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Study On The Economic and Environmental Impact Of The Polluting Industry Transfer

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Abstract: At the beginning of the 21st century, the trend of provincial industrial transfer became more evident. The transfer of industry will have a degree of impact on the economy and environment of the transfer-in-land and transfer-out-land. This paper uses the data of 10 polluting industries and 30 provinces in China from 2007 to 2014, as well as the industrial competitiveness model to calculate the transfer of polluting industries in China, which chooses OLS and the Tobit model to examine the effect of pollution industry transfer. The study found that: (1)The development of polluting industries has a positive effect on the economy. (2)The environmental impact is related to the type of pollutant: the industrial solid waste Environment Kuznets Curve is inverted U. The Kuznets Curve of sulfur dioxide is u-shaped. There is no Environmental Kuznets Curve for industrial waste water and industrial exhaust.

Introduction

Since 2000, the international and domestic business environment has changed dramatically. The development of coastal cities has been restricted by the lack of natural resources and the increase of factor costs [1]. Some traditional industries have encountered challenges. At the same time, with the advantage of low labor cost, adequate raw materials and various kinds of preferential policies, the less developed areas have become more attractive to the traditional industries. With the market and government policy jointly exerting force and adjusting the industrial structure, those industries at the bottom of the industrial chain will be transferred to the central and western regions whose economy is less developed [2, 3].

The government needs to take a more holistic view and take a more cautious approach when it comes to polluting industries transfer. At the same time, consideration and evaluation from more levels are needed, so it is urgent to study the effect of pollution industries transfer. This paper studies the effect of pollution industries transfer from two perspectives: economy and environment.

Measurement of pollution industries transfer

Due to the diversity of resources, regional advantages, economic development and environmental regulations, some industries have achieved the rearrangement of the industrial space either passive or actively implementing. In 2006, the state council issued 《The first national survey of pollution sources》, which stipulates 11 heavy pollution industries. Considering the availability of data, this paper mainly studies 10 heavy polluting industries except the Manufacturing of leather, fur and feathers (velvet) and their products.

Pollution industry transfer measurement model

In this paper, the measurement is expected to reflect the industry relative changes, so the industry competitiveness factor model has been selected [4,5,6]. This model calculates the change of industrial competitiveness which reflects the relative change and excludes the change caused by the own development pollution industries. The trend and characteristics of industrial transfer are measured by calculating the change of industrial competitiveness coefficient of each province.

The assumptions of the model construction include: (1)The quality of consumer goods is only reflected in price and output value. (2) Total output equals total demand. (3)There is no import and export. (4) The per capita consumption structure and consumption level across the country.

$$IC_{ij}=\frac{(Y_{ij}-q_i)L_j}{\sum_{j=1}^{31}Q_{ij}}=\left(\frac{Q_{ij}}{L_j}-\frac{\sum_{j=1}^{31}Q_{ij}}{\sum_{j=1}^{31}L_j}\right)\frac{L_j}{\sum_{j=1}^{31}Q_{ij}}. \quad (1\text{-}1)$$

The IC_{ij} is the industry competitiveness coefficient of i industry in j region; Q_{ij} represents the output of the i industry in j region; L_j is the population of the j region; $Y_{ij}=\frac{Q_{ij}}{L_j}$ represents the per capita output of the i industry in j region; $q_i=\frac{\sum_{j=1}^{31}Q_{ij}}{\sum_{j=1}^{31}L_j}$ represents the demand per capita of the i industry.

The calculation results of polluting industries transfer

According to the model 1-1, the competitiveness coefficient of each province's pollution industry is shown in the following table:

Table 1The competitiveness coefficient of polluting industries in provinces (except Tibet) from 2007 to 2014

Year / Region	2007	2008	2009	2010	2011	2012	2013	2014
Beijing.	0.005497	0.003027	0.001355	0.000799	-0.002060	-0.001930	-0.002100	-0.002140
Tianjin.	0.012093	0.011902	0.012074	0.012160	0.013226	0.012860	0.012328	0.011862
Hebei.	0.007893	0.011049	0.008355	0.006373	0.008211	0.005741	0.002362	-0.000190
Shanxi.	-0.001060	-0.002410	-0.006940	-0.007760	-0.007840	-0.006400	-0.010490	-0.012170
Inner Mongolia	0.001756	0.004470	0.007490	0.005974	0.007381	0.007646	0.006328	0.004131
Liaoning	0.018627	0.021208	0.023361	0.023954	0.020988	0.025540	0.023280	0.017220
Jilin	-0.007370	-0.005480	-0.004810	-0.004330	-0.002600	-0.001120	-0.001090	-0.001370
Heilongjiang	-0.014720	-0.015190	-0.014010	-0.013640	-0.013470	-0.012970	-0.012290	-0.013290
Shanghai	0.020863	0.018407	0.012570	0.012230	0.008632	0.005434	0.002739	0.000846
Jiangsu	0.063955	0.062219	0.060291	0.056652	0.049993	0.051842	0.052480	0.052068
Zhejiang	0.037677	0.031710	0.028137	0.026135	0.022001	0.017618	0.016508	0.015586
Anhui	-0.026080	-0.022580	-0.020880	-0.017340	-0.014150	-0.014110	-0.013250	-0.012820
Fujian	-0.001130	-0.001990	-0.000630	0.000499	0.001823	0.001888	0.002740	0.006211
Jiangxi	-0.012890	-0.010780	-0.009920	-0.006590	-0.005380	-0.005250	-0.003840	-0.001400
Shandong	0.071013	0.071824	0.078934	0.067546	0.065646	0.070499	0.073814	0.076977
Henan	-0.005930	-0.006710	-0.008530	-0.008050	-0.002830	-0.003930	-0.002090	0.001896
Hubei	-0.017730	-0.013830	-0.011080	-0.008480	-0.005710	-0.002260	-0.001470	-0.000370
Hunan	-0.022160	-0.020650	-0.019610	-0.018000	-0.014380	-0.015710	-0.015230	-0.015420
Guangdong	0.012441	0.007419	0.004132	0.003246	-0.003810	-0.010630	-0.008540	-0.008480
Guangxi	-0.021400	-0.020900	-0.020880	-0.017510	-0.015960	-0.013860	-0.013450	-0.012720
Hainan	-0.002720	-0.002990	-0.003300	-0.003370	-0.003580	-0.003540	-0.004020	-0.003700
Chongqing	-0.013320	-0.012720	-0.012400	-0.011640	-0.011520	-0.012030	-0.011680	-0.010960
Sichuan	-0.033080	-0.032630	-0.028490	-0.026710	-0.024880	-0.028840	-0.028140	-0.028670
Guizhou	-0.019460	-0.019670	-0.018980	-0.018870	-0.018560	-0.018170	-0.017470	-0.016700
Yunnan	-0.020060	-0.021370	-0.022330	-0.022030	-0.022210	-0.021940	-0.021860	-0.022100
Shanxi	-0.015730	-0.015260	-0.014450	-0.013230	-0.012040	-0.010380	-0.010380	-0.009640
Gansu	-0.005980	-0.007390	-0.008080	-0.008090	-0.007620	-0.007840	-0.007680	-0.007610
Qinghai	-0.001650	-0.001380	-0.001360	-0.001100	-0.000990	-0.000900	-0.000900	-0.000670
Ningxia	-0.000450	-0.000590	-0.000740	-0.000440	-0.000240	0.000527	0.000804	0.000600
Xinjiang	-0.006770	-0.006570	-0.007130	-0.006220	-0.005890	-0.005600	-0.005210	-0.004730

The following conclusions can be drawn from the above estimates:

(1) In the current stage, there is a transfer of industries in China, but relatively few provinces are transferring the polluting industries out, and most of the provinces are engaged in polluting industries.

(2) The polluting industries in China is transferred from the eastern region to the central and western regions.

(3) The transfer of pollution industry has experienced different stages, first from the east to the central, and then to the west.

(4)The transfer of polluting industry in China is decentralized. In the process of transferring polluting industries from the east to the outside, there is more than one province to transfer polluting industries out, and the provinces who undertake polluting industries are not concentrated in a few provinces.

(5) Transfer of polluting industries in China also shows the characteristics of incomplete. Although the polluting industries in China began to transfer, most of polluting industries still mainly developed in the east in 2014, and the competitiveness of polluting industries central and western regions is weak.

Empirical study on the economic effect and environmental effect of pollution industry transfer

Hypothesis of economic effect and environmental effect of pollution industry transfer

Economic effect hypothesis of pollution industry transfer

With the transfer of polluting industries, the scale of the corresponding industries will be further expanded, which will not only enable the enterprises who transferred in to realize the economies of scale, but also further promote the concentration of factors, As a result, the factors and products will be more abundant, the cost of elements will be reduced and new industries will enter. The newly transferred industries tend to have higher technical levels relative to those in receiving area, which will lead to the spillover effect of technology. This technology spillover is not limited to the transferred-in industries, but also overflows to the related industries, which promotes the local economic production efficiency and economic growth.

In this paper, the development of polluting industries indicates the transfer of pollution industry. Therefore, this paper makes the following assumptions:

H_1: the development of pollution industries promotes the development of economic.

Environmental effect hypothesis of pollution industry transfer

According to the pollution paradise hypothesis, as the polluting industry moving, the contaminant is transferred from the transferred-out areas to the i transferred-in areas, which makes the polluting industry acceptance zone a "polluted paradise". According to the Kuznets Curve, leveraging the polluting industries to develop the economy will worsen the environment, and the environmental pollution problem will be alleviated after the economy has developed to a certain level. In addition, according to the negative externalities of the environment, the development of industry will cause environmental pollution, but with the transferring of polluting industries, the spillover effects of pollution treatment technologies and the scale effect of centralized pollution control will be beneficial to alleviating environmental problems. Due to the fact that this article has only studied the circumstances from 2007 to 2014, and based on the circumstance of these pollution emissions, it is preliminary to determine that the development of the current polluting industry has been largely a negative impact on the environment. The main pollutants studied in this paper include industrial wastewater, industrial solid waste, industrial waste gas and sulfur dioxide. The polluting industries have the same effect on them, so here's the following assumption:

H_2: The development of polluting industries has resulted in an increase in industrial waste water emissions.

H_3: the development of polluting industries has resulted in an increase in industrial solid waste emissions.

H_4: the development of polluting industries has resulted in an increase in industrial waste gas emissions.

H_5: the development of polluting industries has resulted in an increase in sulfur dioxide emissions.

The empirical research on the economic effect of pollution industries transfer

Variable selection and data source

Economic development is influenced by many factors. This paper takes the development of pollution industry as the main research variable and studies its influence on economic development. This is the basis for the selection of variables, explanatory variables and corresponding control variables. In this paper, the per capita GDP in the corresponding period of each provinces is selected as the explanatory variable, which reflects the level of economic change in the region.

The results of explanatory variables and control variables include: pollution industry transfer, capital, human capital stock, trade openness, research and development strength and other non-polluting industries. The data used in this section is from the 《China Statistical Yearbook》(2007-2015), the Provincial Statistical Yearbook and EPS database.

Model Establishment

In order to verify the effect of industrial transfer on economy, the corresponding control variables that have an impact on the economy are selected. The model is built as follows:

$$Y_{i,t}=\alpha_0+\alpha_1 R_{i,t}+\alpha_2 K_{i,t}+\alpha_3 HL_{i,t}+\alpha_4 MY_{i,t}+\alpha_5 QT_{i,t}+\alpha_6 A_{i,t}+\mu_{i,t} \quad (2\text{-}1)$$

i represents a region, t represents a period. $Y_{i,t}$ is the explanatory variable, indicating the level of regional economic development. $R_{i,t}$ is the main explanatory variable, representing industry transfer. $K_{i,t}$, $HL_{i,t}$, $MY_{i,t}$, $QT_{i,t}$, $A_{i,t}$ are the control variables, respectively representing the capital, human capital stock, trade openness, other non-polluting industries and R&D intensity. α_0 is a constant term, α_i is the regression coefficient, $\mu_{i,t}$ is the disturbance term.

Analysis of the economic effect of pollution industry transfer

In this article, the panel data is used to make a regression by Eviews8 software. Firstly, the unit root is tested, and because all variables are stationary and had long-term co-integration relationship, the fixed effect model was selected through Hausman test. The regression results are as follows:

Table 2 The regression results of pollution industries transfer economic effect

Variables	Coefficient	Standard deviation	T-value
C	-0.186	0.041773	-4.452522***
R	5.338952	1.087682	4.908557***
K	0.232946	0.045273	5.145403***
Hl	0.54567	0.207668	2.627608***
MY	-0.39247	0.26992	-1.454017
QT	0.130914	0.02103	6.225045***
A	0.304859	0.028753	10.6025***
Adjusted R^2	0.939379		
F-statistic	106.815		

Note: *、**、*** respectively represents that the result is significant under 10%,5%,1% level.

According to table 2, the corresponding t-value of the pollution industry's competitiveness coefficient is positive and significant at the 1% level, which validates the hypothesis H_1: the polluting industries have a promoting effect on the economy. It promotes the economic development of transfer-in zone to undertake the relevant industries. At the same time, the economic development of transfer-out zone will be damaged due to the transferring out of related industries.

According to the control variable reaction, capital accumulation, human capital stock, other non-polluting industries and research and development strength had a promoting effect to the economy, while the effect of trade openness on economic was uncertain.

Robustness test of the economic effect of pollution industries transfer

In order to further enhance the reliability of the regression results, the proportion of the output value of the pollution industries in each province to national pollution industry output value is used to as a substitute for the competitiveness of polluting industries for robustness testing[5,9]. The test results are as follows:

Table 3 The results of the robustness test of the economic effect of pollution industries transfer

Variables	Coefficient	Standard deviation	T-value
C	-0.23769	0.064157	-3.704853***
R	0.24589	0.050595	4.859991***
K	0.274513	0.051983	5.280863***
Hl	-0.33148	0.202931	-1.63346
MY	0.325801	0.267169	1.219455
QT	0.108476	0.011859	9.147073***
A	0.349092	0.026981	12.93866***
Adjusted R2	0.750172		
f-statistic	120.6097		

The empirical research on the environmental effect of pollution industries transfer

Variable selection and data source

To study the environmental effects of polluting industries, four kinds of pollutants are selected as environmental indicators, including industrial wastewater, industrial solid waste, industrial waste gases, sulfur dioxide.

The emission of pollutants is affected by a variety of factors. the indicators selected in this paper include: pollution levels, economic development level, pollution industry transfer, human capital stock, trade openness, the industrial structure, the level of science and technology, regional population factors and environmental governance level. All the data used in this section is from the 《China Statistical Yearbook》 (2007-2015), the Provincial Statistical Yearbook and EPS database.

Model establishment

According to environmental Kuznets Curve theory, there are a variety of relationship between the economic growth and pollutant emission, The environmental Kuznets Curve can be shaped like N, inverted-N, U, inverted-U, linear and so on[7-10]. The environmental pollutant emission is affected by many factors, so the model is as follows:

$$Q_{i,t}=C+\gamma_1 gdp_{i,t}+\gamma_2 gdp_{i,t}^2+\gamma_3 gdp_{i,t}^3+\gamma_4 R_{i,t}+\gamma_5 ZB_{i,t}+\gamma_6 MY_{i,t}+\gamma_7 JG_{i,t}+\gamma_8 KJ_{i,t}+\gamma_9 RK_{i,t}+\gamma_{10} ZL_{i,t}+\varepsilon_{i,t} \quad (2\text{-}2)$$

i represents the regions, and t represents the year. Q is explained variable which stands for pollution levels. Per capita GDP（gdp）is selected as a variable, and the second and third item of the level of economic development are added. The economic development level and the industrial transfer situation are the main explanatory variables, The industrial transfer is represented by $R_{i,t}$. ZB, MY, JG, KJ, RK, ZL are the control variables, among which ZB represents the capital intensity, MY represents the trade level, JG represents the industrial structure, KJ represents the technology level, RK represents the regional population factor, ZL represents the level of environmental governance. $\varepsilon_{i,t}$ is the disturbance term.

Analysis of environmental effect of pollution industries transfer

Using data from 30 provinces, cities and autonomous regions of China from 2007 to 2014, the relationship between the four types of pollutant emission indicators and economic growth and the development of polluting industries were examined. The data is stable, and the variables have a co-integration relationship. The results of regression test are as follows:

Table 4 Results of environmental Kuznets Curve and environmental effect of polluting industries transfer

Explained variable / Explanatory variables	The proportion of industrial solid waste to that in China	The proportion of industrial waste water to that in China	The proportion of industrial waste gas to that in China	The proportion of sulfur dioxide to that in China
C	0.034919*** （3.655756）	0.721743*** （3.976403）	0.001255 （0.9153）	0.050644*** (9.568227)
gdp	0.03713*** （3.143083）	0.192917 （1.350791）	-0.005672 （ -0.49094 ）	-0.007873 (-1.202682)
gdp^2	-0.025462** （ 2.17873）	NA	NA	0.010824* (1.671432)
gdp^3	NA	NA	NA	NA
R	-0.309881** （ -2.434302）	4.609727* （1.803614）	0.267713** （2.160258）	0.048867 (0.692754)
ZB	-0.036135 （ -1.625155）	0.12468 （0.282371）	0.073005*** （3.755718）	0.046392*** (3.76531)
MY	-0.036506 （ -1.20496）	-2.770522 （ -4.726477）	-0.080469** （-1.86813）	0.000508 (0.030246)
JG	0.007888 （ 0.480741）	-1.15854*** （ -3.486019）	0.050949** （2.094493）	-0.0359*** (-3.948528)
KJ	-0.00806** （ -2.097866）	0.183142** （2.368244）	-0.003907 （ -0.66319）	-0.007891*** (-3.706191)
RK	-0.001871 （ -0.16646）	-0.523897*** （ -2.809931）	0.005213 （1.0039）	-0.019254*** (-3.091348)
ZL	0.02335*** （2.679513）	-0.377617** （ -2.140373）	0.014925 （0.930221）	0.023817*** (4.93209)
Adjusted R^2	0.961928	0.474147	0.49862	0.975897
F-statistics	159.9097	4.922641	23.42247	255.6512
Observations	240	240	240	240
Model type	Fixed Effect	Fixed Effect	Random Effect	Fixed Effect

Note: It's the value of t-value in brackets, *、**、*** respectively represents that the result is significant under 10%,5%,1% level.

According to the test results, the environment Kuznets Curve of industrial solid waste shows inverted-U type, which means the solid waste discharge increases with the economic development firstly, and then starts to decrease after the inflection point reached a turning point. The SO^2 environment Kuznets Curve shows a u-shaped type. As the economy develops, and sulfur dioxide emissions are gradually reduced before the turning point. The environmental Kuznets Curves of industrial waste water and industrial waste gas do not exist, and the test results are not significant. Therefore, the economic development has no obvious impact on industrial waste water and waste gas emissions.

The effect on industrial wastewater and industrial waste gas of polluting industries transfer is clearly positive, which is consistent with H_2 and H_4 hypothesis. The development of polluting industries has resulted in an increase in industrial waste water and industrial waste gas emissions. With the polluting industry transferring out, the emissions of industrial waste water and gas will be reduced. The relationship between the emissions of sulfur dioxide and the development of polluting industries has failed to pass the test, but its symbol still proves that the development of polluting industries will lead to the increase of sulfur dioxide emissions. The emission of industrial solid waste has been significantly tested, but the result is contrary to hypothesis H_3.

the robustness test of the environmental effect of pollution industry

In order to further enhance the reliability of the regression results, the proportion of the output value of the pollution industries in each province to national pollution industry output value is used to as a substitute for the competitiveness of polluting industries for robustness testing[5,9]. The test results are as follows:

Table 5 The robustness test results of the environmental effect of pollution industry

Explained variable / Explanatory variables	The proportion of industrial solid waste to that in China	The proportion of industrial waste water to that in China	The proportion of industrial waste gas to that in China	The proportion of sulfur dioxide to that in China
C	0.044934*** (4.834391)	0.5683*** (3.179902)	-0.000695 (-0.0641)	0.048524*** (9.493698)
gdp	0.034521*** (2.937617)	0.201937 (1.420764)	-0.002035 (-0.17928)	-0.008473 (-1.31123)
gdp^2	-0.02389** (-2.041421)	NA	NA	0.010971* (1.704787)
gdp^3	NA	NA	NA	NA
R	-0.262332** (-1.921021)	4.663601* (1.701796)	0.343861*** (3.117923)	0.0882 (1.174527)
ZB	-0.038352* (-1.719046)	0.149423 (0.339345)	0.034046 (1.425222)	0.045798*** (3.73297)
MY	-0.036048 (-1.182744)	-2.771271*** (-4.721912)	-0.085626** (-2.024154)	-0.0000179 (-0.001066)
JG	0.004496 (0.272932)	-1.143416*** (-3.441903)	0.044696* (1.873997)	-0.037595*** (-4.149932)
KJ	-0.007346** (-1.911531)	0.177776** (2.312575)	-0.002759 (-0.470761)	-0.007626*** (-3.608644)
RK	-0.000389 (-0.034517)	-0.549326*** (-2.988303)	0.004032 (0.795235)	-0.01909*** (-3.084053)
ZL	0.023447*** (2.668026)	-0.384215** (-2.169416)	0.016729 (1.048693)	0.023447*** (4.851873)
Adjusted R^2	0.961512	0.474147	0.53459	0.979819
F-statistics	158.125	4.922641	6.270065	256.8163
Observations	240	240	240	240
Model type	Fixed Effect	Fixed Effect	Random Effect	Fixed Effect

Note: It's the value of t-value in brackets, *、**、*** respectively represents that the result is significant under 10%,5%,1% level.

Comparing table 4 with table 5, the symbol and significance of data tend to be consistent, so it is considered that the result is reliable.

conclusions and policy recommendations

Through the industrial competitiveness coefficient model and the Tobit regression model, the effect on economy and environment of interprovincial pollution industry transfer in China has been studied. It has been found that the pollution industries have transferred from the east to the central and western regions. The transfer of polluting industries is decentralized and incomplete. As pollution industries become more competitive, it is playing a more important role in promoting the economic development, which means that the transferring-in of pollution industries will benefit the economy while it will damage the economy development to transfer polluting industries out.

The shape of the environmental Kuznets Curve is different for different pollutants: the environmental Kuznets Curve of industrial solid waste is inverted U-type, the environmental Kuznets Curve of sulfur dioxide is U-type, while the environmental Kuznets Curves of industrial waste water and gas do not exist. Namely, the development of pollution industries increases the discharge of industrial waste water and industrial waste gas, and reduces the emission of industrial solid waste. The impact on sulfur dioxide emissions of the development of polluting industries is uncertain. Therefore, the development of polluting industries does not necessarily lead to an increase in pollutant emissions. The transfer of interprovincial industry is conducive to economic transformation and upgrading in more-developed regions. This will divert resources from polluting industries to higher-value, cleaner industries. On the one hand, the economically underdeveloped areas which undertook the pollution industries can fulfill their environmental obligations (the domestic consumption of polluting industrial products should be borne by the local people), on the other hand, the economic forces brought by the polluting industries will drive the development of other industries.

But because the current industrial transfer in China is still a short-term effect, it has not been a win-win situation for the economy and the environment. China adheres to the path of sustainable development, so it cannot blindly pursue economic output and neglect its impact on the environment. At the same time, it’s necessary to attach importance to economic development. In view of this, the main recommendations of this paper are as follows:

(1) Each of the provinces should transfer the polluting industries out step by step according to the conditions of the region. With the pollution industry transferring out, the government should also actively promote the transformation and upgrade of industries, plan the industry layout reasonably, shorten the time of idle resources and adjust the resource utilization way, so that the optimal allocation of resources can be realized at an earl time.

(2) Because of the negative externality of the environment, the Chinese government needs to take action from the perspective of the whole, to set up policies on environmental protection and industrial transfer on the basis of market forces, to improve the efficiency of investment in pollution control and education and allocate funds reasonably.

(3) The corresponding environmental regulation policy must be formulated according to the environmental bearing capacity of the province. The supervision and management of pollution industries’ development must be strengthened at the same time. This will prevent the pollution

industry from overextending and limit the development of polluting industries to the extent that the environment can bear.

(4) The key to reducing pollutant emissions is the focus and call at the national level and the implementation of policies at the provincial level. The measures taken by the provinces in which the discharge of pollutants has been reduced should be summarized and promoted from the height of the policy.

(5) The central and western regions should learn from the practice of developed provinces, to promote the practice of centralized pollution controlling and control the discharge of pollutants within a reasonable range.

(6) Local government should strengthen publicity to guide the public and entrepreneurs to focus on environmental pollution problems and strive to make breakthroughs in the field of pollution control. For those who have made outstanding contributions, the government should give corresponding incentives to increase innovation and entrepreneurship.

(7) Environmental regulation should gradually cover different regions. Only under the similar environmental regulations, the transfer of the industries will not be to avoid the environment regulation, but to upgrade and develop better. This will force the enterprises to carry on the transformation and upgrading and make them update the technology and promote cleaner production.

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