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February 1998

Online at <https://mpra.ub.uni-muenchen.de/13150/>

MPRA Paper No. 13150, posted 04 Feb 2009 07:09 UTC

Joint Implementation: Sacrifices or Opportunities for China?

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In 1992, the Norwegian delegation introduced the concept of joint implementation (JI) into the negotiations for the United Nations Framework Convention on Climate Change (FCCC) aimed at, in the long term, stabilizing greenhouse gas (GHG) concentrations in the atmosphere. At the Rio Conference on Environment and Development, JI was put into the final text of Article 4.2 of the FCCC that 154 countries and the European Union signed. This is deemed a breakthrough for JI as a climate policy instrument. The inclusion of JI in the FCCC is also widely regarded as a first step towards a global regime of tradeable GHG emission permits.

In brief, JI means that the investor country invests in emission abatement projects in another (host) country where the costs of abating GHG emissions are lower than trying to achieve an equivalent abatement within the own country and is credited, in whole or in part, for emission abatements in its own GHG accounts. Thus, JI offers the potential for lowering the global costs of abating GHG emissions.

Economic rationale for JI projects with China

China's contribution to global CO₂ emissions, which is high already, is expected to grow significantly (see Table 1). Thus, advocates of controlling CO₂ emissions call for substantial efforts in China. However, the Chinese authorities have claimed that China cannot be expected to make a significant contribution to solving the carbon emission problem, by arguing that ignoring the industrialized countries' responsibility for the majority of global CO₂ emissions and simply asking for special action on China's part would seriously harm China's economic development and improvement of living standards. Then, what are the economic effects of possible future carbon limits for China? How can we encourage China's participation, given the global characteristics of climate change and China's importance as a source of future CO₂ emissions in line with its industrialization and urbanization?

Using a dynamic computable general equilibrium model of the Chinese economy, Zhang (1997a, 1998) has analysed the implications of two scenarios under which China's CO₂ emissions in 2010 will be cut by 20% and 30% respectively relative to the baseline. The two emission targets are less restrictive in that they are not compared with the level of emissions in a single base year, but with the baseline CO₂ emissions in 2010, the latter being 2.46 times that in 1990. The carbon tax required to achieve a 20% cut (Scenario 1) in CO₂ emissions in 2010 relative to the baseline is estimated to be US\$ 18 at 1987 prices, while the corresponding figure necessary to achieve a 30% cut (Scenario 2) in CO₂ emissions in 2010 is estimated to be US\$ 35 at 1987 prices.

Even under the two less restrictive carbon emission scenarios, China's gross national products (GNP) drop by 1.5% and 2.8% respectively in 2010 relative to the baseline, indicating that the economic losses tend to rise more sharply as the degree of the emission reduction increases. Given the fact that most studies surveyed by the IPCC (Intergovernmental Panel on Climate Change) second assessment report estimate that the economic losses under very restrictive carbon limits (e.g. the stabilization or even 20% below 1990 levels in 2010) are reported not to exceed 2% of GNP for the OECD countries, the above results clearly indicate that China would be one of the regions hardest hit by carbon limits.

This, combined with the developed countries being responsible for the majority of global CO₂ emissions, explains the Chinese government stance in carbon abatement.

Table 2 shows the carbon tax levels across the countries and regions considered. It can be seen that the carbon taxes required in China in order to achieve the same percentage of emission reductions relative to the baseline are much lower than those of the developed countries and the world average. This provides the economic rationale for the development of JI projects with China. Indeed, it is in the direct interest of the developed countries to encourage such a take-up, since this will act as a relief of pressure on these countries for yet more stringent measures to reduce their GHG emissions.

Table 1 *Energy-related results for the baseline scenario of the Chinese economy*

	1990	2000	2010
Energy consumption (million tce (tons of coal equivalent))	987.0	1546.4	2560.4
Energy consumption per capita (tons of coal equivalent)	0.86	1.19	1.80
Coal (million tons)	1055.2	1578.9	2418.2
Coal's share in total energy consumption (%)	76.2	72.9	67.5
Electricity (terawatt-hours)	623.0	1395.7	2745.2
Energy intensity of GNP (tce per million yuan)	717	504	403
Elasticity of energy consumption with respect to GNP	0.56 ^a	0.55 ^a	0.68 ^a
Elasticity of electricity consumption with respect to GNP	0.84 ^a	1.01 ^a	0.93 ^a
Average annual rate of energy conservation (%)	3.60 ^a	3.46 ^a	2.21 ^a
CO ₂ emissions (million tons of carbon)	586.9	898.9	1441.3
CO ₂ emissions per capita (tons of carbon)	0.51	0.69	1.01

^a The figures in 1990 are annual average for the period 1980-1990, in 2000 for the period 1990-2000, and in 2010 for the period 2000-2010.

Sources: Zhang (1997a, 1998).

Table 2 *Carbon taxes across regions in 2010 (at 1985 \$ per ton of carbon)*

	USA	Japan	EEC	Total OECD	China	World
Scenario 1	53.4	55.9	85.7	62.7	10.1	45.1
Scenario 2	120.3	103.1	158.6	132.3	18.3	92.9

Sources: Zhang (1997a, 1998).

China's stance on JI

Many Parties to the FCCC are keen to see JI as a key part of any protocol, although it is not without conceptual and operational problems (Zhang, 1997a, 1997b). For example, the US has incorporated JI in its Draft Protocol to the FCCC submitted on 17 January 1997 to its Secretariat. Then, what is China's stance on JI? At first glance, it would seem that JI should be in China's interest on the following grounds.

First, China is even more vulnerable to climate change than the developed countries, and a broad commitment to JI would also reduce the potential damage from climate change in China itself, since after all it is not only the developed countries whose climate will change if GHG emissions are not reduced.

Second, driven by the threat of further degradation of the environment and the harmful economic effects of energy shortages, China is already determined to push energy conservation and enhanced energy efficiency in general and more efficient coal usage in particular. While taking such drastic domestic efforts, China badly needs assistance and economic and technical cooperation with the developed countries, because of very large amounts of capital and technical expertise required. In this regard, JI could provide an opportunity for China to get increased access to more advanced energy efficiency and pollution control technologies and additional funding.

However, the fact is that from the beginning, China, joining in many other developing countries, is strongly opposed to the concept of JI. With the support of many western environmental non-governmental organisations, they have accused the developed countries of using JI as a means of buying their way out of responsibility for climate problems and at the same time postponing the radical changes in their own consumption patterns and passing the responsibility on to the developing countries. The fact that JI is voluntary and is based on the decision of both parties will probably not have much effect on their view. They have also expressed the fear that:

(i) all their low-cost abatement options would be used up so that they would face only high-cost options if they would be subsequently required to reduce their own emissions;

(ii) the OECD countries will redefine existing development aid projects as JI projects and thus reduce their aid budgets accordingly. Small developing countries particularly fear that JI will tend to shift the OECD countries' attention towards those developing countries with large economies and GHG emissions; and

(iii) developed countries may use JI to interfere their internal affairs, given that the implementation of JI projects across national borders touches on the issue of national sovereignty.

Acknowledging the strong opposition to JI in the developing world, the first Conference of the Parties to the FCCC in Berlin in April 1995 endorsed a pilot phase of JI referred to as activities implemented jointly (AIJ) among Annex I Parties (i.e., OECD and countries with economies in transition) and, on a voluntary basis, with non-Annex I Parties (i.e., developing countries). During the AIJ pilot phase that ends no later than the year 2000, emission reductions achieved are not allowed to be credited to current national commitments of investor countries under the FCCC. However, because Annex I countries do not provide adequate domestic incentives to encourage their private sector participation in project financing, since inception of the pilot phase, there is a relatively small number of AIJ projects that have so far been officially reported to the FCCC Secretariat as being accepted, approved or endorsed by the governments of the host and investor countries. Moreover, the geographical distribution of these projects is quite uneven, with very few AIJ projects being established in Africa and Asia. Given the short time horizon of the AIJ pilot phase and the lack of a diversified base of the current AIJ projects, there would not be enough practical experience to provide an empirical basis for a decision on whether to move forward beyond the pilot phase, if the current pattern would continue.

China in action

The growing environmental concern built into both international and national programmes and China's rapid integration into the world economy tend to make China more amenable to international cooperation on the environment. Indeed, China has been supporting international cooperation on combating global warming in accordance with the principle of "common but differentiated responsibilities". China played an active role in preparing the FCCC and in the IPCC, co-chairing its Energy and Industry Subgroup of the Working Group III. At present, China is actively participating in a negotiating process aimed at producing a protocol or another legal instrument to deal with the threat of climate change in the post 2000 period in accordance with the "Berlin Mandate". Until now, the Chinese government has ratified the FCCC and China's Agenda 21, the latter serving as a white paper of China's population, environment and development in the 21st century. A National Group of Co-ordination on Climate Change has been established with the involvement of 18 ministerial agencies including the Ministry of Foreign Affairs, the State Planning Commission, the State Science and Technology Commission, the Ministry of Electric Power, the National Environmental Protection Agency, and the China Meteorological Administration. Its mission is to co-ordinate ministries and agencies in their efforts to address climate change, with the four working groups dealing with scientific assessment

(China Meteorological Administration and Chinese Academy of Sciences are in charge), impact assessment and response strategies (State Science and Technology Commission and National Environmental Protection Agency are in charge), economic implications (State Planning Commission and Ministry of Electric Power are in charge), and matters related to the Convention (Ministry of Foreign Affairs and State Science and Technology Commission are in charge) respectively. Marking the beginning of the process of developing China's response strategy for climate change, several projects have been initiated that deal with various aspects of climate change. Given the fact economic development still remains priority for China, its climate policy will focus on the so-called win-win strategies. China has also made great efforts to abolishing current subsidies for energy consumption, reducing barriers to trade and to protecting intellectual property rights in order to facilitate the transfer and spread of economically viable low-carbon or carbon-free advanced energy technologies. All this at least indicates China's genuine concern about the potential impacts of climate change and its willingness to take all possible measures to limit the growth of its own per capita GHG emissions.

Potential areas in China's interest

If Annex I countries have showed that they are really taking the lead in significantly reducing their GHG emissions within a short time-frame and are living up to their commitments to providing adequate transfers of financial resources, technology and expertise, and if the four-year AIJ pilot phase turns out to be a success, then a increasing number of developing countries will become more positive to the concept of JI. Only then, there will be a reasonable prospect of joint implementation of abating GHG emissions between developed and developing countries, and China will no longer be sceptical about JI and tend to cooperate on JI projects. If this would be the case, what then are the potential areas in China's interest?

It is usually acknowledged that the success of JI premises an effective understanding of local (host country) development aspirations and the use of JI to push ahead with efforts to achieve these aspirations. Thus, in order to enhance their possibility of success, there is the need to make due consideration of local objectives and local conditions in designing JI projects. Considering that China is more concerned with local pollutants, such as SO₂, NO_x and particulates from coal burning, and regards them as its own environmental priorities, it is expected that the most potential areas of interest to China are related to those activities and options aimed at: (1) improving the efficiency of energy use, particularly at energy-intensive energy sectors (for example, iron and steel industry, chemical industry, building materials industry, and power industry) and devices (for example, industrial boilers); (2) pushing efficient use of coal through increasing proportion of raw coal washed; popularizing domestic use of coal briquette; substitution of direct burning of coal by electricity through development of large-size, high-temperature and high-pressure efficient coal-fired power plants; expanding district heating systems and developing co-generation; increased penetration of town gas into urban households; and through development and diffusion of environmentally sound coal technologies; (3) speeding up the development of hydropower and nuclear power; and (4) developing renewables. These emission-abating options, though aimed at reducing GHG emissions, will contribute to the reductions of local pollutants and thus will be beneficial to a more sustainable development of the Chinese economy.

Conclusions

The extent to which non-Annex I countries would work together with Annex I countries in combating global warming would be contingent on Annex I countries really taking the lead in reducing their GHG emissions and providing adequate technology transfer and financing. This is the best means of encouraging developing country participation and convincing hitherto sceptical countries of JI as a cost-effective climate measure. Moreover, given the breadth of the subject of JI and its close linkage with national sovereignty, global political agenda, and national development priorities, a wide and successful

implementation of JI will be conditional upon the consensus on a variety of operational issues such as the form of JI, criteria for JI, the establishment of baselines against which the effects of JI projects can be measured, and the verification of emission reductions of JI projects. Even if such a consensus would be reached, given the fact that AIJ/JI remains virtually unknown to the majority of social and economic sectors in China as in most developing countries, it is still unrealistic to expect that AIJ/JI projects with China work as smoothly and fast as the developed countries wish. This underlines the need to promote JI through pilot projects in China's interest and capacity building in China in order to make JI gain ground and provide mutual benefits to all the parties involved. Furthermore, the extent of China's cooperation on JI will to some extent depend on the certainties about climate change. This in turn underlines the need for the scientific community to continue its efforts to clarify the scientific basis for climate change problem in order to lower the uncertainties about its magnitude, timing and regional patterns.

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