

The relationship between environmental regulation and labor force employment

-- Based on provincial panel data from 2010-2019

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Abstract

Lucid waters and green mountains are gold and silver mountains, and employment is the foundation of people's livelihood. Protecting the environment and promoting the employment are the important subjects of China's economic and social development. Based on the theoretical and empirical evidence, this paper finds through the provincial panel data from 2010 to 2019 that environmental regulation generally promotes employment by affecting GDP, but environmental regulation in northeast China has a negative effect on employment. Therefore, China should find the balance between the intensity of environmental regulation and economic growth, so as to protect the environment and improve people's livelihood.

Keywords

Labor force employment; economic growth; environmental regulation.

1. Introduction

After the two sessions in 2021, carbon neutrality has become a hot concept in China's economic development. Since the reform and opening up, China's economy has developed rapidly, but it is the rugged development that has also sacrificed the environment. With the flattening of economic development, China has put forward the development concept of "clear waters and green mountains are golden mountains of gold and silver mountains". Governments at all levels have adopted imperative or incentive environmental regulation means to promote the balanced development of economy and environment from different perspectives and achieved excellent results.

Over the past 40 years of reform and opening up, China's legislation on the ecological environment has been continuously improved. So far, 11 environmental protection laws, 20 laws on resource protection, 40 administrative regulations on environmental protection, and hundreds of regulations by environmental protection departments. Relevant local people's congresses and governments have formulated more than 1,000 local environmental protection regulations and regulations. However, due to the short time of legal practice, the cooperation effect of some government departments is not good, and the legal implementation is difficult to achieve results. Under the more stringent legal provisions, there is no effective legal supervision, resulting in some enterprises "have policies and countermeasures at the top", and ignore the harm of their behavior to the environment when improving their own economic benefits.

Employment is fundamental to people's livelihood. To enable people to live a better life, we need to ensure full employment and steadily increase the income of workers. However, the high intensity of environmental regulation may lead to the relocation of enterprises or even direct

closure, which will affect employment to a certain extent. Especially after the environment is included in the scope of performance assessment, some governments may directly adopt a one-size-fits-all approach to restrict some enterprises for the sake of local environmental performance, resulting in a large number of people unemployment. Therefore, how to do a good job in environmental protection, economic growth and improve people's livelihood is a difficult problem for the Chinese government to consider.

2. Relevant concepts and a literature review

2.1. Theoretical research on employment

2.1.1. Concept

Employment refers to the production and service activities within the legal age, namely the workers over the age of 16, in order to obtain certain remuneration. The employment theory of western economics was laid down in the capitalist market, The early belief that the market had an "invisible hand" came from regulating the supply and demand of the job market, So unemployment is only a temporary phenomenon; After the great economic crisis of the 1930s confirmed the failure of Say's Law, Keynes's theory of non-full employment began to become mainstream, Believe that the "visible hand" of the government needs to regulate, Use of monetary and fiscal policies to address economic problems, But the structural problems of employment are still not considered; The new Keynesian theory corrects for this aspect, More thinking about the supply level; With the further development of the theory, Mortenson recognizes that the issue of supply matching in an informative job market is key to frictional unemployment, He built experience-oriented matching functions by gathering information on the labour market, Also studying the salary decision mechanism, To alize the level of unemployment. However, these theoretical studies do not consider the subdivision of specific countries, specific economic scale and national system, but generally explore the western capitalist countries, so they have great defects. With the further of development economics theory, scholars began to study the employment problem of developing countries, the segmentation theory emphasizes the different wage level market unemployment will lead to higher level of labor to flow to a lower level of the market, and the lower level of market labor because do not have related ability to flow to a higher level, so the theory is more focused on the segmentation of the market structure difference and wage difference of decisive factors research, emphasis on investment in education, and the adjustment of industrial structure upgrade.

2.1.2. Research on the factors affecting employment

Economic growth affects employment

Oken once argued that economic growth would affect employment, meaning that every 2% increase in GDP reduces unemployment by 1%, thus clarifying the stable relationship between economic growth and employment. However, in the study of Chinese scholars, this relationship is not completely consistent. Gong Yuquan (2002) found that when the economic growth rate rises, the quality effect of employment growth is greater than the quantity effect, thus the employment growth and economic growth. When economic growth slows down, the increase of unemployment will lead to the downward rigidity of the urban registered unemployment rate. CAI Fang (2004) found that the effect of employment growth driven by government-led investment is not significant, while the economic growth, counter-cyclical macroeconomic policies are powerless to solve natural unemployment; secondly, the countercyclical macroeconomic policies guide the investment direction to industries with low employment intensity, thus reducing the ability of counter-cyclical measures to promote employment. Zhang Chewei (2009) used macro statistics to analyze the employment effect of economic growth in stages. The results showed that China's economic growth has significantly promoted the

increase of non-agricultural employment, and there is a high correlation between economic growth and employment.

Capital investment affects employment

The impact of capital investment on employment varies depending on the type of investment. For example, capital investment can be divided into government financial input and foreign investment. CAI Fang (2004) found that FDI plays a positive role in the development of China's labor market and the cultivation of workers' human capital. Lu Shuoyu (2018) analyzed the impact of FDI on the total volume and structure of the employment in China. The results found that FDI promoted the improvement of the number of employment in China to a certain extent, and at the same time also played a crucial role in the upgrading of China's industrial structure. Wang Jian (2005) through the measurement analysis of the annual data between 1983 and 2002 found that FDI not only had a positive direct pulling effect on China's employment, but also had a negative indirect inhibitory effect on domestic employment by crowding out domestic investment and improving productivity level. Every 1 percentage point increase in FDI growth will directly lead to 0.052 percentage points of employment growth, while indirectly reducing employment opportunities by 0 percentage point, thus leading to a 0 percentage point increase in real employment growth. Based on the panel data from 1990 to 2012, Liu Zhenghua found that FDI had a direct pulling effect on the employment in eastern, central and western China, and showed a trend of decreasing from east to west. In the study of FDI, Pan Wenyong (2022) found that FDI will reduce the level and scale of informal employment by reducing the industry concentration, and reduce the negative effect of domestic informal employment; and FDI has the substitution effect on the labor force, and then inhibit the level and scale of informal employment.

Jia Jingquan (2021) constructed the structural equation model by using the provincial panel data, The results show that fiscal policy can have a direct impact on employment levels, It can also have indirect effects on the employment level through intermediate variables; In the direct effect, The scale of fiscal expenditure has a positive impact on the employment level, The macro tax burden has a certain degree of negative impact on the employment level; In the indirect effects, The scale of fiscal expenditure and the macro tax burden can both affect the employment level through household consumption, economic growth and industrial structure upgrading, Moreover, the impact of the macro tax burden on the employment level through the intermediate variables is greater than the impact of the fiscal expenditure scale on the employment level through the intermediate variables. According to the analysis of intermediary effects, Mou Junlin found that the expansionary fiscal policy to increase the fiscal deficit can promote employment growth through consumption, investment (especially private investment) and economic growth path. Using the structural vector autoregression model, Guo Xinqiang found that the expansionary fiscal expenditure policy can stimulate employment, but the effectiveness of employment depends on the structural bias of the government expenditure. The increase of investment expenditure will stimulate employment and the productive expenditure of the government can influence the productivity, investment liquidity constraint and price stickiness. When the government increases the employment revenue, the actual employment level will increase, otherwise the social employment pressure will be formed.

Technological progress affects employment

Technological progress is the source of economic development, but the impact of technological progress on employment has never been conclusive. Cui Youping based on the DEA-Malmquist productivity index, empirical measure the 1995~2013 China 29 provinces (municipalities directly under the central government, autonomous regions) of total factor productivity (TFP) and technological progress, technical efficiency index, total factor productivity and technological progress on the role of employment is negative, but the influence of technical efficiency for employment is not significant. In the context of the new normal of economy, we

should be based on the upgrading of industrial structure and take technological progress as the driving force, improve the efficiency of transforming scientific research results into output, and create opportunities for the increase of employment from the perspective of supply and demand. Zhao Li (2010) found that there is a long-term balance between China's technological progress and employment. The influence of technological progress on China's employment has a lag and a great elasticity. In the long term, technological progress can promote employment, but in the short term, technological progress has a destructive effect on employment. There is a great fluctuation in the relationship between technological progress and employment, which may be because with the reform and opening up, the adjustment of industry structure has an impact on employment, and the contribution rate of this impact to employment change may be higher than that of technological progress in the early stage.

Luo Zhi (2012) calculated the rate of technological progress in various industries based on the panel data and sequence DEA method of 22 provinces in China from 2000 to 2007. The research results show that the influence of technological progress on employment is completely different in different industries; the overall impact of export through technological progress and output on employment is significantly positive, and the overall impact of import is negative, but the size and direction of the net effect of trade on employment in different industries are affected by the speed of technological progress. Luo Jun (2014) believes that no matter the industries with high degree of R & D investment or the industries with low degree of R & D investment, technological progress will promote the employment of labor force, and the driving effect of the industries with high degree of R & D investment and technological progress on employment is greater than the industries with low degree of R & D investment.

2.1.3. The theory of environmental regulation

Environmental Kuznets curve

Kuznets curve is the earliest famous American economist kuznets in 1955 proposed income distribution changes with the economic development process and the curve, at the beginning of the economic development process, especially in the national per capita income rose from the lowest to medium level, income distribution tend to deteriorate, and then with the economic development, gradually improve, finally achieve more fair income distribution, reversed the shape of the U. The Y axis represents the Gini coefficient or distribution status, and the X axis is the time or income status. Later scholars use the Kuznets curve to explain the relationship between environment and economy, which means that when a country's economic development level is low, the degree of environmental pollution is relatively light, but with the increase of per capita income, environmental pollution increases from low to higher, and the degree of environmental deterioration increases with the economic growth; when the economic development reaches a certain level, that is to say, after reaching a certain critical point or "inflection point", with the further increase of per capita income, environmental pollution decreases from high to low, the degree of environmental pollution gradually slows down, and the environmental quality is gradually improved. However, the environmental Kuznets curve is only a generalization of the environment-income relationship, and the complexity and dynamics of reality will constantly break its evolution path, and new problems make the environment-income relationship deviate from the inverted U shape and present diversity.

Porter's hypothesis

Porter And Vender Linde and other scholars believe that the relationship between environmental protection and economic development cannot be simply divided into two sides. They argue that proper environmental regulation can encourage companies to make more innovations that will increase their productivity, thereby offset the cost of environmental protection and increase their profitability in the market, which is Porter's hypothesis.

The pollution paradise hypothesis

Baumol and Oates put forward the "pollution paradise hypothesis", believing that trade opening will promote the transfer of high-carbon industry from countries with strong environmental regulation to countries with weak environmental regulation, and developed countries may lead to some developing countries becoming "pollution paradise" while improving environmental quality. There are three main assumptions that the cost of pollution control has a marginal impact on investment decisions and trade flows; the cost of pollution control is important enough to have a measurable impact on trade and investment; and set environmental standards to attract investment or promote exports.

2.2. Literature review

In terms of studying the impact of environmental regulation on employment, domestic and foreign scholars have drawn different conclusions, which can be roughly divided into three categories:

Environmental regulation has a positive effect or little impact on employment: Wang Zhuyan and Pan Chao believe that environmental regulation promotes employment, and its dual dividend hypothesis can be realized, and environmental regulation can increase employment through the indirect effect of improving the level of industrial agglomeration. Qiao Bin believes that the use of environmental regulation to promote social welfare first and then restrain it is an inverted U-shaped relationship. However, the current intensity of environmental regulation in China is far from the inflection point, and the increased intensity will increase China's welfare. Zhou Jieqi and Liang Wenguang, based on the perspective of human capital, used the spatial autoregressive model to find that environmental regulation, through the dynamic matching of human capital premium, can further promote industrial structure upgrading and energy conservation and emission reduction technology innovation, and contribute to high-quality development. Shi Meicheng et al. adopted the dual difference method to analyze the employment effect of environmental regulation from the perspective of regional and industry differences. The results show that the different environmental regulation between regions will affect the transfer of highly polluting industries between different regions. Further research shows that the higher intensity of environmental regulation will promote the employment in capital-intensive industries. Marc A.C. Hafstead and Robertson C. Williams They believe that although the pollution tax will lead to the reduction of employment in a certain enterprise or industry, other enterprises with less pollution or no pollution will increase employment, and the flow between departments makes the impact of environmental regulation on employment much lower than the theory. Niels Anger and Ulrich Oberndorfer outlined the relative quota allocation within the EU emissions trading system and conducted an econometrics analysis of the large number of German companies covered by the scheme, and found that the relative quota allocation had no significant impact on the performance and employment of regulated German companies in the first phase of trading. Russo found through field interviews that the implementation of environmental regulations has significantly improved social benefits, not only helping to improve corporate profits, but also further absorbing employment.

Environmental regulation has a negative effect on employment: Tu Zhihui et al. Policies based on "two control zones" 1994 in China from 2013, As found by the PSM-DI method, The average environmental regulation has a negative impact on the employment of sulfur dioxide control area and acid rain control area; The regression analysis of Kuai Peng and Shi Yuqin et al. shows that environmental regulation has a significant negative impact on the overall employment of the manufacturing industry; After the grouping, Labor-intensive industries are significantly negatively affected, capital-intensive industries are not significantly affected, and technology-intensive industries are generally positively affected, So they suggest that the government subsidize the cost of pollution control and strengthen skills training for workers to mitigate the

impact of environmental regulation, At the same time, the emerging environmental protection industry is vigorously supported to attract more talents. Chinese scholar Lu Yang (2011) used the VAR model to divide the manufacturing industry into high carbon industries and low carbon industries, and estimated the impact of carbon tax on employment. The results showed that the introduction of carbon tax not only reduced the output of all industries, but also inhibited the employment of industries. Sun Qiuyu found to improve the intensity of environmental regulation on migrant workers urban employment caused significant negative impact, region, in high-income areas, improve the intensity of environmental regulation of migrant workers urban employment inhibition than low-income areas, high-income areas through the industrial structure upgrading hinder employment of migrant workers, low-income areas through industrial transfer of migrant workers employment. Gan Quan Xin and Yang Liu (2015) found that environmental regulation had adverse effects on employment through OLS regression, and 2 SLS regression also found similar results. Michael Greenston Analysis found that since the US issued the Clean Air Act Amendment, pollution-intensive enterprises have lost more than 500,000 jobs. Kahn And Mansur found that the US carbon tax had increased the cost of manufacturing and had a negative impact on employment. Henderson (1997) took 742 cities in the United States as samples to examine the impact of environmental regulation policies on the size and location of enterprises. The results showed that due to the implementation of environmental regulation policies, enterprises would transfer the production place and reduce the production scale to meet the compliance standards, so as to reduce the demand of polluting enterprises in the region.

The influence of environmental regulation on employment effect is not a single: Du Wencai and Zhang Xiaoxuan studied the paper industry, the study found that the policy significantly reduced the paper enterprises in Shandong province labor demand, environmental regulation on the labor demand of the negative impact is mainly reflected in the influence of non-state-owned enterprises, the influence on the influence of state-owned enterprises is not big. Li Bin used the double difference method to find that environmental regulation in the acid rain control area is mainly for the promotion of employment, while in the sulfur dioxide control area is mainly for the extrusion of employment. From the perspective of labor market segmentation, Fan Hongmin et al. empirically tested the difference in the impact of environmental regulation on the employment of urban dual labor force by using the panel data of 30 provinces from 1998 to 2014. The results showed that the negative impact of environmental regulation on the employment of urban migrant workers was greater than the impact on the employment of urban local labor force. Zhao Lingdi, call jade for the first time focusing on the ecological fragile northwest economic zone, with the aid of GMM and intermediary effect model, found that the region environmental regulation and industrial employment after inhibition first promote U dynamic relationship, the current regulation strength in the curve down phase, the short term regulation increased to release of employment "welfare", compared with high pollution areas, low pollution areas environmental regulation intensity closer to the curve turning point, easily across the inflection point for industrial employment "welfare".

3. Current problems facing employment

3.1. The contradiction between supply and demand of employment is intensifying, and we need to take active measures to respond flexibly

In the future, the contradiction between supply and demand of labor force is intensifying, especially due to the impact of COVID-19, the risk of labor demand contraction in some industries is increasing. On the other hand, in terms of labor supply, the number of college graduates will reach 8.74 million in 2020, and the number of college graduates will further increase in the future. The total number of new urban jobs and the pressure on ex-servicemen

and new migrant workers are still large. On the other hand, from the perspective of employment demand, the sudden new pneumonia has had a certain impact on the economic and social development. Some enterprises have difficulties in production and operation, and the employment demand is sluggish.

3.2. The rapid growth of new forms of employment requires the establishment of corresponding policies and regulations

With the progress of science and technology, industrial development and the continuous improvement of social division of labor, new occupations and new forms of employment are constantly emerging. For example, in July 2020, the Ministry of Human Resources and Social Security, together with the State Administration of Market Regulation and the National Bureau of Statistics, released nine new occupations and five new types of work, and improved three other types of work. These new industries and these new forms of employment attract a lot of jobs. In the background of new forms of employment, the creation of new jobs, the legal protection of workers and the legitimate rights and interests of consumers have become more and more important.

4. Environmental governance status

In order to better guide and support the development of the domestic environmental protection industry, the state officially included the environmental protection expenditure items into the national fiscal budget in 2007. During the 12th Five-Year Plan period and the 13th Five-Year Plan period, the state has further increased its investment in the environmental protection industry. According to the National Bureau of Statistics, the country's total investment in environmental pollution control increased from 493.7 billion yuan in 2008 to 953.9 billion yuan in 2017, with a compound annual growth rate of 6.81 percent. Although China's investment in environmental pollution control has increased year by year, it accounted for only 1.2% of GDP by 2017. According to international experience, when the proportion of environmental pollution control investment is 1% of GDP-1.5%; when the proportion reaches 2% -3%, the environment can be effectively improved. According to the data of the National Urban Ecological Protection and Construction Plan (2015-2020), by 2020, China's environmental protection investment in GDP will be no less than 3.5%, and there is a lot of room for improvement.

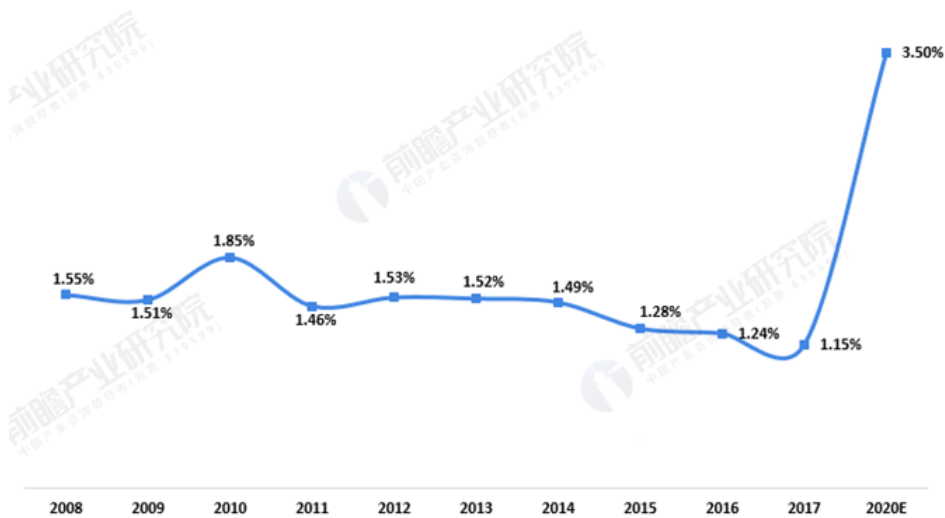


Figure 1: proportion of environmental governance investment in GDP in 2008-2020

As shown in figure 2, the total investment in environmental governance has experienced a steady increase -- rapidly increase -- reduce -- slow increase -- steady reduction process, due to

the early pollution of the environment need more money to repair, so there will be a rapid increase process, as the early repair work leveled off, environmental governance investment gradually decreased but because the enhancement of environmental protection awareness and the government gradually increased regulation, enterprise investment in environment innovation will further increase, but in the end due to the basic end of the production line, environmental governance investment will tend to be a relatively stable level.

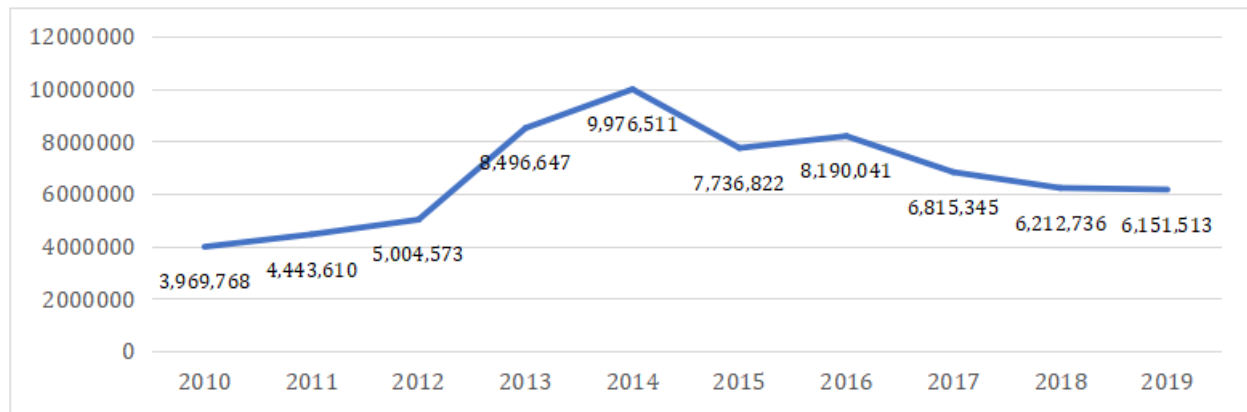


Figure 2: The total investment in industrial pollution control

5. Model setting and empirical analysis

5.1. Selection of indicators and data source

This paper analyzes the relationship between environmental regulation and employment based on provincial panel data. Due to the lack of data in Tibet Autonomous Region, Tibet was excluded. Meanwhile, because Hong Kong, Macao and Taiwan data are difficult to obtain, so Hong Kong, Macao and Taiwan are not included. The data of this paper are mainly from the China Statistical Yearbook and the Statistical Yearbook of each province. There are many factors affecting employment. Therefore, this paper selects the employment rate of 30 provinces and municipalities directly under the Chinese mainland in 2010-2019 as the explanatory variables, and selects technological innovation, education level and urbanization level as control variables, and selects appropriate indicators as environmental regulation intensity indicators, namely the core explanatory variables. The specific introduction is as follows:

Environmental regulation strength: because the index cannot be directly obtained, so need to measure by alternative variables, such as Sun Liwen using the regional environmental protection system and area ratio as environmental regulation strength index, xue-gang zhang use pollution removal rate to measure strength, and Peng Xing choose the government made the environmental penalty decision case number as an index, and some scholars choose industrial pollution control investment and industrial added value ratio to measure (wang yuan, 2022). Because some statistics are no longer counted after 2011, this paper uses sulfur dioxide emission so as a measure of environmental regulation, that is, when the coefficient is negative, it shows that environmental regulation has a promoting effect on employment.

Technology innovation: Technology contract registration is a unique way of science and technology management in China, and the statistical objects include four types of contracts: technical service, technology development, technology transfer and technical consultation. Technical content is the gold standard for contract registration, so the transaction amount reflects the situation of China's scientific and technological innovation and technology transfer to some extent. The technology market turnover of tec was selected as the variable to measure technology innovation.

Level of economic development and urbanization: This paper uses per capita GDP as the measure of economic development level. At the same time, the number of urban permanent urban population is city to reflect the level of urbanization.

5.2. Selection of indicators and data source

5.2.1. Model settings

To eliminate the possible heterosexuality of the model, take the original data logarithmic-ally and set the following model:

$$\ln emp = \beta_0 + \beta_1 \ln so + \beta_2 \ln tec + \beta_3 \ln city + \beta_4 \ln rgdp \quad (1)$$

table 1: Descriptive indicators

VARIABLES	N	mean	sd	min	max
so	300	496,050	400,683	1,900	1.827e+06
emp	300	0.978	0.0103	0.947	0.996
city	300	2,550	1,609	252.0	8,226
rgdp	300	49,841	25,982	12,882	161,776
tec	300	3.374e+06	7.023e+06	5,666	5.695e+07

As can be seen from this table, many variables have a large difference between the maximum and the minimum value, and they cannot reflect the relationship between environmental regulation and employment, so further regression test is required.

5.2.2. Regression analysis

Table 2: Regression analysis

VARIABLES	lnemp
lnrgdp	0.0132***
lnso	0.000258
ln tec	-0.000223
ln city	0.00200
Constant	-0.179***
Observations	300
Number of id	30

A houseman-test was first performed to determine the use of fixed or random effects, which can be seen as not significant, so the null hypothesis was rejected and the underlying assumptions of the random effects model were not met.

Table 3: Ordinary least squares

	Lnemp	lnemp
lnrgdp	0.0118***	0.00816***
ln tec	-0.00160***	-0.00179***
ln city	0.00415***	0.00628***
lnso		-0.00299***
_cons	-0.158***	-0.0947***

First of all, ols regression excluding environmental regulation. It can be seen that both urban permanent resident population and per capita GDP are positively correlated and significant at the confidence interval of 1%. It can be understood that the increase of permanent urban resident population and the increase of per capita GDP have a significant positive effect on the increase of employment rate. According to the law, each percentage point increase in GDP increases two percentage points, so this regression is in line with the rule. The increase of urban population will gradually accelerate the progress of China's industrialization, because urbanization promotes the industrial production efficiency in a sense. With more enterprises and factories, many farmers contract their land and find jobs in cities, improving the employment level. However, the technology turnover shows a significant negative correlation with the employment level, because the improvement of the automation level will inevitably lead to the decrease of the labor demand in the short term, thus affecting the employment level. After the addition of environmental regulation intensity, it can be seen that the reduction of sulfur dioxide emissions has significantly improved the employment level, which shows that the strengthening of environmental regulation has promoted employment.

The increase of environmental regulation intensity will promote the increase of the output value of the tertiary industry, and the development of the tertiary industry in China has gradually become a new engine of China's economic development, which has greatly promoted the growth of per capita GDP. So does environmental regulation promote employment indirectly through the impact on per capita GDP, i. e., the intermediary effect? In this paper, the mediation effect was also tested by bootstrap-test, and the results are shown in Fig:

Table 4: bootstrap-test

VARIABLES	y1
_bs_1	-0.00105*** (0.000286)
_bs_2	-0.00161*** (0.000516)
Observations	300

Since the index of environmental regulation intensity is the emission of sulfur dioxide, it can be seen that the lower the sulfur dioxide emission, the higher the per capita GDP, and the higher the employment level. At the same time, environmental regulation also has a significant direct impact on employment, that is, environmental regulation has a partial intermediary effect on employment.

5.2.3. Regional analysis

Table 5: regional analysis

	middle part	Northeast China	the west area	east
VARIABLES	lnemp	lnemp	lnemp	lnemp
lnrgdp	0.0186***	0.0296***	-0.000379	0.0168***
lnso	0.000637	0.00892***	-0.00447***	-0.00402***
Intec	-0.000766	0.00293	-0.000970**	-0.00417***
lncity	0.00113	-0.0316***	0.00631***	0.0142***
Constant	-0.228***	-0.257***	0.00658	-0.206***
Observations	60	30	110	100
R-squared	0.431	0.744	0.312	0.495

In order to further analyze, China was divided into eastern, western, northeastern and central regions for regression test. The results found that environmental regulation had a significant negative correlation effect on employment in northeast China. As northeast China is still dominated by heavy industry, the local area is faced with the difficulty of transforming the old industrial bases, so the strengthening of environmental regulations can not fully and effectively achieve the goal of industrial structure upgrading, and the practice of closure and transfer leads to more severe local employment forms. Due to policies, human resources and good location advantages in eastern China, environmental regulation has promoted the development of new green industries, thus promoting employment. The western region relies on the country's overall western development strategy to attract the development of green and clean energy enterprises. Meanwhile, the strong imperative environmental regulation forces local enterprises to carry out technological innovation and attract new talents. However, the impact of environmental regulation on employment in central China is not obvious.

6. Conclusion

This paper uses the provincial panel data from 2010 to 2019 as a sample to explore the impact between environmental regulation, technological innovation and employment, and draws the following conclusions:

Environmental regulation generally has a significant positive correlation impact on employment. Under the current situation, China can achieve the win-win situation of environmental regulation and employment rate increase. From the perspective of influence mode, the strengthening of environmental regulation is conducive to the transformation and upgrading of industrial structure, so as to promote the improvement of economic level to improve the employment level. From the point of specific areas, the eastern and western regions can strengthen environmental regulation to promote the transformation and upgrading of industrial structure to improve the employment rate, while the northeast needs to environmental regulation and find a balance between local industrial structure transformation, in the face of the old industrial base cannot only shut down and turn, need to take more innovative and flexible thinking to create a good employment environment for the local.

In response to this conclusion, the following suggestions are proposed:

Formulate reasonable environmental regulation policies, and appropriately increase the intensity of environmental regulation under appropriate circumstances

The development of high-quality economy and the realization of domestic and international double cycle are inseparable from the improvement of environmental quality. Increasing the degree of environmental supervision and management is conducive to improving the level of environmental development, and then promoting the benign development of employment level and economic level. Studies in developed countries have found that when the investment in environmental pollution control exceeds 3% of GDP, it will have a relatively good governance effect, while China only starts to exceed 3% after 2020, which shows that it is necessary to appropriately improve the intensity of environmental regulation and encourage enterprises to strengthen their investment in environmental governance. At the same time, residents' awareness of environmental protection should be improved, voluntary environmental regulation should be supplemented by command-control environmental regulation, and the idea of pollution first and then treatment later should be abandoned. At the same time, the government should also innovate the means of environmental regulation, use incentive environmental regulation to make enterprises spontaneously increase the proportion of environmental investment, and at the same time use scientific and technological innovation to achieve the effect of high-quality employment.

Implement incentive and compensatory policies

The government should provide financial subsidies and policy support to relevant enterprises, such as compensation policies for enterprises that develop and use new green technologies. This method can encourage existing enterprises to develop pollution control technology, so as to achieve the effect of reducing pollution emissions. As technology research and development increases the cost of enterprises, enterprises may not be able to operate well and cause unemployment, and provide some necessary policy support and tax subsidies to related enterprises, not only to achieve the purpose of environmental remediation, but also to ensure the normal operation of enterprises, but also can produce some new technical positions to promote employment.

The United States

Environmental regulation has both crowding in and crowding out effect on employment. The government should adopt appropriate policies to increase the promotion effect of crowding in effect on the economy and reduce the adverse impact of crowding out effect. When a region has a complete green industrial chain and supporting administrative regulations, it will have a positive external effect on the recruitment of high-tech talents. So the government should provide good infrastructure and improve the administrative rules and regulations, the use of good market economy environment to promote green enterprises, to form a perfect green industry chain, optimize the training system of skilled personnel, by creating a good market competition environment, reduce the high intensity of environmental regulation caused by the outflow of production factors.

Implement different environmental regulation policies according to local conditions and regional characteristics

China has a vast territory and abundant resources, and different regions have different geographical advantages, which will also lead to different industries suitable for development in different regions. At the same time, the influence of historical factors and the different degree of national overall policies will lead to obvious differences in economic development in different regions, so that the number of labor force in different regions and the distribution of different industries will be different, and the quality of labor force will also be different. Therefore, the need to consider the local actual situation when making policies, not one size fits all. Region in northeast China, for example, if only adopt relatively strict command control regulation policy, for the local economic development pillar —— heavy pollution industry may lead to the loss of employment, and will not attract high-tech talent inflow, so ultimately very conducive to the green industry, unable to achieve win-win environmental improvement and economic growth. So we should according to the local industry development situation, combined with the reality of the era after the outbreak factors, the market incentive and command control environment regulation means, use of flexible regulation to promote the innovation of administrative regulations, to promote the local factors of production upgrade replacement and innovation of industrial structure, so as to promote the improvement of employment level, achieve a win-win situation of economy and environment. For the eastern region, due to the high concentration of high-tech talents and the more perfect industrial structure, appropriate policies should be adopted to make use of the advantages of the local market, manpower and capital to create a sustainable industry

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