value and build a measurement system, the United Nations carried out an environmental and economic accounting in the 1970s. *Millennium Ecosystem Assessment* (MA)

[1] Business School, University of Shanghai for Science and Technology, P. R. China
[2] School of Urban and Regional Science, Shanghai University of Finance and Economics, P. R. China
* Corresponding author (E–mail: gibun@agr.kyushu–u.ac.jp)

issued by the United Nations and *The Economics of Ecosystems and Biodiversity* (TEEB) initiated by the European Commission and Germany, as well as some other projects, attempt to build a complete methodology of monetary accounting. Liu and Yang (2018) have constructed a new accounting framework for the ecosystem services of non–monetary quantity based on the methods of energy analysis and monetary accounting. Some scholars have also successively analyzed the accounting of Gross Ecosystem Product (GEP). Costanza (2014), Ouyang (2013), and other researchers have established an accounting system including the value of ecological products, regulatory services, as well as ecological and cultural values. Xie (2015) proposed the value table of ecosystem services and the analytical method of equivalent factors.

In the study of ecological civilization, Liu *et al*. (2023) found that the policy of piloting low–carbon cities effectively has promoted the reduction of carbon dioxide emissions brought by the growth of unit GDP. Liu *et al*. (2003) also discovered that being included in the "National Civilized City" can significantly reduce the concentration of PM2.5, carbon dioxide, and sulfur dioxide. Zhang *et al*. (2021) found that tax incentives for green development can improve the total factor productivity of mining companies. Liu *et al*. (2018) found that piloting low–carbon cities can promote the green transformation of residents' lifestyles. Lu and Xiong (2020) used the method of Differences–in–Differences to find that the establishment of the first batch of ecological civilization demonstration areas in China have increased the net effect of agricultural green efficiency by 6.7%. Ding (2021) found that the establishment of national key ecological function areas in China has significantly improved local economic development. Dong (2020) analyzed and evaluated the net effect of carbon emission reduction concerning the pilot policies of 6 low–carbon provinces and autonomous regions in China in terms of per capita carbon emissions and carbon intensity. Yang *et al*. (2021) used the DID method to test and found that the policy has significantly reduced the emissions of air pollutants in China. In the documents measuring the value of "Two Mountains", Ma *et al*. (2017) initially used the "green gold index" to measure the relationship between "Lucid Waters and Lush Mountains" and "Gold and Silver Mountains". Zhai and Zhou (2017) used the entropy weight method to calculate the green economic development index of 11 cities in Zhejiang Province. Gao *et al*. (2020) used green total factor productivity to measure the transformation efficiency of the "Two Mountains" Bases. Sun *et al*. (2020) constructed an evaluation index system to calculate the effectiveness of the "Two Mountains" practices and analyzed the threshold effect. Zhang *et al*. (2021) quantitatively evaluated the practical effect of "Two Mountains" in Sihong County. Chen *et al*. (2021) evaluated the transformation effect of "Two Mountains" in Ninghai County, Zhejiang Province from the perspective of ecosystem GDP. In terms of mechanism and construction, Du *et al*. (2018) put forward suggestions focusing on promoting the construction of "Two Mountains". Qin *et al*. (2018) analyzed the operating mechanism of the "Two Mountains" Bases Policy. Liu (2021) constructed an evaluation index system for the development of a green economy in Miyun District, Beijing City, and put forward suggestions for establishing a market–oriented ecological compensation mechanism.

To sum up, in terms of indicator measurement, due to the lack of basic data, there are no uniform standards in current studies. With different accounting methods for specific indicators, there are quite different accounting results in the same area, so the policy effect cannot be objectively analyzed as well. From the perspective of research, the provincial panel data can evaluate the comprehensive influence of the pilot policy of ecological civilization on the regional economic, ecological environment, and social effects. However, the "Two Mountains" Bases are mostly basic units such as towns, villages, forest farms, counties, and districts, so the scope of measurement indicators needs to be further focused to accurately evaluate the construction effect of these bases. In terms of research content, it is difficult to obtain county–level data, while few studies are based on that for analysis. Therefore, based on the county's panel data, this study selects 2510 counties and districts across the country as samples, takes the "Two Mountains" Bases as a quasi–natural experiment, and uses the method of Propensity Score Matching Differences–in–Differences (hereinafter referred to as PSM–DID) to analyze the construction effect of the base for the first time.

METHODOLOGY OF MEASUREMENT

The important premise of adopting the DID method is that both the treatment and the control group need to meet the assumption of a common trend, which may not be satisfied. Fortunately, the PSM–DID method proposed and developed by Heckman (1998) can effectively solve this problem. This paper selects the first batch of 13 "Two Mountains" Bases in 2017, including Saihanba Machinery Forest Farm in Hebei Province, Youyu County in Shanxi Province, Sihong County in Jiangsu Province, Huzhou City, Quzhou City and Anji County in Zhejiang Province, Jingde County in Anhui Province, Changting County in Fujian Province, Jing'an County in Jiangxi Province, Dongyuan County in Guangdong Province, Jiuzhaigou County in Sichuan Province, Wudang District of Guiyang City in Guizhou Province, and Liuba County in Shaanxi Province. The second batch of 16 "Two Mountains" Bases in 2018 is also included, such as the Yanqing District of Beijing City, Yili Ecological Demonstration Area of Kubuqi Desert of Hangjin Banner in Inner Mongolia Autonomous Region, Mongolian Autonomous County of Qian Gorlos in Jilin Province, Lishui City in Zhejiang Province, Dongtou District of Wenzhou City, Wuyuan County in Jiangxi Province, Mengyin County in Shandong Province, Luanchuan County in Henan Province, Shiyan City in Hubei Province, Yongning District of Nanning City in Guangxi

Zhuang Autonomous Region, Wangxia Township of Changjiang Li Autonomous County in Hainan Province, Wulong District of Chongqing City, Enyang District of Bazhong City in Sichuan Province, Chishui City in Guizhou Province, as well as Tengchong City and Hani Terrace Heritage Area of Yuanyang County of Honghe Prefecture in Yunnan Province. A total of 29 "Two Mountains" counties and districts were used as the treatment group, while the rest ones are set as the control group. *The Construction and Management Regulation on the Practice and Innovation Base of "Lucid Waters and Lush Mountains are Gold and Silver Mountains"* was issued by the Ministry of Ecology and Environment in 2017. To make the model close to the actual situation, the paper also sets the year of policy implementation as 2016, since it is the year that the declaration of the "Two Mountains" Bases and the subsequent series of operations have an actual influence. Based on this, a model can be built:

$$Growth_{it} = \beta_0 + \beta_1 did_{it} + \mu_i + \mu_t + \beta_2 X_{it} + \varepsilon_{it} \quad (1)$$

In the formula, the explained variable $Growth_{it}$ stands for the green economic development index; it and represents the administrative unit and year of the county and district respectively; did_{it} is the core explanatory variable. The estimate β_1 obtained after the DID reflects the net influence of the "Two Mountains" Bases on the green economic development of the county and district in the processing group, which is also the paper's most interesting coefficient. If β_1 is greater than 0, it means that the "Two Mountains" Base can promote green economic development; β_1 is less than 0, it shows the "Two Mountains" Base cannot be conducive to the development. X_{it} is a series of control variables; μ_i, individual fixed effect; μ_i, time fixed effect; ε_{it}, random error term.

"Lucid Waters and Lush Mountains" focus on reflecting the regional ecological status and environmental quality, while "Gold and Silver Mountains", material wealth and social value. Referring to the practices of Sun (2020) *et al.*, the "Two Mountains" index is constructed by using the entropy weight method as an explanatory variable to measure green economic development. The "Lucid Waters and Lush Mountains" index selects air quality (PM2.5 concentration) and carbon emission as the negative indicators; the government environmental protection expenditure, as positive ones. The "Gold and Silver Mountains" index selects GDP per capita (calculated with 2010 as the base period), the proportion of the added value of the tertiary industry, per capita disposable income, per capita savings, and medical treatment as positive indicators.

Firstly, the positive and negative indicators should be standardized. The calculation formula is as follows:

$$X_{ij} = (x_{ij} - \min x_{ij}) / (\max x_{ij} - \min x_{ij}) \quad (2)$$

$$X_{ij}' = (max\, x_{ij} - x_{ij}) / (max\, x_{ij} - min\, x_{ij}) \quad (3)$$

In the formula, X_{ij} and are respectively j positive and negative indicator data of the i county and district after standardization; x_{ij} is the j positive and negative indicator data of the i county before standardization.

Using every evaluation index data x_{ij}, its information entropy (E_j) and formula can be calculated:

$$E_j = -\frac{1}{\ln n}\left[\sum_{i=1}^{n}(P_{ij}\ln P_{ij})\right] \quad (4)$$

$$P_{ij} = X_{ij} / \left(\sum_{i=1}^{n} X_{ij}\right) \quad (5)$$

In the formula, P_{ij} the proportion of the j index of the i county to the sum of the j indexes of the whole country; E_j is the entropy of the j index. Based on the obtained information entropy, the weight of each evaluation index w_j can be calculated:

$$w_j = \frac{(1-E_j)}{\sum_{j=1}^{m}(1-E_j)} \quad (6)$$

In the formula, w_j is the objective weight of the j index, with a value between 0 and 1.

The standardized data X_{ij} and the weight of each evaluation index w_j are combined and calculated to obtain the "Lucid Waters and Lush Mountains" and "Gold and Silver Mountains" indexes. The calculation formula is as follows:

$$I_{Kij} = \sum_{j=1}^{m} w_j X_{ij} \quad (7)$$

In the formula I_{Kij} is the "Lucid Waters and Lush Mountains" or "Gold and Silver Mountains" index of the i county or district's j index. When j is 1, 2, or 3, I_{Kij} is the "Lucid Waters and Lush Mountains" index of $I_{LSQS_{it}}$; when j is 4, 5, 6, 7, or 8, I_{Kij} is the "Gold and Silver Mountains" index of $I_{JSYS_{it}}$.

The "Lucid Waters and Lush Mountains" and "Gold and Silver Mountains" indexes can mutually transform and promote each other. The research uses the coupling coordination model for reference to measure the "Two Mountains" index. The model is as follows:

$$C_{it} = \sqrt{I_{LSQS_{it}} I_{JSYS_{it}}} / I_{LSQS_{it}} + I_{JSYS_{it}} \quad (8)$$

In the formula, C_{it} is the coupling degree of the i county in t ; $I_{LSQS_{it}}$ the "Lucid Waters and Lush Mountains" index of the i county in t ; $I_{JSYS_{it}}$ the "Gold and Silver Mountains" index of the i county in t . To reflect the mutual transformation accurately between the "Lucid Waters and Lush Mountains" and "Gold and Silver Mountains" indexes, the evaluation model of the "Two Mountains" index needs to be further completed:

$$T_{it} = \alpha I_{LSQS_{it}} + \beta I_{JSYS_{it}} \quad (9)$$

$$\mathrm{TMT}_{it} = \sqrt{C_{it} T_{it}} \quad (10)$$

In the formula T_{it} stands for the comprehensive development of cooperative effect concerning the "Lucid Waters and Lush Mountains" and "Gold and Silver Mountains" indexes of the i county or district's in t. α β and are undetermined coefficients, plus $\alpha+\beta=1$, respec-

tively representing the contribution of "Lucid Waters and Lush Mountains" and "Gold and Silver Mountains" towards the effect of the "Two Mountains" practice; $\alpha+\beta=1$ is the "Two Mountains" index of the i county in t, which can reflect not only the comprehensive evaluation of the two but also their coordinated development. In the process of the practice, "Lucid Waters and Lush Mountains" and "Gold and Silver Mountains" are equally important to the contribution of the whole system. Therefore, their undetermined coefficients are both set as 1/2.

To better reflect the core idea of green economic development, we should not only protect the environment and develop the economy but also improve people's living standards and social values. In combination with the existing research, this paper selects the government's environmental expenditure (*Govern*), environmental pollution (co_2), per capita disposable income (*LnRPincome*), per capita savings (*Lnsav*), medical treatment (*Lnhospit*), and local education (*Lndradu*) as the control variables. To measure the educational level more reasonably, the methods of Liu (2008), Jess and Spiegel (1994) are applied for reference, while the relevant data are acquired by assigning corresponding coefficients to different educational backgrounds such as primary school, junior high school, senior high school, and university.

DATA

Existing research has constructed multi–level indicators to measure the value of "Two Mountains", always regarding a single county or 11 prefecture–level cities in Zhejiang Province as the research objects. This paper aims to study the influence of the "Two Mountains" Bases nationwide, spending a lot of time and energy on collecting the national county data from 2010 to 2019, all of which are compiled by China Statistical Yearbook (Township), China City Statistical Yearbook, the statistical yearbooks of provinces, cities, and counties, Statistical Communique of the PRC on the 2021 National Economic and Social Development, the official government website and local statistics bureau. Inevitably, many counties and districts are facing the problems of missing data and newly established administrative divisions. After verification one by one, the missing data in the yearbooks are obtained from news newspapers, local media reports, and so on. while that of some individual counties and districts in certain years are supplemented by the interpolation method, and their prices are adjusted with the base period of 2010.

Relevant descriptive statistics are shown in Table 1. The obvious difference between the maximum and minimum values of haze concentration and carbon dioxide concentration indicates that environmental pollution has become a serious problem in some parts of China, so it is urgent to strengthen the protection and utilization of "Lucid Waters and Lush Mountains". From the perspective of medical treatment, industrial structure, per capita savings, and per capita GDP, the large gap between their maximum and minimum values represents that the economic development of different counties and districts across the country is not well–balanced, so it is necessary to accelerate the transformation of more "Gold and Silver Mountains" to improve people's living standards.

RESULTS AND DISCUSSION

Parallel trend test

In this paper, concerning the practice of Beck (2010), if the establishment of the "Two Mountains" Bases has no influence, with the same variation trend occurring in the green economic development of both the treatment and control group, then it shows the use

Table 1. Descriptive statistics

Variables	N	Mean	St. Dev.	Min	Max
pm2.5	25100	25.6400	26.5300	1.2248	263.2657
struc	25100	0.3990	0.1920	0.0197	0.9251
co_2	25100	2.9400	3.2830	0.0024	55.5647
pergdp	25100	40,1080	88,9220	2785	607857
thrdincrea	25100	0.3570	0.1620	0.0527	0.9699
Lngradu	25100	11.9200	3.1120	8.2702	15.2128
Lngdp	25100	12.9800	3.6170	9.2413	18.2000
Lngovern	25100	11.7900	2.6270	6.7604	15.7219
Lnsav	25100	11.9700	4.3200	1.7917	16.7620
LnRPincome	25100	9.5860	2.5180	7.1499	12.6297
Lnpergdp	22540	10.3600	0.7670	7.932	13.7432
Lnhospit	25100	6.9140	2.4790	2.4849	10.2443

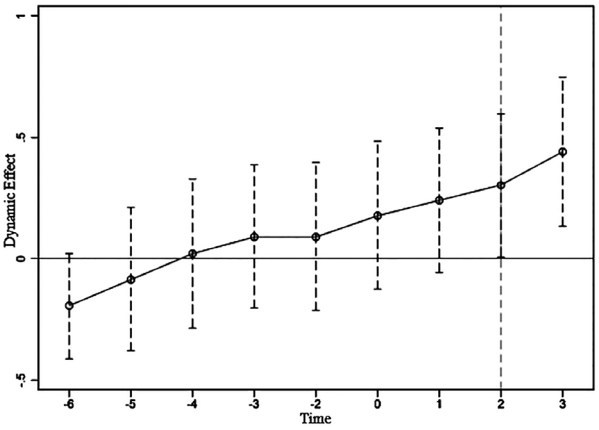

Fig. 1. Parallel trend test.

of the DID conforms to the parallel trend hypothesis. The result is shown in Figure 1. Through the graphic method, it can be found that there is no significant difference in the development trend of the green economy between the treatment and control group before the establishment. Besides, in the two years before and after the initial construction of the "Two Mountains" Bases, the green economic development in each county gradually accelerated. Over time, the construction effect strengthened and became sustainable step by step, representing the pass of the parallel trend test.

Radius matching PSM–DID benchmark regression

According to the above analysis, the 29 counties and districts that began to declare the "Two Mountains" Bases in 2016 were taken as the treatment group, while the remaining ones are used as the control group. The PSM method of radius matching is used to select the closest counties and districts from the control group. Since this paper involves multi–period panels, the PSM method is carried out year by year. Education (*Lngradu*), government intervention (*Govern*), per capita savings (*Lnsav*), per capita disposable income (*LnRPincome*), medical treatment (*Lnhospit*), and environmental pollution (co_2) are used as matching variables to match the treatment and control groups of counties and districts, while the Logit model is also adopted to estimate the propensity score of the above matching indicators. During the PSM–DID estimation, the first step is to carry out a balance test about whether the mean value of matching variables in the treatment and control groups shows significant differences before and after matching. The result is shown in Table 1: After the radius matching, the standardized deviation of all matching variables has significantly decreased compared with that before matching. The absolute value of the standardized deviation after matching is within 10%, while the P value of the T–test after matching is greater than 10%, which does not reject the original hypothesis that there is no systematic difference between the treatment and control groups. This shows that there is no obvious difference in the matching variables between the treatment and control groups after matching, so it is feasible to adopt the PSM–DID method.

Column 1 in Table 2 is the regression result without adding control variables, while the core explanatory variable coefficient β_1 is 0.0135, significantly positive at 1%, indicating that the "Two Mountains" Base is conducive to the green economic development of the treatment group's counties and districts. On this basis, the control variables are gradually increased. From Columns 2 to 7 in Table 2, the variable coefficient of government intervention is significantly positive at 1%, indicating that the intervention promoted the transformation of "Two Mountains". The reason is that the government's expenditure on environmental protection has reduced environmental pollution, increasing the "Lucid Waters and Lush Mountains" index; on the other hand, the government's investment in market regulation has also accelerated the development of agriculture, forestry, animal husbandry, fishery, and green industry, increasing

Table 2. Propensity Score Matching Differences between the Pre– and Post– Processing groups and control groups

Variables	Sample	Mean		St. Dev.	T	P
		Treat	Control			
Lngradu	Before	12.5730	12.4330	8.2000	1.1000	0.2700
	After	12.5730	12.5060	3.9000	0.4900	0.6230
Govern	Before	12.4480	12.3130	17.8000	3.3500	0.0010
	After	12.4480	12.3940	7.1000	0.8500	0.3960
Lnsav	Before	12.9910	12.6600	10.6000	1.6600	0.0980
	After	12.9910	12.8320	5.1000	0.6300	0.5300
LnRPincome	Before	7.54640	7.3192	12.1000	1.9900	0.0470
	After	7.54640	7.4303	6.2000	0.7700	0.4430
Lnhospit	Before	10.3690	10.2590	18.9000	4.1700	0.0000
	After	10.3690	10.3200	8.4000	1.0100	0.3110
co_2	Before	2.4900	2.9027	–12.5000	–2.4000	0.0160
	After	2.4900	2.7459	–7.8000	–0.9600	0.3390

the "Gold and Silver Mountains" index. The variable coefficient of per capita disposable income is significantly positive at 1%, showing that the real income of residents has been improved. This is because the construction of the "Two Mountains" Bases has transformed into more "Gold and Silver Mountains" and improved the material life of residents. More income has stimulated more consumption, which has promoted the development of the market economy and fed back the entire economic system. As a result, the "Two Mountains" economy has achieved a virtuous cycle. The coefficient of environmental pollution is significantly negative at 1%, representing that the "Two Mountains" Base has reduced environmental pollution indeed. This is because the construction process makes rational use of natural resources and transforms them into "Gold and Silver Mountains", which is also the sustainable development of "Lucid Waters and Lush Mountains". The improvement of the ecological environment has protected the biological chain, so the "Lucid Waters and Lush Mountains" index has been improved correspondingly. The excellent environment has reduced the possibility of residents getting sick, released the pressure of medical treatment, and lowered the medical expenditure, so that the residents' real disposable income has been improved, and the "Gold and Silver Mountains" index has also been increased. The coefficient of education is positive but not significant, showing that it has no remarkable influence on green economic development. The reason may be that the declaration of the "Two Mountains" Bases is the result of local authorities' self–selection. The declared counties and districts are often those with relatively poor economic development but good natural resource conditions, which means they have a strong desire to get policy support. However, poor economic development is often equal to the scarcity of educational resources, so it is impossible to conclude that education can significantly influence green economic development. In the same way, the relatively low savings of residents in counties and districts applying for the "Two Mountains" Bases and the immature local financial industry cannot boost the economy and significantly influence green economic development. The coefficient of medical treatment is positive but not significant. There are three possible reasons as follows. First, people prefer those large hospitals in provincial capitals to seek better medical resources for severe diseases and surgery. Therefore, the medical treatment in these counties and districts is not significantly high compared with large cities. Secondly, the counties and districts of the "Two Mountains" Bases will not cause more medical expenses for residents due to the excellent environment, so they will increase the "Golden Mountains and Silver Mountains" index to some extent, but not so significantly in influence. Thirdly, owing to customs, awareness, and other reasons, residents may not choose to go to the hospital for treatment, so it is impossible to conclude that medical treatment can prominently influence green economic development.

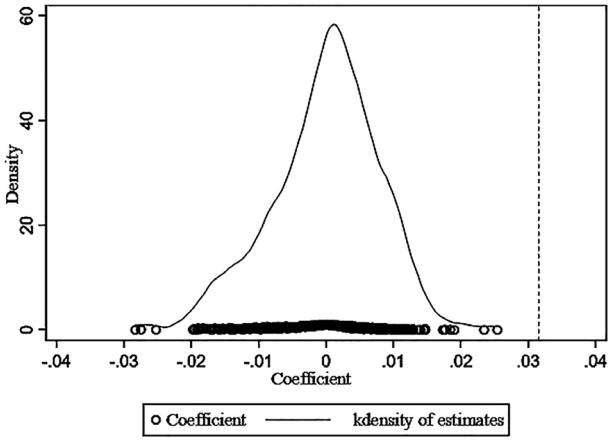

Fig. 2. Placebo test

Robustness test

To verify the rationality of the benchmark regression result above, this paper further adopts the following methods for robustness tests.

Placebo test

From all 2510 counties and districts, 29 of them are randomly selected as the hypothetical "Two Mountains" Bases, keeping the total amount of observation remained at 25100 (2510 counties and districts, 10 years of observation variables). If the newly set control group does not show a significant positive influence, the conclusion drawn in the previous context is proved to be robust. This paper refers to the research of Fu *et al*. (2019). The specific methods are as follows: Let all the study areas receive several impacts at random. If the mean value of random samples' estimated coefficients is around 0, while the truly estimated coefficients are significantly not 0, it shows that the estimated result is not influenced by other unobserved factors. The paper sets the number of impact times as 500. The kernel density distribution of estimated coefficients is shown in Figure 2: The coefficients estimated based on random samples are distributed around 0, while the real estimated coefficients are less than 0–year 0.03, indicating the robustness of the result.

Robustness test of changing PSM and explained variables

There are multiple matching modes for PSM. This paper adopts kernel matching to test again. The result is shown in Table 3. From Column 1 in Table 3, there is a small difference between the estimated result of kernel matching and the result of radius matching at the significance level, as well as a similar coefficient value, indicating that the estimated result of this paper has strong robustness.

The entropy method was used to measure the "Two Mountains" index above. Here, concerning the practices of He *et al*. (2009), Su and Huang (2018), Qin and Ge (2019), the idea of dimensionality reduction is adopted by transforming multiple indexes into comprehensive

Table 3. PSM–DID benchmark regression results

Variables	Model1	Model2	Model3	Model4	Model5	Model6	Model7
β_1	0.0135***	0.0136***	0.0134***	0.0134***	0.0133***	0.0133***	0.0132***
	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)
Lngradu		0.0010***	0.0001	0.0001	0.0002	0.0002	0.0003
		(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Govern			0.0043***	0.0042***	0.0033***	0.0033***	0.0033***
			(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Lnsav				0.0002	–0.0001	–0.0001	–0.0001
				(0.0003)	(0.0003)	(0.0003)	(0.0003)
LnRPincome					0.0110***	0.0109***	0.0110***
					(0.0005)	(0.0005)	(0.0005)
Lnhospit						0.0004	0.0005
						(0.0002)	(0.0002)
co_2							–
							0.0003***
							(0.0001)
Individual	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Time	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
N	24241	24241	24241	24241	24241	24241	24241
R–squared	0.9710	0.9710	0.9720	0.9720	0.9720	0.9720	0.9720

Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

ones replaced by principal components. 10 indicators representing the local development of the green economy are selected; SPSS1 6.0 Software is used to standardize the whole sample data; KMO Test and Bartlett's Test of Sphericity are also conducted. The result of the KMO value passes the test (0.780), showing that principal component analysis can be performed. Three principal component factors are selected; the varimax–rotation method is used to obtain the load matrix; the comprehensive score of each county and district every year can be calculated through the proportion of each principal component in the total variance contribution rate. The measured economic performance, per capita GDP, and per capita disposable income are taken as the explanatory variables. Both GDP and per capita disposable income are logarithmic, with DID as the estimation method. According to Columns 2–4 in Table 3, the coefficients of the kernel explanatory variable are all significantly positive at 1%, indicating the stability of the conclusion that the "Two Mountains" Base is beneficial to green economic development. Among them, the government expenditure and medical treatment are significantly positive at 1%, which also echoes the above conclusions.

Dynamic Effect Test

This paper examines the dynamic changes of the coefficients of kernel explanatory variables. In this paper, the establishing year of the "Two Mountains" Base is set as 2016, and the dynamic effect of policy implementation can be observed from the changing trend of 2017 to 2018. The result is shown in Table 4. According to Table 4, the kernel explanatory variable β_1 is significantly positive at 1% in three years, and the coefficient decreases gradually with time, which indicates that the establishment of the "Two Mountains" Base is beneficial to the comprehensive development of the counties and districts within three years, though its influence is gradually weakening. The reason may be that the time limit for the inspection of the "Two Mountains" Base construction has not yet arrived, while the counties and districts have gradually slackened in the process. Another possi-

Table 4. Robustness testing

Variables	Kernal PSM–DID	Economic Performance	Per Capita GDP	Per Capita Disposal
β_1	0.0110***	0.2450***	0.0757***	0.0391***
	(0.0008)	(0.0311)	(0.0196)	(0.0137)
Control	Yes	Yes	Yes	Yes
Individual	Fixed	Fixed	Fixed	Fixed
Time	Fixed	Fixed	Fixed	Fixed
N	24242	25100	25100	25100
R–squared	0.9760	0.9550	0.9980	0.9980

Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table 5. Dynamic effect

Year	β_1
2016	0.0132***
	(0.0009)
2017	0.0111***
	(0.0010)
2018	0.0099***
	(0.0012)
N	24241
R–squared	0.9720

Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

ble reason is that it has been markedly improved in the early process so that it suffers from insufficient stamina afterward.

Mechanism Analysis

To further explore the specific path of the "Two Mountains" Bases' influence, this paper measures the government's ecological compensation, economic development, and industrial structure by adopting the government's environmental expenditure, per capita GDP (logarithm), and the ratio of tertiary to secondary industry respectively. Column 1 and 2 in Table 5 shows that the coefficients of government ecological compensation and economic development are both positive and significant at 1%, indicating that the "Two Mountains" Base can have a significantly positive influence on the local green economic development by improving ecological compensation and economic development. The first reason is that to build the "Two Mountains" Base, the local government must increase investment in environmental governance and reduce pollution. In the process, the ecological compensation has been improved, "Lucid Waters and Lush Mountains" have been protected, and "The Gold and Silver Mountains" have been added, which ensures the efficient output of local agriculture, forestry, fishery, and animal husbandry. The diversified biosphere has promoted the development of an ecological economy such as ecological aquaculture, and a better marine environment is beneficial to the development of port–side trade and marine industry so that residents can work and live in health and happiness, creating more economic and social value. The second reason is that after receiving policy support, the counties and districts in the treatment group have utilized the financial assistance allocated by the central government to support the green industry, innovate and develop the existing industries, and promote the employment of residents at the same time. The government regulates the market and strengthens the concept of green production, while residents also prefer clean energy and a low–carbon lifestyle. Column 3 in Table 5 shows that the estimated coefficient of industrial structure is negative and significant at 1%, indicating that the "Two Mountains" Base can influence green economic development by optimizing the industrial structure. The reason is that the "Two Mountains" Base has both promoted the sound development of primary industry and eliminated the old industry, screening the production behaviors with backward technology as well as high pollution and energy consumption. Some enterprises have to give up the market for new ones with green innovative technologies. The investment and introduction of green enterprises have accelerated the optimization of industrial structures. The ecological industries developed by "Lucid Waters and Lush Mountains", such as ecotourism, marine industry, marine bio–pharmaceuticals, marine trade, beach economy, and wildlife protection, have also brought more income and consumption to residents.

Heterogeneity Analysis

This paper further analyzes the heterogeneous influence of the "Two Mountains" Bases on green economic development. The geographical location, marine location, and type of green economic development will influence the effect of the "Two Mountains" Base. The regression result is shown in Table 6.

Regional Heterogeneity in the East, Middle, and West of China

The east of China has developed rapidly with its advantageous geographical location. The Strategy for the Rise of Central China and the Development of the Western Region in China have also introduced talents and funds for the central and western regions, realizing the coordinated development among the three. However, its location factors will also lead to differences in the effect of policy implementation. Based on this, the paper divides the counties and districts into three parts, namely the east, middle, and west regions. the result is shown in Table 7. The coefficients of eastern and central regions are significantly positive at 1%, indicating that the construction of "Two Mountains" in both

Table 6. Mechanism testing

Variables	Govern Economic Compensation	Economic Development	Industrial Structure
β_1	0.0490**	0.0391***	–0.0192***
	(0.0227)	(0.0137)	(0.0054)
Individual	Fixed	Fixed	Fixed
Time	Fixed	Fixed	Fixed
N	25100	25100	25100
R–squared	0.9950	0.9980	0.9310

Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively. Standard error in parentheses.

Table 7. Heterogeneity analysis

Variables	East	Mid	West	Coast	Inland	the leading type of 'Gold and Silver Mountains'	the leading type of 'Lucid Waters and Lush Mountains'	the balanced type of 'Two Mountains'
β_1	1.2110***	0.6020***	0.0489	1.2140***	0.4040***	–0.1730	1.0470***	0.6080***
	(0.1470)	(0.1160)	(0.0865)	(0.1410)	(0.0799)	(0.1100)	(0.3440)	(0.1510)
Individual	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Time	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
N	7130	7910	100600	8010	17090	5839	2989	3995
R–squared	0.5610	0.5500	0.5330	0.5630	0.4650	0.5470	0.4220	0.7150

Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively. Standard error in parentheses.

regions has achieved remarkable results. The eastern region enjoys the advantages of capital, technology, and talent, which are all important conditions for industrial transformation and upgrading and has rapidly achieved green economic development on a solid economic base. The central region has a strong industrial foundation, developed secondary industry, and a large population. The Chengdu–Chongqing Urban Agglomeration, Central Plains Urban Agglomeration, and Wuhan Metropolitan Area have played a strong role in innovation and resource agglomeration, effectively promoting green economic development. The coefficient of the western region is not significant, because it is the main position for the transfer of heavy pollution industries, undertaking the ones eliminated from the upstream. In addition, with the weak strength of local environmental regulations and insufficient public awareness of environmental protection, the concept of "Two Mountains" cannot be well developed. There is still much room for improvement in environmental protection technologies such as low energy consumption and pollution, while the government should also strictly control and guide them as well.

Regional Heterogeneity in Coastal and Inland Areas

The development of "Lucid Waters and Lush Mountains" includes not only that of "Lush Mountains", but also "Lucid Waters". The result shows that the coefficients of coastal and inland areas are significantly positive at 1%. The comparison of coefficients indicates that the construction effect of the "Two Mountains" Base in coastal areas is significantly stronger than that in inland ones because the rational use of marine resources can play a greater role in that. On the one hand, the coastal ecosystem possesses higher service value, and recreational activities such as beaches can bring greater economic benefits. On the other hand, the marine ecosystem can provide fishing resources, nutrient resources, etc., and create a lot of ecological and economic value.

Heterogeneity in the Development Types of "Two Mountains"

According to the comparison of the annual mean and average values of the "Lucid Waters and Lush Mountains" and "Gold and Silver Mountains" indexes, the counties and districts can be divided into 3 parts: the leading type of "Gold and Silver Mountains", the leading type of "Lucid Waters and Lush Mountains", and the balanced type of "Two Mountains". The non–significant coefficient of the "Gold and Silver Mountains" leading type in the result indicates the poor development of the green economy in these areas. The reason is that they are relatively advanced in commerce, high–tech, and modern service industry, with developed economies but scarce natural resources. As a result, the relatively low "Lucid Waters and Lush Mountains" index has brought down that of "Two Mountains". The coefficients of "Lucid Waters and Lush Mountains" leading type and "Two Mountains" balanced type are significantly positive at 1%, indicating that the prominent effect of green economic development, among which the former effectively protect and utilize the ecological resources so that the "Two Mountains" concept is implemented, while the latter, under the benign "Two Mountains" mutual benefit effect, attain the joint development of "Lucid Waters and Lush Mountains" and "Gold and Silver Mountains" in harmony and unity.

CONCLUSIONS

"Lucid Waters and Lush Mountains" are important production factors of "Gold and Silver Mountains" and rich means of production. The former can be transformed into the latter. At the same time, since "Lucid Waters and Lush Mountains" are valuable resources that can create economic value, "Lucid Waters and Lush Mountains" are the same as "Gold and Silver Mountains". Besides, "Gold and Silver Mountains" can also be used to protect and build "Lucid Waters and Lush Mountains". The two can influence and transform each other. The development of "Lucid Waters and Lush Mountains" is that of the ecological environment; the development of "Gold and Silver Mountains" is that of the economy—the two are harmoniously integrated. Finally, this paper studies the influence of the "Two Mountains" Bases Policy on green economic development. Key findings are concluded as follows.

(a) The establishment of the "Two Mountains" Base

has a significant positive influence on green economic development with a long–term nature. It can not only protect the local ecological environment and natural resources but also increase its transformation of economic and social value. What's more, the local economic development has also played a role in feeding back the environment. The elements of the whole system can transform into each other, achieving joint development in harmony and unity.

(b) In the process of building the "Two Mountains" Base, the green economy has been promoted by increasing the government's ecological compensation, improving economic development, and optimizing the industrial structure. The "Two Mountains" Bases in the eastern and central regions of China have achieved remarkable results, while in the western regions, the construction still needs to be strengthened and consolidated. The utilization of marine resources in China's coastal areas can produce more benefits than inland areas. In China's economically developed but resource–poor areas, the construction of "Two Mountains" still needs to be improved.

(c) The "Two Mountains" Base is a successful practice of the "Two Mountains" Bases Policy. The relevant counties and districts have developed an ecological economy through their ecological advantages and achieved green benefits for the people, which is a successful experience that can be copied and used for reference, making outstanding contributions to the ecological civilization in China.

Suggestions

First, the government should improve the level of local science and education. Better educational resources will bring more talents and green innovation, so that green technology can be applied to protect the environment and measure ecological value, such as the survey of geographical conditions and the regulation of water pollution.

Secondly, the government should fully utilize the advantages of the ecological environment, reduce the production behavior of high pollution and energy consumption, and encourage the development of green, low–carbon, and environment–friendly ecological industries. The unreasonable industrial layout should be adjusted, while the coastal counties and districts should make good use of their geographical advantages to develop the marine economy. Besides, it is also important for the local government to accelerate the development of the green financial industry, boost physical enterprises, and reduce economic inequality through financial inclusion, which is conducive to increasing social value and building a more dynamic ecological economy.

Thirdly, the government should formulate detailed and operable relevant policies to regulate and lead the market, establish a sound property rights system for environmental resources and production emissions, clarify value accounting, establish a scientific and reasonable ecological value measurement system, and improve the ecological compensation system based on the transfer payment of central finance. A market–oriented system of pollution emission, carbon, resource, and other taxes must be formulated for the production behavior of pollution emissions. The responsibility system of departments at all levels should also be implemented to ensure green economic development with a sound institutional system.

Lastly, according to the actual situation of each county and district, we should strengthen the management of water, air, and soil, establish a unified assessment system, and refine the environmental control unit. Since it is difficult to obtain county–level data nationwide, many relevant environmental indicators cannot be obtained. Besides, relevant data are unavailable in many areas, which is not conducive to the evaluation of local ecological value and the measurement of ecological compensation. Therefore, it is necessary to increase investment to build a more scientific and reasonable system of ecological value measurement and evaluation, enrich and complete ecological environmental data, and measure local environmental data from multiple angles and dimensions, to establish an accurate and long–term database to record changes in environmental quality, and better make accurate evaluation and suggestions on the construction of ecological civilization.

AUTHOR CONTRIBUTION

B. Qin designed the study. Y. Ge analyzed the data and wrote the paper. L. Ge, Y. Yu, G. Lin, and M. Yabe participated in the design of the study and supervised the work. Y. Takahashi assisted in editing of the manuscript and approved the final version.

ACKNOWLEDGMENTS

The research was supported by Foundation for Humanities and Social Science Youth Research, Chinese Ministry of Education (16YJC790083), Shanghai Philosophy and Social Science Planning Project (2020BGL012). We thank all these organization for their support.

REFERENCES

Beck, T., R. Levine and A. Levkov 2010 Big Bad Banks? The Winners and Losers from Bank Deregulation in the United States. *The Journal of Finance*, **65**(5): 1637–1667

Chen, M., R. T. Ji, X. Liu, C. W. Liu, L. H. Su and L. J. Zhang 2021 Gross ecosystem product accounting for "Two Mountains" Bases and transformation analysis: the case study of Ninghai County. *Acta Ecologica Sinica*, **41**(14): 5899–5907

Costanza, R., R. de Groot and P. Sutton 2014 Changes in the global value of ecosystem services. *Global Environmental Change*, **26**: 152–158

Ding, F., G. Y. Zhuang 2021 Has the establishment of National Key Ecological Function Areas promoted economic development? ——evaluation of the policy effects based on a DID study. *China Population, Resources and Environment*, **31**(10): 19–28

Dong, M., C. F. Li 2020 Net carbon emission reduction effect of the pilot policies in low–carbon provinces. *China Population, Resources and Environment*, **30**(11): 63–74

Dong, Z. Q., H. Wang 2021 Urban Wealth and Green Technology Choice. *Economic Research Journal*, **56**(4): 143–159

Du, L. Z., Y.H. Zhao, K. T. Tao and W. F. Lin 2019 Compound Effects of Environmental Regulation and Governance Transformation in Enhancing Green Competitiveness. *Economic Research Journal*, **54**(10): 106–120

Du, Y. C., C. Y. Cheng, L. He, Q. Wang and C. Z. Ge 2018 Work Point and Suggestions of Environmental Economic Policies based on the "Two Mountains Theory". *Research of Environmental Sciences*, **31**(9): 1489–1494

Fu, J. S., Z. N. Pu and X. Cai 2019 Evaluation on the Implementation Effect of Resource–Based Cities' Transformation Policy: Based on a PSM–DID Method. *Journal of Environmental Economics*, **04**(1): 108–122

Gao, H., W. L. Ye, S. J. Peng and W. J. Zhang 2020 A Method of Measuring Conversion Efficiency from "Lucid Waters and Lush Mountains" to "Invaluable Assets" Based on Green Total Factor Productivity. *Research of Environmental Sciences*, **33**(11): 2639–2646

Grossman, G. M., A. B. Krueger 1995 Economic Growth and the Environment. *NBER Working Papers*, **110**(2): 353–377

Heckman, J. J., H. Ichimura and P. Todd 1998 Matching as an econometric evaluation estimator. *The review of economic studies*, **65**(2): 261–294

He, Q. F., W. Chen and X. J. Wang 2009 Relationships among Direct Human Capital Input, R&D Input, and Innovation Performance: An Empirical Study Based on Panel Data about S&T Activities in China. *Technology Economics*, **28**(4): 1–9

Hu, Y. J., J. Wu and R. S. Hu 2019 Internal Logic and Development Path of the "Two Mountains" Theory for Ecological Civilization Construction. *Strategic Study of Chinese Academy of Engineering*, **21**(5): 151–158

Huang, D. W. 2021 Financial Development and Urban Total Factor Productivity Growth: A Case Study of 26 Cities in the Yangtze River Delta Urban Agglomeration. *Economic Geography*, **41**(6): 77–86

Huang, H. P., X. Z. Qiao, J. Zhang, Y. L. Li and Y. M. Zeng 2019 Spatio–Temporal Differentiation and Influencing Factors of Regional Tourism Carbon Emissions under the Background of Green Development: A Case Study of the Yangtze River Economic Belt. *Economic Geography*, **39**(11): 214–224

Huber, J. 2000 Towards industrial ecology: sustainable development as a concept of ecological modernization. *Journal of Environmental Policy & Planning*, **02**: 269–285

Jess, B., M. M. Spiegel 1994 The role of human capital in economic development evidence from aggregate cross–country data. *Journal of Monetary Economics*, **34**(2): 143–173

Jiang, Q. B., Q. M. Tan 2021 The Impact of High–tech Industry Agglomeration and Environmental Regulation on Regional Ecological Efficiency: Empirical Evidence from China's Regional Development. *East China Economic Management*, **35**(3): 86–92

Jin, C., Y. Q. Lu 2021 Review and Prospect of Research on Value Realization of Ecological Products in China. *Economic Geography*, **41**(10): 207–213

Li, H. D., W. B. Ma, Y. B. Gao, X. F. Zhang, L. J. Zhao, N. Wang and S. G. Yan 2020 Eco–Environmental Gains and Conversion Benefits of "Lucid Waters and Lush Mountains are Invaluable Assets" in Poverty Alleviation Field. *Research of Environmental Sciences*, **33**(12): 2761–2770

Liu, G. Y., Q. Yang 2018 Non–monetary Accounting on Ecosystem Services Valuation: Theory and Methodology. *Chinese Journal of Environmental Management*, **10**(4): 10–20

Liu, W. J., Y. Zhu, W. L. Ye, W. J. Zhang and D. Wang 2018 Philosophical Foundation and Practical Suggestions About the Theory of "Lucid Waters and Lush Mountains are Invaluable Assets". *Environmental Protection*, **46**(20): 52–54

Liu, W. 2021 Transformation of Green Water and Green Mountains into Jinshan and Yinshan: Evaluation and Path——Taking Miyun District of Beijing as an Example. *Ecological Economy*, **37**(1): 206–211

Liu, Z. Y., Y. Y. Hu and X. Z. Yi 2008 Testing for the Mechanism of Impacts of Heterogeneous Human Capital on Economic Growth. *The Journal of Quantitative & Technical Economics*, **04**: 86–96

Liu, X., M. Yang and X. Nie 2023 Can city brand reduce urban air pollution? – An empirical research based on "National Civilized City" in China. *Technological Forecasting and Social Change*, **186**: 122–179

Lu, S., J. Xiong 2020 Can the establishment of ecological civilization demonstration zones improve agricultural green efficiency? Based on the empirical data of Hunan province. *Journal of Central South University (Social Sciences)*, **26**(3): 90–101

Ma, G. X., F. Yu, J. N. Wang, X. F. Zhou, J. Yuan, X. J. Mu, Y. Zhou, W. S. Yang and F. Peng 2017 Measuring gross ecosystem product (GEP) of 2015 for terrestrial ecosystems in China. *China Environmental Science*, **37**(4): 1474–1482

Nyagwachi, A. O., G. Chelwa and C. V. Walbeek 2020 The Effect of Tobacco and Alcohol Control Policies on Household Spending Patterns in Kenya: An Approach Using Matched Difference in Differences. *Working Papers*

Ouyang, Z. Y., R. S. Wang and J. Z. Zhao 1999 Ecosystem services and their economic valuation. *Chinese Journal of Applied Ecology*, **10**(5): 635–640

Ouyang, Z. Y., C. Q. Zhu, G. B. B Yang, W. H. Xu, H. Zheng, Y. Zhang and Y. Xiao 2013 Gross Ecosystem Product: Concept Accounting Framework and Case Study. *Acta Ecologica Sinica*, **33**(21): 6747–6761

Qin, B. T., L. M. Ge 2019 Empirical Analysis of Regional Industrial Economy and Environmental Pollution in China. *Statistics & Decision*, **35**(4): 133–136

Qin, C. B., J. Q. Su, Q. Wang, J. Wan and J. N. Wang 2018 Practice Mechanism Analysis of the Theory of "Lucid Waters and Lush Mountains are Invaluable Assets". *Research of Environmental Sciences*, **31**(6): 985–990

Qu, C., G. H. Liu, W. J. Wu and J. N. Wang 2020 Environmental Efficiency Evaluation of Ecological Compensation for National Key Ecological Functional Zones in the Yangtze River Economic Belt. *Research of Environmental Sciences*, **33**(2): 471–477

Shen, M. H., D. Mao 2019 Review of the evaluation of marine ecosystem services value. *Acta Ecologica Sinica*, **39**(6): 2255–2265

Su, J. J., X. Y. Huang 2008 Empirical Study on Economic Performance Evaluation Index System of Tourism Industry Based on Principal Component Analysis: A Case on Shanxi Province. *Technology Economics*, **03**: 100–104

Sun, C. Y., C. Y. Cheng, X. M. Duan, Y. C. Du and C. Z. Ge 2020 Construction of an Evaluation Index System to Calculate the Effectiveness of "Two Mountains" Practices. *Research of Environmental Sciences*, **33**(9): 2202–2209

Sun, C. Y., C. Z. Ge, X. M. Duan and C. Y. Cheng 2020 An Analysis of the Threshold Effect of "Green Water and Green Mountain" Transforming into "Jinshan Yinshan" ——Take Zhejiang Province as an Example. *Productivity Research*, **06**: 10–14

Wang, B. B., Q. H. Mo and H. Q. Qian 2020 The Diffusion Models and Effects of the Local Environmental Policy Innovation——A Micro–econometric Evidence from the Diffusion of River Chief Policy. *China Industrial Economics*, **08**: 99–117

Wang, H., J. C. Chen, L. Jiang and X. M. Jiang 2018 Research on the Economic Interpretation and Practical Modes of "Green Hills Are Just Golden Hills". *Forestry Economics*, **40**(1): 3–8+43

Wang, H., X. M. Jiang, J. C. Chen and W. M. Song 2017 A Theoretical Explanation for the Relationships between "Green Hills" and "Golden Hills". *Chinese Rural Economy*, **04**: 2–12

Wang, Y. F., W. Q. Tao 2021 Influence and effect of China's pilot low–carbon city initiative on urban green total factor productivity growth. *China Population, Resources and Environment*, **31**(6): 78–89

Xie, G. D., C. X. Zhang, C. S. Zhang, Y. Xiao and C. X. Lu 2015 The Value of Ecosystem Services in China. *Resources Science*, **37**(9): 1740–1746

Xie, G. D., C. X. Zhang, L. M. Zhang, W. H. Chen and S. M. Li 2015

Improvement of the Evaluation Method for Ecosystem Service Value Based on Per Unit Area. *Journal of Natural Resources*, **30**(8): 1243–1254

Xin, B. G., F. F. Gao 2021 Is the ecological civilization pilot reform conducive to the improvement of ecological total factor productivity? China Population, *Resources and Environment*, **31**(5): 152–162

Yang, S. Y., F. Wang and N. Liu 2020 Assessment of the Air Pollution Prevention and Control Action Plan in China: A Difference–in–Difference analysis. *China Population, Resources and Environment*, **30**(5): 110–117

Zhai, S. and J. H. Zhou 2017 Research on the Evaluation for the Practice of "Lucid Waters and Lush Mountains are Invaluable Assets" Development in Zhejiang. *Journal of Huzhou University*, **39**(9): 6–13

Zhang, J., Y. Zhang 2003 Recalculating the Capital of China and a Review of Li and Tang's Article. *Economic Research Journal*, **07**: 35–43

Zhang, X. Q., J. Y. Ji and X. Y. Gu 2021 Evaluation on Implementation "Two Mountains" Theory in Practice Innovation Base——A Case Study of Sihong County, Jiangsu Province. *Environmental Science and Management*, **46**(6): 180–184

Zhang, Y. Z., Y. H. Qiao 2021 Research on the Impact of Environmental Regulation on Green Total Factor Productivity in Manufacturing Industry: PSM–DID Test Based on Carbon Emission Trading Policy. *Ecological Economy*, **37**(4): 30–36

Zhang, Y., X. Li and Y. Song 2021 Can green industrial policy improve total factor productivity? Firm–level evidence from China. *Structural Change and Economic Dynamics*, **59**: 51–62