

COLLABORATIVE INTERVENTION MECHANISMS BETWEEN DIRECT INVESTMENT AND ENVIRONMENTAL CONFLICTS

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Abstract

Developing countries' craving for direct investments derives from their innate economic and social advancement as well as political appeals. However, direct investments, in some cases, deteriorate the environment and lead to environmental conflicts. In China, the yearly increasing direct investment not only contributed to the rapid development of economy, at the same time also brought environmental pollution and conflict, especially from joining the WTO in 2001 this kind of phenomenon is becoming increasingly obvious. Based on the empirical analysis, this paper through the Chinese direct investment, social development and environmental pollution studies the causes of dramatically environmental pollution under China's yearly increasing direct investment from the perspective of environmental conflicts and environmental governance. In order to effectively reduce and alleviate the effect of the conflicts of weird circuit, combing the social development, economic growth and environmental conflicts, this paper studied respectively the environmental intervention mechanism based on three main different game-agents, namely government, enterprise, and people, in the hope of acting as an effective way to the problem of economic growth and environmental damage, and effectively intervene the environmental conflicts, which is beneficial to the whole economy act as a virtuous circle development.

Keywords: Direct Investment; Environmental Conflicts; Collaborative Mechanism



1. Introduction

China has entered into a new period as for its globalization and internationalization since it joined in WTO in 2001, of which both the social and economical development has been lasted for a “golden decade”. Since then, Keynesianism has, as a guidance of Chinese economy, became a famous school exerting a dominated influence on Chinese economic policies. In particular, growth mode of early Post-Keynesianism that stressed savings and investments has less difference with China’s economic development mode. On this point, both sides promote economy by means of increasing direct investments, and then various investments are attracted leading to a temporarily virtuous circle. It is noteworthy that Chinese environment is, with the increasing of investment, experiencing a sharp deterioration, and increasingly serious with the growing of waste water, waste gas, acid rain as well as group events caused by environment. In addition, Chinese government has made carbon reduction commitment in Copenhagen Climate Conference in 2009. All of these factors urge us to consider how to increase direct investments promoting social development on the basis of protecting environment, and how to cope with the relation among direct investments, social development, and environmental pollution, whose relevant contents have turned into the research points in academic world.

Gruver (1976) earlier advocated casual relationship between direct investments and environmental damage. He has studied the most optimized method of social investments for bound invariable by introducing damage invest. Gradus and Smulders (1993) have studied the relation between social development and environment damage from the perspective of social sustainable development and environmental management. After that, more research are done on direct investments from abroad and environmental damage. Wheeler (2001) then stated that pollution of developing countries arising from foreign direct investments is more serious as compared of that in developed countries. Hoffmann (2005) has, on the basis of empirical examples from panel data, conducted a set of Granger casual model on the casual relationship between foreign direct investments and environmental damage, among which shows a casual relation. Waldkirch and Gopinath (2008) proposed, on the basis of relation between direct investment at broad and environmental damage, a series of solutions and advices for environmental protection in Mexico. Through some practical examples, Wagner and Timmins (2009) found that cohesive effect existed in direct investment at broad and environmental damage. After such casual relation is proved, the research is mainly focused on environmental management on the backdrop of direct investment. For instance, Kob and Yeh (2007) did research on investment tactics of entity options of environmental management. Heal and Tarui (2010) considered that there was some harmony between the technology and the pollution which had the potential of being invested adequately and being let out properly. In addition, Lee (2009) demonstrated the relationship among direct investment, environmental damage, and economical development based on empirical examples in Malaysia. Based on empirical examples in Brazil, Russia, and India, Pao and Tsai (2011) also found, through analyzing aforesaid three aspects by Multivariate Granger causality model, that there was casual relation between each other among these three aspects in terms of CO₂ emission, energy consumption, FDI and GDP. In recent research, Lan (2012) studied the relation among human resource, direct investment and

environmental damage. Dong (2012) interpreted classical topic “environmental paradise” from the perspective of direct investment and environmental system. Kima and Adilov (2012) hold that the direct investment and environmental damage was a dilemma for developing countries, which needed reasonable consideration of environmental systems.

Those who study the relation between direct investment and environmental damage on the backdrop of Chinese market are listed as followings: Guo and Han (2008) did empirical research, through building cohesive model, on connection of direct investment and environmental damage as well as environmental management. The conclusion is drawn that the direct investment exerted influence on environment by means of affecting economic scale and structure together with that technology in China. Equally, the increase of direct investment stock enlarged the economic scale which gave rise to the increase of industrial pollution emission. It finally arrived at conclusion that China has shown the trait of being “shelter for pollution”. Through research on Kuznets curve without regard to polices, Li and Ren (2011) discovered that China’s current situation of GDP has yet occupied the left position of its inflection point, and the continued increase of economy might further lead to environmental deterioration. Based on China’s provincial panel data, Xu and Deng (2012) hold that it is direct investment, especially the foreign direct investment that lead to China’s environmental pollution, which is concluded by means of space calculation. Through research on Copeland-Taylor Model, Cheng (2013) taken the technology into account and divided the effect of direct investment on host countries’ environment into three aspect: scale, structure and technology effect, which was a new perspective for researching the relation between direct investment and environmental damage. Moreover, Elliott et al (2013) studied the relation among direct investment and environmental system and pollution from the perspective of government’s public integrity which shown the effect of direct investment on environment had certain relation with local government’s public integrity. In current situation, the direct investment had negative effect on environmental standard, and it increased local emission load of pollution as a whole.

From the above references, it concludes that environmental pollution is, with increase of direct investment, bound to be outgrowth of such investment. A series of theory researches are proved by focusing on cohesion and relation between two parts. However, there exists less researches on how to connect social development and environmental conflicts and management so as to study direct investment and environmental pollution, and further study the collaborative intervention mechanism between them. It is just the research point and innovations of this paper.

For above research objects, the following researches are conducted. The second part demonstrates, through theory analysis and empirical calculation, that there exists mutual relation among direct investment and social development and environmental pollution in recent decade in China, which proves either direct influence or indirect influence of direct investment on Chinese environment. The third part analyzes the environmental conflicts and management raised form environmental pollution, whose purpose lies in showing other relative factors affecting the relation between China’s direct investment and environmental pollution. Such statement is dealt from the angle of environmental pollution conflicts and social environmental management. Based on above researches, the fourth part proposes the idea of collaborative intervention mechanism in terms of governments, enterprises, and publics. Finally, the conclusion is arrived at in fifth part.



2. Direct investment, social development and environment pollution

There is a coupling relationship between direct investment and social development: direct investment enlarges production, boosts consumption, innovates technology, creates jobs and thus develops the economy and society. Statistics (Figure 1) reveal direct investment serve as a strong driving force for the sustainable long-time development of China's economy. About annual 20% increase of investment (Figure 1-b) causes over 10% of GDP growth rate, which shows that the investment has grown to be the key factor driving Chinese economy forward. It is noted in figure 1 that the all fixed assets DI and GDP are chosen to be two norms to measure the development level of Chinese DI and society, while Industry Emission (IE), as a measurement of Chinese environmental pollution, chooses the statistics of 2000-2011 for keeping the consistency.

The developing countries attached great importance to the effect of DI on society, especially on economic development in a long period in the past. This phenomenon was originated from Europe into which the capitals flew by Marshall Plan that European economy was reestablished. Such experience was successfully imitated by some countries in Asia and South America. Evsey (1946) theoretically deduced the static Keynes Model into a dynamic growth model, holding that the success of the aforementioned countries comes from the belief that capital is the prerequisite of development, and the growth rate depends on the scale of investment. This theory has always existed in Chinese society. Through research on promoting productivity and technology, Yao et al (2006) discovered the positive effect of DI on economic development. Xu (2008) found out, through comparing the economic power among different districts in China, necessary connection between investment and increase, which showed that investment scale and structure played an critical part in local economic power. Zhao and Yu (2012) used total factor productivity as the measurement for developing economy and borrowed statistics from 30 industrial data and thus found that the increase of DI not only lead to economic development directly, but also mobilize the transformation of economic growth pattern of Chinese industry. From the perspective of service industry, Yao (2012) demonstrated that there existed obvious Granger relation among DI, added value of service industry, and GDP, which showed it was the DI as Granger reason that lead to GDP growth. These studies arrived at a unanimous conclusion that the investment played as a key force to drive economy and as an indispensable factor to pull economy, which proved that economic growth needed capital investment.

However, this kind of investment-driven growth leads to excess competition among different areas, deteriorating environment and resources, thus the benefits of economic growth is offset by environmental damage and conflicts. Perkins et al (1998) believe that sustainable development can not be achieved at the cost of natural resource and environment, the suffering of which outgrows the benefits of investment. Virtually, Chinese statistics verify the worries of them. Statistic shows that Chinese economic growth neglects the deteriorating environment: the pollution of river, air and land exceed people's expectation, in which the pollution of the river is the most severe: (data source: statistical yearbook 2005-2010 China's condition of resource and environment). Besides, resource consumption speeds up; energy consumption per GDP is rising year by year, which is 2.2 times of global average, 7 times of Japan, 6 times of America and 2.8

times of India. (news conference of vice-minister of China’s ministry of environmental protection, Beijing News of 4th, Sep, 2012). Industrial waste gas emission has been growing swiftly with a rate much more than that of energy consumption. As shown in figure 2: comparison between China’s energy consumption and industrial waste gas emission in late ten years.

To explore the relationship between DI, social development and environmental pollution, the intermediate variable (GDP) and Granger casual relation mode are introduced so as to conduct analysis, from the perspective of quantitative modeling of being affected or affecting between the aforesaid three aspects. Such relationship will show whether and how DI increase give rise to environmental deterioration.

Granger casual model which is introduced uses the below principles: how seriously the current y is influenced by past x . Meanwhile, the lagged value with added x whether influences well. Once x has close tie with y in this sequence or their components present a statistical relation, y is caused by Granger. The aforesaid description could also be stated as followings: deviation after a n period of time of forecast on y sequence is called as MSE, i.e. Equation (1). The specific calculation is listed in Equation (2), in which x_t 、 y_t 、 η_t^x 、 η_t^y respectively signifies the index and random disturbance of t in two i . ϕ is presented as a item that waited to be estimated. P is the best lagged item in VAR model, which could be decided by AIC statistics in specific. When all ϕ in equation are zero, the x can not caused by variable y in Granger, that is to say, the variable y exogenously leads to variable x . To assure all items of being zero, F test is applied. Here the specific details of building models are omitted.

$$MSE = \frac{1}{n} \sum_{i=1}^n (\bar{y}_{t+i} - y_{t+i})^2 \tag{1}$$

$$\begin{pmatrix} x_t \\ y_t \end{pmatrix} = \begin{pmatrix} \phi_{x0} \\ \phi_{y0} \end{pmatrix} + \begin{pmatrix} \phi_{xx}^{(1)} & \phi_{xy}^{(1)} \\ \phi_{yx}^{(1)} & \phi_{yy}^{(1)} \end{pmatrix} \begin{pmatrix} x_{t-1} \\ y_{t-1} \end{pmatrix} + \begin{pmatrix} \phi_{xx}^{(2)} & \phi_{xy}^{(2)} \\ \phi_{yx}^{(2)} & \phi_{yy}^{(2)} \end{pmatrix} \begin{pmatrix} x_{t-2} \\ y_{t-2} \end{pmatrix} + \dots + \begin{pmatrix} \phi_{xx}^{(p)} & \phi_{xy}^{(p)} \\ \phi_{yx}^{(p)} & \phi_{yy}^{(p)} \end{pmatrix} \begin{pmatrix} x_{t-p} \\ y_{t-p} \end{pmatrix} + \begin{pmatrix} \eta_t^x \\ \eta_t^y \end{pmatrix} \tag{2}$$

Based upon the above models, Granger casual relation is employed to testify DI, GDP, and IE, together with their correspondingly speed-rising items - DIR, GDPR, IER. Also, the lagged relativity between each item is measured. The result is listed in Table 1 and Figure 2.

The conclusion is drawn from Table 1 and Figure 2:

(1) The statistics of Table 1 shows as P - the confidence coefficient is 10%, there exists bilateral Granger casual relationship between DI, GDP, and IE. That is to say, the direct investment, social development, and environmental pollution can affect each other. Strictly speaking, it is more easier to identify the casual relation among these three items while P is 5%. In other words, there exists bilateral Granger casual relation between direct investment and social development in China that the environmental pollution would affect the development of society while the latter would less influence the former, and direct investment would straightly give rise to the acceleration of environmental pollution while the latter would equally less influence the former.



(2) The above conclusion is further testified in Figure 2, i.e. there exists instant linear relationship between DI, GDP and IE when I (the lagged time) is zero. In addition, the direct investment could ,according to Figure 2, exert a straight influence upon social development in current period, while the society's further development could in turn promote the investment. Such immediate benefits count, to some extent, for blind pursue of China's local governments on the fixed assets investments. But it is learn from the lagged relation that in later period, the negative effect will gradually appears given that these investments could not continue to follow up. That means the social development caused by direct investment need much more investment to keep the situation, which explains for the strange circle that Chinese economy gets trapped in . Upon the influence of relative factors, the environmental pollution will be accelerated.

(3) According to Table 1, when P is 5%, there exists not bilateral Granger casual relationship between DIR, GDPR, and IER, which could be testified in Figure 1-b. This conclusion shows that the speeding-up of direct investment will less affect the social development and environmental pollution, which is equally proved in lagged relation shown in Figure 2. It is easy to find there not exists obvious lagged relation between these the increase of three items.

To sum up, there exists bilateral casual relation between direct investment, social development, and environmental pollution, but their increases can less affect each other. This is the reason why this paper chooses these three items to conduct research. On the prerequisite of aforesaid relation, how to face the environmental collision, how to engage in controlling pollution and how to build collaborative intervention mechanism based on the connection of "the government, the enterprise, and the public are the main contents this paper deals with.

3. Environmental conflicts and governance under environmental pollution

Li and Ren (2011) demonstrated that the promoting of economy caused by direct investment would probably give rise to environmental problem. Taking the measures and remedies after polluting the environment may intensify conflict. In terms of this topic, this chapter will, under the backdrop of pollution, conduct a further research on Chinese environmental conflict and relative treatment.

3.1 Environmental conflicts under environmental pollution

Figure 3 gives an outline on number of times of environmental pollution conflict, water pollution and air pollution from 2000 to 2011 in China, along with the direct economic lose caused by these pollution conflicts. According to this figure, it is easy to arrive at the following conclusions:

It has a trend of gradual drop of number of times of these three pollution, among which the times in 2008 change less.

Instead of water pollution, air pollution has became the main source of pollution in China since 2009.

On the issue of direct economic lose caused by pollution conflicts, it presents a trend of gradual falling from 2000 to 2003, and from 2004 to 2007. Since 2007, such lose takes

a rising tendency. Due to the change of statistics method, China has not yet published the recent data of this phenomenon. However, it can be inferred from published numbers of conflicts that the direct economic loss still exists on a high level.

The situations of Chinese environmental conflicts mentioned above are evolved from the statistics and their distributions. Notably, all the aforesaid four kinds of pollutions take a changing tendency from 2008. The total times of environmental conflicts, water pollution and air pollution have a falling trend since 2008, while the environmental conflicts in 2011 rebound, of which the economic loss takes a rapid increasing tendency since 2008. It is just the DI (direct investment) that leads to such a phenomenon.

In 2008, the sub-prime crisis in America caused a global financial crisis. In the latter half of the year, the Chinese economy was greatly influenced and decreased. To solve this problem, the Chinese government in November 2008 put forward investment plans about 4 trillion and a series of stimulated measures to boost domestic demand. From the fourth quarter of 2008 to the end of 2010, the central government expanded 11800 hundred million, which buoyed 830 billion of local government's investments, and 1410 billion of bank loans, as well as 580 billion of other investments including enterprises' own capitals, which completed investment work of approximately 4 trillion. Corresponding to these investments, environmental conflicts show the signs of stopping dropping and starting to rise, together with rapid growth of direct economic reduction caused by environmental conflicts. In 2008 and 2009, such reduction respectively rose by 450% and 140% growing from 30 million to 450 million. The above conclusion also shows that to promote direct investment not only speeds up the social development, but also aggravates the environmental conflicts.

The results shown in the above figure come from statistics data. Environmental conflict incidents, another form corresponding to pollution conflict, will be exemplified in the following contents. Table 2 collects the conflict incidents recently happened from 2010 to 2012. It is easy to find that the sudden incidents occur frequently and their effects escalate any previous years as the direct investment increases and environmental conflicts change a lot. Especially for those occurrences of major environmental events, they cause great damage to people's life, properties, and public safety. For example, the sewage disposal incident happened in the most developed area Qidong City, Jiangsu Province triggered thousands of inhabitants to go up to the street to protest against the government's tolerance of environmental pollution, which leads to the paralysis of government and destruction of public order; Another case happened in a relatively backward area Shifang City, Sichuan Province, the investment-driven policy aroused people's great concern on the environment, its government building was blocked by thousands of people for an environmental-harmful project signed with an enterprise; In other cases, government's investment decision on a PX project was met with people's protest in Zhenhai county, Zhejiang Province. On the surface, they are conflicts between development and environment, but in essence, they are conflicts between people and government, people and enterprises, and government and enterprise; some people use government's authority to influence and deprive others' interests; as the agent on behalf of people's rights, the government seems to pay no attention to people's craving for environmental protection in stimulating economic



growth, thus environmental conflicts become incompatible with social contradiction in which government plays an ambiguous role: either sacrifice development or environment, and as if there is no a third way out.

The above phenomenon reflects that the occurrence of environmental conflict events intensifies the contradiction between investment and environment, and the usual consultative mechanism hardly exerts influence, which leads to the harsh conflicts between the public and enterprises, the public and governments, as well as enterprises and governments.

3.2 The causes analysis of environmental pollution and conflicts

The reason for China's environmental conflicts can be summarized to the following reasons:

Defects in economic and political mechanism. In working towards the goal of developing, "pollution first, treatment later" becomes the basic rule in governing state. When economic development runs contradict with environment protection, the government prone to encourage the former, so with the aid of public power, enterprises grab more and more public resources (including the environment) in collaboration with government, while the cost is paid by the public, leading to their passive protest. The best examples are shown in severe conflicts in the forced demolition of people's houses all over China, and the building of hydropower plants in Yunnan and Sichuan Province, as well as PX projects launched in various regions.

The role confusion of the government---as the designer of rules, operator and executor, when the environment was polluted, the related enterprise can be forgiven by its "communication" and even "collusion" with the government. At this point, people become the victim such as sewage disposal in Qidong and investment conflicts in Shifang Project in Sichuan Province.

People's limited cognitive system and cognitive ability cannot predict the result of environmental impairment and its capability of self-purification, thus they protest simultaneously after they become the victim, such as the mud-rock catastrophe in Zhouqu County and the planting program of Yunnan XinGuang Group.

As in the case of PM 2.5 in Beijing and water pollution of Armani, non-transparent and delayed information cause panic among people.

The simplicity and crudeness of negotiation system plus government's interference in the setting of reimbursement price trigger the shift of conflicts or contradiction to people and government, such as the forced demolition of people's house by the real estate all over China and the explosion accident in Qiaojia County, Yunnan Province.

in the process of developing industry, government emphasize economic returns rather than environmental protection, so technological upgrading lags behind. The virulent pollution happened in Zijing mining, Harbin Pharmaceutical Factory and Longjiang County in Guangxi and the lead poisoning in Hunan, Hubei and Anhui Province are powerful evidences. Government can use force to alleviate the conflict but this is only expedient and cannot solve these problems essentially.

3.3 Environmental governance under environmental pollution

Drawn from the above analysis, it can be found that irrational rising of single DI not only give rise to social economy's fast increase of table data, but also to accelerating of social environmental pollution. Nevertheless, the more worried thing is that Chinese economy runs confliction with environment in the process of which the system presents distorted, i.e. investment-driven policies make industrial sectors' profitable objectives deviate from environmental objectives. Figure 4 points out proportion of those items including total investment of Chinese environmental control, investment of town's environmental framework construction, investment of industrial pollution and investment of environmental control in GDP from 2001-2011.

(1) In recent years, China has always expanded the total investment of environmental management, in 2011, however, the amount of investment descended. Meantime, the same trend appeared in that town's framework construction. The aforesaid conclusion could be testified in affiliated figure of Figure 4.

(2) According to proportion of total investment of environmental management in GDP, may the reduce of environmental management in 2011 be affected by that policies' decision of reducing the amount of environmental management.

(3) Seen from the affiliated figure of Figure4 on the compare about the tendency, the control of industrial pollution runs almost opposite from that environmental control and that town's framework construction. It was noteworthy that in 2011, China still, on the prerequisite of drastic drop of total investment of environmental management, expanded investment of industrial pollution's control. Such movement could reflect, to some degree, the rationality of China's control on pollution, which also reveals a relatively positive trait of environmental management.

Known from Figure 1 and Figure 4, China's emission of industrial waste gas from 2001to 2011 presented a tendency of rising fast, among which the emission in 2011 rise by 29.92%, while the investment of environmental management of industrial sectors dropped by 6.55%. This comparison is hard to believe, because of its inevitable "negative externality": People who benefits from economic development have to bear the cost of environmental impairment. Investment-incentive policy creates an opportunity for enterprises to make low cost income. Through investment government solve tough social and economic problems, however, it is people who pay the cost.

To give a further analysis on relation of China's pollution control with DI, social economy, and environmental pollution, DI, GDP, IE, IEP (Environmental Pollution Control), IPH (Industrial Pollution Harnessing) are introduced to conduct modeling of Granger casual relation and calculating. The specific consequences are shown in Table 3, which could arrive at following conclusions:

(1) There exists lateral Granger casual relation between DI, GDP, and IEP. That is to say, the amount of IEP is greatly influenced by fixed assets investment and GDP, but the reverse influence is not existed. The increase of DI will affect the results of Chinese pollution harnessing in the following two terms, while GDP can, on the other hand, exert influence at current period.



(2) There exists lateral casual relation between IEP and IE, i.e. the former will affect the level of the latter, and the reverse influence is not existed. It is easy to draw the conclusion that such result is accordance with the reality logic.

(3) Distinct from IEP, IPH has no Granger casual relation with DI and GDP, which means China's harnessing on source of pollution is not impacted by input and income having certain independence.

(4) IE has lateral Granger casual relation with IPH, namely the more industrial waste gas emit, the more investment on pollution harnessing that Chinese relevant governments will increase.

It can be drawn from above conclusion that China's IEP is straightly impacted by direct investment and social development, which partly accounts for the reason of this paper's research on direct investment and environmental conflicts. But the effect of environmental harnessing still has not impact on direct investment and social development, which in part explains why China attached no importance on protecting environment in the past. In addition, China's IPH is greatly influenced by emission of industrial waste gas, which also indicates the signs that China's regulation on source of pollution is rational and programmatic.

The analysis concludes: there exists a coupling relationship between economic development and environmental conflicts, that is to say, when there is an increase in investment, environment deteriorate accordingly and conflicts get more severe. Researches on the surface is hard to explain why economic development brings people benefits as well as loss, what's more, the latter is taking the edge of the benefits of development off. A question is thereby raised: in building up investment, why can't we lessen environmental damage and thus lower the price people have to pay for? Existing researches give various answers without touching upon the "deviation" phenomena in the incentive system of development and impairment, and the interest analysis among people which deserves a study in depth.

4. The collaborative interference mechanism of direct investment and environmental conflicts

In the choice of development or environment, there exists there different game-agent: government, enterprise and people .They would choose differently under different circumstances: firstly, when the government, enterprise and people take unanimous action, environmental protection is emphasized, conflicts will not take occur and development is rational; Secondly, when the government, enterprise, and the public take actions accordingly, government uses investment-driven development policy which damage the environment, making the development unsustainable; Thirdly, when the government and enterprises collaborates to act, investment grows, people's environmental rights is infringed and conflicts become severe. Fourthly, government and people move as one to ensure the protection of environment as well as economic growth as to relief the conflicts. Different games lead to different environmental results and conflicts varies according to different strategies adopted by game agent.

Virtually, Chinese government does not hope to witness the environment going downhill and conflicts emerge, and they have been seeking a balance between investment growth

and environmental safety, promulgating a lot of stringent laws and regulations, and investing more in the environmental governance. In recent years, the government has propelled environmental protection to a political height and proposed the governing ideas of “scientific outlook on development”: to restructure industry, renovate technology, save energy and reduce emissions, change people’s consumption ideas, up education and health benefits, and strengthen surveillance, what’s more, environment protection becomes the indicators for performance appraisal. However, many conflicts can not be solved without development, if stringent measures are taken, the cost of development will rise, and investment decrease; if face of this dilemma, government, enterprise and public will choose to act to their own interest, invalidating the surveillance mechanism and the law, which makes the environment more fragile. The typical case reflected in graph 1 indicates that some enterprises destroyed vegetation without restraint, disposed wastewater stealthily, and cut the cost of harnessing environment, which led to a great number of events with negative effects and acute conflicts, and at the same time, government’s surveillance authority failed. Thus it can be seen that the essence of the conflict of direct investment and environmental pollution is a conflict of interest among people, it is people who control the public power influence and deprive of the rights and interests of others, thus the control and influence of public power become a key link in the process of conflict generation and resolution. Simultaneously, the stakeholders of direct investment and environmental conflict are both beneficiary and victim, namely when government, enterprise and people enjoy growth, at the same time they also pay the cost of environmental damage. When the government select growth incentives, the capital input accelerate, negative externalities increase. Including government civil servants, businessmen and people pay the cost for damage caused by the deterioration of land, water and air.

Whether it could keep the sustainable environment and balanced growth and conflict in the process of selecting continuously grow? The flowing part is specifically trying to build coordinated intervention of the incentive mechanism corresponding to the government, enterprises and public, hoping to solve the environmental conflicts from the source.

4.1 Environmental intervention mechanism based on government synergy

The establishment of collaborative intervention mechanism should be started from the local government, based on the local government, and rely on the local government, in this regard, the following construction and perfection of environmental protection and governance mechanism are needed.

The establishment of collaborative intervention mechanism should be started from the local government, based on the local government, and rely on the local government, in this regard, specific need and perfect the construction of environmental protection and governance mechanism:

- (1) make environmental protection as civil rights endowed by the Constitution and ensure people’s right to protect the environment;
- (2) found a public hearing or decision-making mechanism on important projects in order to be open to public’s opinion;



(3) form an environment priority system; build an early-warning mechanism; promulgate the development plan of economic, resources and environment as to undergo public's supervision;

(4) set up an environmental compensation mechanism: through taxation legislation, levy compensatory or punitive tax on environmental hazards or grand projects;

(5) draw up a profound educational training program to educate enterprises as well as people on technology and skills;

(6) increase the input on technology and innovation, and change the economic growth pattern, setting a creative collaborative mechanism for all the society;

(7) encourage the public and social organizations to monitor the environment, and reinforce the collaborative mechanism, maintaining channels for communication among government, enterprises and people;

(8) build a conflict early-warning mechanism, making use of media and social organizations to reduce and prevent social conflicts, and build a compensation fund for environment pollution in order to make amends to the victims;

(9) draw out regional environmental protection regulations which must be observed and enforced so as to restrict the pollution made by state-own and multi-national enterprises.

4.2 Environmental intervention mechanism based on enterprise synergy

At the same time, the construction of collaborative intervention mechanism between direct investment and environmental conflicts should be started from enterprise. It could be carried out from the following aspects simultaneously.

(1) Establish an open evaluating system of social responsibility for enterprises to raise their concern for environmental protection; to improve the process of investment decision, emphasizing environmental analysis and popularizing the "one-vote negation" system.

(2) Set up "environment account" for enterprises evaluated by professional agents.

(3) Step up an indicator for carbon emission, and to limit the amount of it through market regulation.

(4) Form an environmental early-warning mechanism and compensation fund, and set an internal environmental monitoring system, publishing its monitoring results at fixed periods.

(5) Strength the on-the-job training, the work standards, and the system of job responsibility; raise staff's environmental consciousness.

(6) Upgrade technologies and innovation and to eliminate the backward production capacity in time to improve the comprehensive efficiency.

(7) Lay stress on the public communication and to receive public surveillance; build up a negotiate mechanism to reduce the conflicts.

(8) Strength the negotiation mechanism in order to keep the channel open for negotiation among government, public and related organizations, and to set up a early-warning mechanism.

4.3 Environmental intervention mechanism based on public synergy

In the construction of collaborative intervention mechanism between direct investment and environmental conflicts, people, as another major groups in addition to the

government and enterprise, need to establish the following coping mechanism from excitation aspect.

(1) Under the interference of NGO establish a collaborative mechanism for public benefits, environmental protection and supervision; propagandize basic value orientation of environment and provide professional service to meet public's need for knowledge of environmental protection.

(2) Innovate technology through media's interference, revealing the vicious act of polluting environment and guiding people the right way to deal with environmental conflicts.

(3) Through people's self-motivation interference strengthen the dialectical education between economic development and environmental protection, constructing public's conscious of social responsibility, energy saving and protecting environment; know how to use related laws and regulations to ensure their rights of environment surveillance.

(4) Through external interference to join the environmental protection treaty of international organizations or neighboring countries; found an environmental secure mechanism of mutual trust.

(5) Through negotiation interference maintain the channel for communication and consultation among government, enterprise and people, and install a conflict prediction and resolution mechanism.

(6) The self-adaptive interference of socially moral sense and universal values construct a common sense of environmental protection and resist against environmental damage. In fulfilling this requires not only laws and regulations, but also a national education system for environmental protection to disseminate the environmental value system and moral code to be abided by the whole society.

(7) A creative synergic mechanism of interference structure an environmental controlling mechanism to solve the problem of district and departmental partition, making a social and international environmental synergic mechanism of interference, and finally connect the international laws and regulations with that of the domestic.

5. Conclusions

Developing countries' craving for direct investments derive from their innate economic and social advancement as well as political appeals: direct investments bring about growth which enriches people and push the society forward. However, direct investments, in some cases, deteriorate the environment and leads to environmental conflicts. In China, the yearly increasing direct investment not only contributed to the rapid development of economy, at the same time also brought environmental pollution and environmental conflict, especially from joining the WTO in 2001 this kind of phenomenon is becoming increasingly obvious. Based on the empirical analysis, this paper through the Chinese direct investment, social development and environmental pollution studies the causes of dramatically environmental pollution under China's yearly increasing direct investment from the perspective of environmental conflicts and environmental governance. this paper holds that the inconsistency between the growth target

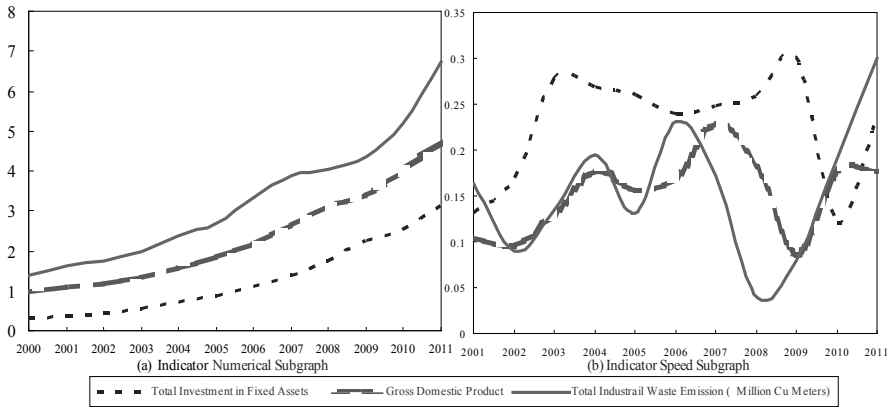


and environmental protection causes frequent conflicts of the society, the essence of which is a conflict of interest among people, and it seems impossible for developing countries to break free of this weird circuit. In order to effectively reduce and alleviate the effect of the conflicts of weird circuit, combing the social development, economic growth and environmental conflicts the three main different game-agent, namely government, enterprise, and people the paper put forward and studied respectively the construction of environmental intervention mechanism based on government synergy, the construction of environmental intervention mechanism based on enterprise synergy, the construction of environmental intervention mechanism based on public synergy in the hope of acting as one to the problem of economic growth and environmental damage at their source, and effety intervene the environmental conflicts, which is beneficial to the whole economy act as a virtuous circle development

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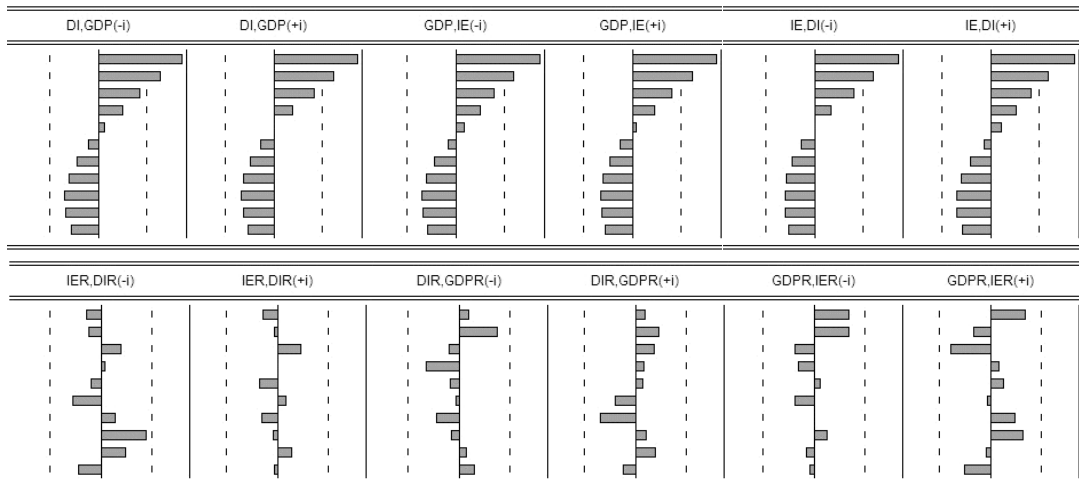
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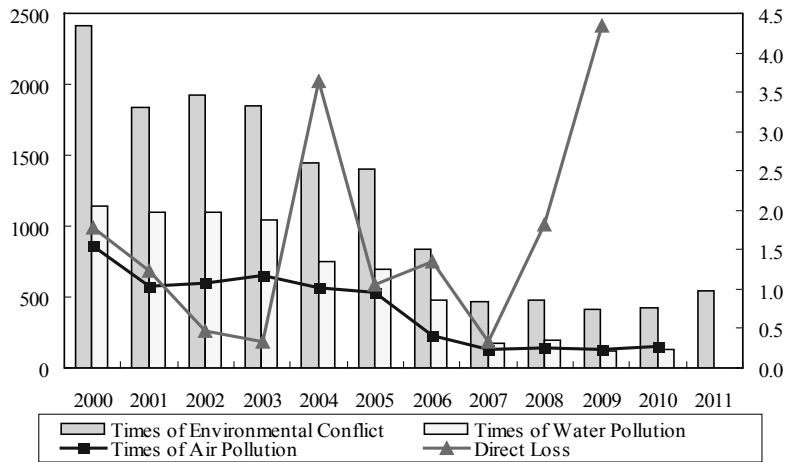
(Note: 1.The information comes from "China statistical yearbook, 2001-2012" and "China environmental statistical yearbook 2000-2011"; 2. b subgraph is the growth in value of three index sequences.)

Figure 1: 2000-2011 Chinese fixed asset investment, gross domestic product, industrial gas emissions



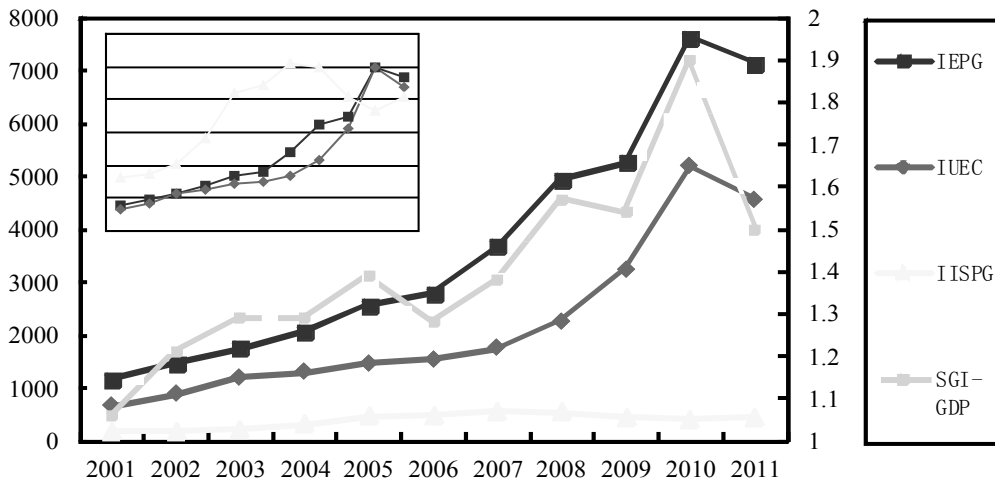
(Note: 1. i represents lag period, from top to bottom in turn is 1-10 of lag correlation coefficient; 2. The dashed inside and outside represents the confidence region.)

Figure 2 Schematic diagram of lag correlation between direct investment, lag correlation and pollution



(Note: 1. The data comes from “China statistical year book 2001-2012”; 2. Due to the different statistical methods, lack of number of water pollution and air pollution data in 2011, lack of direct loss data from 2009 to 2011; 3. The scale at the left is corresponding to the first three indicators, the scale at the right is corresponding to the loss indicator.)

Figure 3 2000-2011 China’s environmental conflicts and loss distribution diagram



(Note: 1. IEPG - Investment of environmental pollution governance; IUEC - investment of urban environmental construction; IISPG - investment of industrial source pollution governance; SGI-GDP - the share of governance investment in GDP; 2. The data from the China environment statistical yearbook 2002-2012; 3. The graph is a trend comparison after three indicators normalized; 4. The scale at the left is corresponding to the first three indicators, the scale at the right is corresponding to GDP rate.)

Figure 4 2002-2011, China’s environmental abatement investment trend map

Table 1 The statistics of the causal relationship between direct investment, social development and poll

relation	Granger causality	The best lag period	F value	P value of F	Conclusions
Causal relationship between the parameter values	$R_t(DI) \not\leftrightarrow R_t(GDP)$	2	31.2295/28.5470	0.0011/0.0018	reject / reject
	$R_t(GDP) \not\leftrightarrow R_t(IE)$	2	4.8490/34.2361	0.0675/0.0012	accept / reject
	$R_t(IE) \not\leftrightarrow R_t(DI)$	2	5.7720/18.6847	0.0502/0.0048	accept / reject
Causal relationship between the in growth value	$R_t(DIR) \not\leftrightarrow R_t(GDPR)$	2	0.7274/1.4678	0.5459/0.3326	accept / accept
	$R_t(GDPR) \not\leftrightarrow R_t(IE)$	2	0.1848/6.8903	0.8379/0.0506	accept / accept
	$R_t(IE) \not\leftrightarrow R_t(DIR)$	2	1.4678/0.7069	0.3326/0.545	accept / accept

(Note : 1. The best lag period fixed by the AIC criterion; 2. The confidence coefficient of P is 5%)

Table 2: The typical conflict events during 2010-2012 in China

Nature	Event	Time	Location	Consequence	Influence and comment
People and Government	slag leakage of Guangdong Zijin Mining	2010	Guangdong Dingjiang, Xinyang	As cuprate leakage flows into Tingjiang through drainage channels, Tingjiang river was contaminated seriously, and the direct loss amounts to 3.18771 million. It is exactly in the same year, on 28 th , September, dam break happened in the tailings reservoirs, resulting in 28 loss or death.	The enterprise was criticized in public notice by the environmental protection bureau, however, it discharges its waste stealthily, employing tricks of delaying and concealing, and government's poor execution worsen the situation.
	Zhou Qu mud-rock flow catastrophe	2010	Zhouqu county, Gansu Province	Mud-rock flow of 1,000,000 cubic meters in Zhouqu county caused a death toll of 702, 1042 severe injury and 42 missing.	The over exploitation of forest and mining resources sowed the seeds for Zhouqu mud-rock flow catastrophe.
	blood lead catastrophe	2010-2011	Hunan, Hubei and Henan Province	There has been 9 case of blood lead exceeding in Hunan, Chenzhou of Hunan, Chongyang of Hubei, Jiyuan of Henan, many villagers were found the level of lead in the blood exceed its proposed maximum.	The enterprises' illegal mining, usage of opaque heavy metal and the discharge of it escape the supervision of governments.
	Harbin pharmaceutical main plant environmental contamination disaster	2011	Harbin	The factory's polluting emissions and sewage has long been contaminated its surrounding, threatening inhabitants living environment seriously.	Inhabitants' struggle and requirement never get the concern of the administration, suggesting the interest of enterprise overrides that of the environment.

Nature	Event	Time	Location	Consequence	Influence and comment
People and enterprises	Hainan APP project	2009-2010	Hainan Province	Sinar Mas Group APP invest 100 million to construct a 3500 thousands alien species supplemented cultivation, generating the disappearance of 25% Hainan tropical forest.	Environmental organization and ecologists had disagreements, but it can't stop the project from expanding to districts of Guangxi and Yunnan province, evanishing local species.
	Demolition of houses for real estate development	2009-2012	all over China	Compulsory demolition and removal cause several case of death in Wucan of Guangdong, Leqing of Zhejiang, Fuzhou of Jiangxi, Changchun of Jilin, Zhuzhou of Hunan as well as Hubei, Guizhou, and Hunan Province.	In the name of developing cities, land agents destroy people's home disregard laws and cause conflicts.
	explosion of pipeline for gasoline and natural gas in Dalian	2010	Dalian	The crack of this pipeline polluted the surrounding environment seriously.	The sea area was polluted; argument was raised about the construction of big chemical projects.
	PX project of Zhen hai county, Zhejiang Province	2012	Zhenhai	Local government agrees to introduce the PX project, and people are against it for the worry of environmental pollution.	The possibility of endangering people's health brings about thousands of people's protection in the way of "walking".
	excessive amounts of PM2.5 Beijing	2010	Beijing	American Embassy of Beijing issued the monitoring data of PM2.5, which exceeds the highest pollution index by 500.	Government balked at people's panic triggered by air contamination, resulting in the loss of its reputation.
	Mo-Cu smelting project in Shifang city, Sichuan Province	2012	Shifang City	The local government's decision to introduce a large scale smelting project meets with inhabitants' protection.	Government's idea of development and concept of political achievement fail to get public support.
	Large-scale marine discharge project	2012	Nantong city, Jiangsu Province	The construction of pulp and paper project by Oji Paper Co. of Japan met with strong protest by local people for the direct sewage disposal into the sea.	Local government often sacrifice environment to attract foreign investment.
	Serious contamination by some foreign enterprises such as Armani trigger simultaneous protest of people	2012	Shaoxing City, Zhejiang Province	Waste gas and sewage danger the environment	In pursuit of political achievement, local government let the polluting enterprises go unchecked because of its poor execution and slack supervision litigation
Cadmium pollution in Longjiang of Guangxi	2012	Longjiang of Guangxi	Excess amount of cadmium in Longjiang River poison a large amount of fish and drinking water.	Economic development lack of environmental protection cause the environment gets worsen with each season.	

(The source of information: statistic year book and Each media news reports 2010-2012)

Table 3 The Granger causality test results between the index of correlation pollution control

relation	Granger causality	The best lag period	F value	P value of F	Conclusions
Take TIIPC as research object	$R_t(IEP) \not\leftrightarrow R_t(DI)$	2	4.2750/11.7465	0.1016/0.0212	accept / reject
	$R_t(IEP) \not\leftrightarrow R_t(GDP)$	1	0.0376/15.3064	0.8518/0.0058	accept / reject
	$R_t(IEP) \not\leftrightarrow R_t(IE)$	2	10.7112/1.5174	0.0248/0.3233	reject / accept
Take PAI as research object	$R_t(IPH) \not\leftrightarrow R_t(DI)$	2	2.1059/0.2431	0.2373/0.7949	accept / accept
	$R_t(IPH) \not\leftrightarrow R_t(GDP)$	3	17.9594/0.5247	0.1714/0.7387	accept / accept
	$R_t(IPH) \not\leftrightarrow R_t(IE)$	2	2.1495/4.7355	0.2323/0.0882	accept / reject

(Note : 1. "TIIPC" and "PAI" represent "total investment on industrial pollution control" and "pollution abatement investment" respectively; 2. The best lag period fixed by the AIC criterion; 3. The confidence coefficient of P is 10%)