

IACEED2010

# Impact Analysis of the Foreign Investment on Environmental Quality of Shandong

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## Abstract

The foreign investment has improved economic growth of Shandong in recent years, but more studies focus on the impact of foreign investment on the environment. The scale and industrial structure of foreign investment are studied and there are no evidences the foreign investment over concentrated in pollution-intensive industries, the foreign investment has more reasonable industrial structure and advanced technology than domestic enterprises and isn't the main pollution sources in Shandong.

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*Keywords:* Foreign investment; Pollution-intensive industry; Environment equity

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## 1. Introduction

Because of locational advantage and good economic environment, Shandong began to introduce foreign investment since reform and opening. The actual use of foreign investment has amounted to \$84.47 billions as of the end of 2008 and the amount in 2008 is \$8.2 billions, an increase of 10.2% over the previous year. The rapid growing of foreign investment has promoted the economic growth and social progress of Shandong significantly. At the same time, the dispute about the relationship between foreign investment and environmental pollution was brought to the forefront. The impact of foreign investment on Shandong environment and how to coordinate the relation of them has been the focus of attention.

Walter and Ugelow (1979) argued the fierce competition attracting the foreign investment among less developed countries could lower the environment protection standards and then induced the foreign

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investment transferred to the pollution-intensive industries. In consequence, the less developed countries would become the "havens" for the world's dirty industries; this concern has become known as the "pollution-haven hypothesis". Baumol and Oates (1986) considered the less developed countries would be the concentration area of the world pollution if they willing to carry out the lax environmental standards. Zarsky (1999) argued the foreign direct investment affected the macro environmental variables at least in six potential ways and the combined affection is negative. The other view is the foreign investment has positive effects on the environment of host country. The foreign investors would bring advanced technologies and management experiences to the host country, which can improve the energy efficient and the environment in the end. Eskelan and Harrison (2002) are representatives of such viewpoint, they found the foreign investment is not only beneficial to the technology progress but also improve the environmental welfare of the host country by importing eco-friendly technologies and products.

In order to confirm if there is "pollution-haven hypothesis" in China, many domestic studies were carried out. Xia youfu (1999) proved the pollution tendency the foreign investment using the data of the Third National Industrial Census. Pan and Yu (2005) carried out causality test about the foreign investment and pollution and found the increasing foreign investment is one reason of the worsening environmental pollution. But Jiang xiaojuan (2007) gave evidence that foreign investment didn't concentrate in the industries that affected the resources and environment extremely

There is no unanimous conclusion about the relation between the foreign investment and environmental pollution of the host country. We will study the relationship in Shandong next two parts and give the conclusion in the end.

## 2. Classification of pollution-intensive industries in Shandong Province

Because of different study purposes and data sources, the classifications of pollution-intensive industries among different scholars are different. The typical classification is M&W classification, Iron and steel, Non-ferrous metals, Industrial chemicals, Pulp and paper, and Non-metallic mineral products are selected to be "dirty industries" (Mani and wheeler, 1999). Several domestic studies also give classification of pollution-intensive industries.

Table 1. The main waste discharge industries and rank in Shandong

industry	water	gas	solid	industry	water	gas	solid
Manufacture of paper and paper products	1	7	7	Manufacture of pharmaceuticals	10		
Manufacture of chemicals and chemical products	2	4	5	Manufactures of chemical fiber	11	9	
Manufacture of textiles	3	8		Petroleum and natural gas extraction	12		
Agricultural and sideline foodstuffs processing	4			Non-ferrous metal smelting and rolling processing	13	6	6
Mining of coal and lignite	5		3	Ferrous metal smelting and rolling processing	14	2	2
Manufacture of food products	6			Manufacture of leather, fur, feather and related products	15		
Manufacture of beverages	7			Manufacture of non-metallic mineral products		3	8
Manufacture of coke, refined petroleum and nuclear fuels products	8	5	9	Mining or non-ferrous metal ores			4
Electricity and heating power supply	9	1	1	Mining or ferrous metal ores			10

To determine the rank of pollution-intensive industries, we use detailed emissions data of every industry in 2008. The industries' emission load proportion is greater than 1% of all industries are listed in table 1. There are 15 industries in the column of waste water, 9 in the column of exhaust gas and 10 in the

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