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Study of Financial Development Effects on Environmental Pollution

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Abstract

This paper analyzes the effect of financial development on environmental pollution through system GMM model. The results show that financial development can reduce environmental pollution, and is conducive to energy conservation and emission reduction. The results have important guiding significance for putting forward the corresponding policies reference to realize energy saving, emission reduction and green development.

Keywords

Environmental Pollution; Energy Footprint; Financial Development; System GMM.

1. Introduction

Since the reform and opening, China's economy has maintained rapid growth overall, but the traditional and extensive development model has caused serious waste of resources and environmental pollution. At the same time, as the core of the modern economy, finance plays a role in allocating funds, and provides support for the sustainable development of the Chinese economy and the construction of ecological civilization.

Some studies have shown that financial development is conducive to improving environmental pollution. Omri (2015) [1] and Dogan (2016) [2] are based on panel data from the Middle East and the European Union, respectively confirming that financial development can effectively improve environmental quality. Chinese scholar Zhou (2015) [3] took 23 countries as an example to conduct a two-way dynamic analysis of financial development and carbon emissions, and found that financial development is an important reason for carbon emission reduction, and carbon emissions have a restraining effect on financial development. The contribution of this paper is that we replace the environmental pollution index with the energy footprint index to make the study more reasonable and scientific.

2. Experimental Model Specification and Data

2.1. Datasets

This article selects the relevant data of 30 provinces in China from 2000 to 2017. The data comes from the "China Statistical Yearbook", "China Financial Statistics Yearbook" over the years. The dependent variable is energy footprint, and independent variable is financial development, and others are control variables.

The descriptive statistics were shown in Table 1, and the scattered plot of financial development and energy footprint was shown in Figure 1, which can be seen that financial development and energy footprint are linearly negatively correlated. Based on this, this paper sets up a series of linear model.

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Table 1. Descriptive statistics for variables

variables	explanation	Mean	Standard error	Min	Max
Energy Footprints ($lnEF$)	convert coal, oil, natural gas and electricity into energy footprint	8.36	0.87	5.02	10.20
Financial Development($lnFIN$)	(scale+structure+efficient)/3	0.33	0.06	0.20	0.50
Economic Development ($lnPGDP$)	GDP per capita	10.03	0.83	7.92	11.77
Industrial Structure ($lnIS$)	Industrial Output(% of GDP)	0.33	0.06	0.11	0.47
Technological Progress($lnRD$)	R&D Expenditure per capita	5.43	1.38	2.35	8.89
Trade Openness ($lnOPEN$)	Trade Openness (% of GDP)	0.24	0.24	0.01	1.00
Energy Structure ($lnES$)	Coal Consumption (% of total energy consumption)	0.51	0.15	0.05	0.93
Permanent Population($lnPOP$)	the permanent population of the region	8.16	0.76	6.25	9.32
Foreign Direct Investment($lnFDI$)	Foreign Direct Investment (% of GDP)	0.32	0.27	0.03	1.90

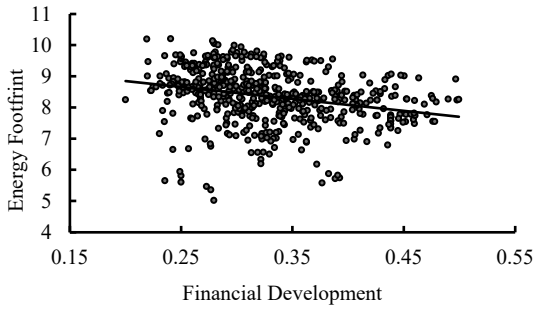

Figure 1. Scatter plot

2.2. Model Specification

This paper sets up the effect equation of financial development on energy footprint

$$lnEF_{it} = c_1 + lnEF_{(-1)} + \theta_1 lnFIN_{it} + \theta_2 x_{it} + \mu_{it} \quad (1)$$

Here, i and t represent cross section and time period respectively, x_{it} represents the control variables. c is the constant of equation. μ represents the random error, θ represents the influence coefficient.

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3. Results and Discussion

The system GMM method is used to perform regression analysis, see Table 2.

Table 2. Regression results

Variables	*lnEF*	*lnEF*	*lnEF*	*lnEF*
	(1)Nationwide	(2)east	(3)Central	(4)west
lnEF (-1)	0.89***	0.92***	0.91***	0.81***
	(35.70)	(34.36)	(36.89)	(9.29)
lnFIN	-0.25**	-0.25*	-0.18*	-0.17*
	(-2.47)	(-1.74)	(-1.69)	(-1.69)
C	-0.54	-0.63	-0.64	0.17
	(-1.35)	(-1.15)	(-1.33)	(0.43)
Control variable	Yes	Yes	Yes	Yes
Fixed area	Yes	Yes	Yes	Yes
AR(2) test P value	0.38	0.29	0.11	0.83
Hansen test	1	1	1	1
Observations	540	198	144	198

Table. 2 shows the coefficient of financial development on energy footprint. The line (1) to line (4) reflects the coefficients of different regions, respectively representing the whole country, eastern, middle and west areas. Judging from the regression results, financial development can directly reduce the energy footprint and promote energy conservation and emission reduction. The coefficient of the impact of financial development on the energy footprint is -0.248, which indicates that an increase in the level of financial development by 1% will reduce the energy footprint by 0.248%. From a regional perspective, the influence coefficients of financial development in the eastern, central and western regions on the energy footprint are -0.254, -0.184, and -0.167, which indicates that regional financial development is also conducive to the realization of energy conservation and emission reduction. However, there are obvious regional differences in its impact effect, with the highest is in the eastern area, the second is in the middle area, and the lowest in the west area. This article believes that this is because after adding other variables, the financial development in the eastern region has better social and environmental conditions to promote the effect of energy conservation and emission reduction, and is more conducive to the energy conservation and emission reduction effect of financial development. The social and environmental conditions in western region are relatively poor, which weakens the energy-saving and emission-reduction effects of financial development.

4. Conclusions and Policy Implications

The results showed that: (1) Financial development was beneficial to the improvement of environmental pollution. (2) By grouping the samples by regions, it could be found that the impact of financial development on environmental quality varies according to different regions. The eastern region had the largest emission reduction effect of financial development, followed by central and western regions.

Therefore, measures can be taken to: encourage asset management institutions to develop a more diverse range of green and sustainable investments, promote green innovation of

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financial products, promote green development of finance, and encourage institutional investors to invest in green indexes; Bank credit should favor green and low-carbon economy, increase support for environmentally friendly and resource-conserving enterprises, and use financial support to accelerate structural adjustment and upgrading.

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