

A “Paradox” in China’s Environmental Management: An Argument From a Comparative Study on Waste Recycling Policies Between China and Japan^{*}

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China appears to have a “paradox” in its environmental management policies. For example, China’s recycling policies appear paradoxical. With its rapidly expanding economy, China is now the world’s largest emitter of urban waste. Under such a situation, China is aiming to build up a recycling economy by enacting a number of related laws. Despite the development of waste recycling regulations, however, the load on the environment by continuously increasing waste has not reduced in China so far. What explains this seemingly paradoxical situation of waste recycling in China? It has been pointed out in the previous study on China’s climate change policies that environment protection falls under the rubric of sustainable development in China. The question here is whether the same story can be applied to areas other than climate change in China’s environmental management. This paper examines it in the area of its waste recycling policy. This paper conducts an evaluation of waste recycling regulations in China by comparing it with the experience of Japan, China’s next-door advanced country. It concludes that the waste recycling regulations in China do not primarily aim at reducing the environmental load by reducing the amount of waste but rather for the main purpose of recycling and reusing resources effectively for the sake of economic development.

Keywords: China, paradoxical environmental management, recycling policy, economic development, sustainable society, the environmental Kuznets curve

Introduction

China appears to have a “paradox” in its environmental management policies. For example, China’s climate-relevant policies appear somehow paradoxical. On the one hand, China, the world’s largest energy consumption and greenhouse gas emitter, has steadfastly refused to commit to any internationally binding emissions reduction target. On the other hand, the country has invested enormously and made great strides in renewable energy. Over the past few years, the country has become the world’s leading manufacturer of solar panels, owner of the world’s largest network of hydropower stations, and a major global player in wind turbine industries.

It has been pointed out that the “paradox” can be reconciled on the basis of China’s priority for growth, which is critical in ensuring the Communist Party’s grip on power (Ong, 2012). Economic development

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remains the Chinese leadership’s foremost priority. Climate change falls under the rubric of sustainable development in China—it is not a stand-alone issue, nor is it treated merely as an environmental concern.

The question here is whether the same story can be applied to areas other than climate change in China’s environmental management. This paper examines it in the area of its waste recycling policy.

With its rapidly expanding economy, China is now the world’s largest emitter of urban waste as well as greenhouse gases. A large volume of waste affects the environment negatively in the long term. Under such a situation, China is aiming to build up a recycling economy by enacting laws such as the Regulation on the Disposal of Waste Electrical and Electronic Equipment at the national level. Compared to advanced countries like Japan, it would appear on the surface that comparable legislation on waste recycling is being adopted. In that sense, it can be said that waste recycling regulations in China are harmonized with international norms.

If waste recycling regulations in China are indeed harmonized with international norms, it will probably create great business opportunities and international cooperation for advanced countries which possess a great deal of technologies related to recycling. Hence, the situation of China with regard to recycling policies has attracted much international attention in recent years, and quite a number of research has been conducted in this area as well (Shinko Research, 2003; Metal Economic Research Institute, 2004; E&E Solutions Inc., 2005; Institute of Developing Economies, 2007; JFE Techno-Research Corporation, 2009; W. J. Gao & Y. Z. Gao, 2011; Kojima, 2012). Most of these studies are reporting the remarkable development of waste recycling regulations in China.

Despite the development of waste recycling regulations, however, the load on the environment by continuously increasing waste has not reduced in China so far. As it will be shown below, for example, China’s per capita volume of un-recycled industrial waste has been increasing rapidly in line with economic development and has shown no sign of turning down.

What explains this seemingly paradoxical situation of waste recycling in China? How should we evaluate the current status of waste recycling regulations in China?

This paper conducts an evaluation of the current status of waste recycling regulations in China by comparing it with the experience of Japan, China’s next-door advanced country. It concludes that the waste recycling regulations in China do not primarily aim at reducing the environmental load by reducing the amount of waste generated but rather for the main purpose of recycling and reusing resources effectively for the sake of economic development.

This paper is divided into five sections. First of all, section one will examine the correlation between the progress of waste recycling and economic development in Japan and China. Based on this, it can be intuitively said that measures taken by China to tackle the environmental load caused by an increasing amount of waste output would not be as advanced as countries like Japan since the country’s level of economic development is still insufficient.

Next, in section two to section four, this hypothesis will be verified by comparing the development of waste recycling regulations in China and Japan and exploring the characteristics of waste recycling regulations in China. Such a comparison shows that regulations in China have not achieved the sufficient level in terms of comprehensiveness and integration, and thus, it cannot be said that the regulations have necessarily reached the level of advanced countries like Japan. Finally, it comes to the conclusion that waste recycling in China is carried out not for the purpose of reducing the environmental load by reducing the amount of waste output but rather to mainly reuse and recycle resources effectively for the sake of economic development.

Economic Development and Waste Recycling in China and Japan

According to the environmental Kuznets curve hypothesis, when an environmental load index is plotted on the vertical axis against the national income level on the horizontal axis, the curve can be seen rising to the right up to a certain level of income beyond which it will start to drop (Seldon & Song, 1994; Grossman & Krueger, 1995; Cole, Rayner, & Bates, 1997). The environmental Kuznets curve hypothesis is sometimes used in comparing the environmental loads of advanced countries and developing countries, although some economists have harboured doubts about its validity (Arrow et al., 1995).

As there is a general trend that waste output increases with the national income level, it may appear that the environmental Kuznets curve hypothesis does not seem to make sense. However, if you consider the situation that waste recycling in various countries has progressed, what is important about environmental load is not necessarily the overall volume of waste but rather the amount of disposing waste without recycling.

In order to highlight the progress of waste recycling in China, this study examines the correlation between per capita volume of un-recycled industrial waste output and per capita GDP (adjusted on a purchasing power parity basis) between China and Japan. The reason why industrial waste is selected as the study subject instead of general waste is because relative long-term statistics on industrial waste is available for use in both Japan and China compared to general waste. The GDP adjusted on a purchasing power parity basis is used because it is a suitable indicator for comparing the rise in income level against economic development. Also, per capita values instead of gross values are used for international comparison due to the large difference in populations between China and Japan.

Figure 1 plots the per capita volume of un-recycled industrial waste output on the vertical axis against the per capita GDP (on a purchasing power parity basis) on the horizontal basis. The graph for Japan is shown in diamonds while the graph for China is shown in squares.

As statistics on industrial waste output is not available prior to the 1990s in Japan, the curve is not a complete inverted U-shaped but it can clearly be seen to be dropping to the right when the per capita GDP reaches about USD 25,000. In terms of the timing, Japan experienced this threshold in the mid-1990s. On the other hand, in China where the per capita income has yet to reach USD 10,000, the per capita volume of un-recycled industrial waste output is increasing rapidly in line with economic development and the graph shows no sign of turning down.

Although this is only the graph of industrial waste output which does not include waste from households, a clear difference can be seen in the progress of waste recycling between China and Japan.

As for the correlation between an environmental load index and the national income level, it has been pointed out in existent researches that the building of a system promotes investment in environmental conservation amid heightening a society becomes to have enhanced demand for good environmental and more effort to invest in environmental protection in line with an increase in income level (Andreoni & Levinson, 2001). Taking it into consideration, two explanations on waste recycling regulations in China and Japan can be derived intuitively from the figure below.

The explanation on Japan is that in line with economic development, the per capita un-recycled industrial waste output declines as a result of measures being taken in response to mounting concerns over the environmental load caused by increasing industrial waste output. On the other hand, the explanation on China is that due to the insufficient level of economic development, measures to reduce the environmental load due to

the increase in waste output are not as advanced compared to advanced countries like Japan.

The following sections verify the actual development status of waste recycling regulations in China and Japan in order to examine these two hypotheses.

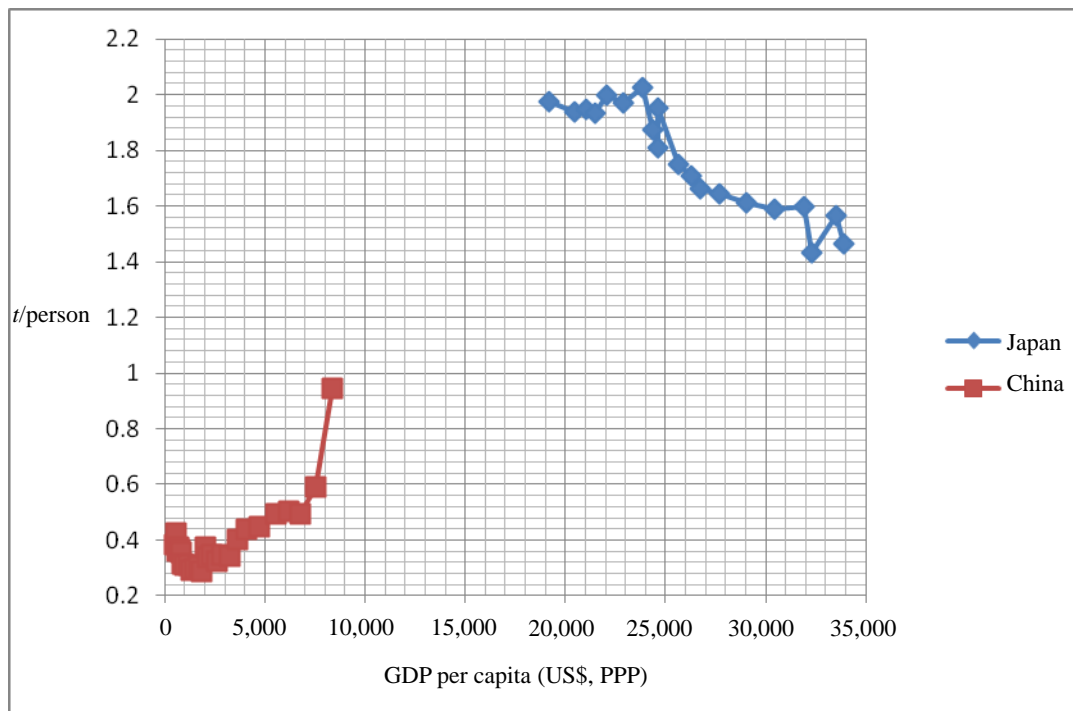


Figure 1. Per capita volume of un-recycled industrial waste output. Source: Created by the authors based on the report “Discharge and Treatment of Industrial Waste” by the Ministry of the Environment (2012).

Developments in Waste Recycling Regulations in Japan

This section verifies the historical progression of waste recycling regulations in Japan (Ministry of Environment, 1969-2012).

In Japan, industrial development activities and rapid urbanization in line with the high economic growth in the 1960s resulted in the diversification of waste quality and rapid increases in the waste output. Amid such a situation, the Waste Management and Public Cleansing Law was enacted in 1970. This law aims to raise the level of public hygiene and conserve the living environment through the containment and proper disposal of waste, and defines the obligations that the citizens, businesses, national and local governments should shoulder as well as the rules governing the disposal of waste.

Subsequently, from the 1970s to the 1980s, in line with changing lifestyles and further economic activity, the volume of waste generated continued to increase and its variety became even more diversified. Meanwhile, securing waste disposal facilities became increasingly difficult. As awareness of the risk of damaging the environment due to increasing waste became more widespread, inappropriate waste disposal such as the illegal dumping of waste also became a huge social problem.

In order to respond to such a situation, movements to promote the recovery and use of renewable resources and the recycling of waste so as to reduce the load on the environment were seen on the policy front in Japan after the 1990s.

For example, in 1991, the Waste Disposal Act was amended with the aim of ensuring the appropriate

disposal of waste, promoting recycling and waste reduction. Subsequently, frequent amendments to the Act were made as the types of waste and various related problems became more diversified.

In the same year 1991, the Law for the Promotion of Utilization of Recycled Resources was enacted for the purposes of environmental conservation, waste reduction, and effective use of resources. This law aims to promote recycling by mainly companies and the use of renewable resources in the product design and manufacturing process. In order to promote waste recycling, this law also defines the rules on displays regarding the type of material used so as to make it easier to collect and sort different waste materials such as aluminum and steel which are required under this law.

In the 1990s, further legislative measures with regard to recycling were promoted such as the Law for the Promotion of Sorted Collection and Recycling Containers and Packaging and the Law for the Recycling of Specified Kinds of Home Appliances. The former law was enacted in 1995 and aimed for effective use of resources and waste reduction by recycling containers and packaging such as glass bottles and pet bottles that have been collected and sorted, into raw materials and products for reuse in new products. The latter law was enacted in 1998 for the purpose of promoting the effective use of resources and waste reduction by recycling useful parts and materials from home appliances such as air-conditioners, televisions, refrigerators, washing machines, etc. that have been discarded from general households and offices.

In line with the changes in lifestyle and economic activities, waste recycling in Japan came to be regulated under individual laws such as the Waste Management and Public Cleansing Law until the 1990s. However, ad hoc measures based on these individual laws were not effective enough to curb the increasing amount of waste generated. In addition, it became more and more difficult to secure land for final disposal plants over the years. Also, environmental problems caused by illegal dumping became more complex.

Therefore, in order to solve such waste recycling problems, starting in the early 2000s, the Japanese government started to promote reduction and reuse of waste in addition to strengthening the existing recycling measures. That is: (1) measures to “reduce” the generation of waste through the adoption of resource-saving and lifespan-extension measures in products; (2) measures to “reuse” parts from collected products; and (3) measures to “recycle” products by the companies. This comprehensive waste policy is known as “3R” (Reduce, Reuse, and Recycle).

At the beginning of the comprehensive “3R” policies, the Basic Law for Establishing the Recycling-based Society was newly enacted in 2000 to form the basic legal framework for waste recycling measures. This law supersedes the individual laws on waste recycling and defines: (1) the legislation on “3R” implementation; (2) the provisions on extended producer responsibilities; and (3) the formulation of a basic plan by the government to promote recycling-based society.

Together with this basic law, individual laws related to waste recycling were developed as a whole package. First, in 2000, the Law for the Promotion of Utilization of Recycled Resources was amended drastically and renamed as the Law for Promotion of Effective Utilization of Resources. Under this law, from the viewpoint of reducing waste, companies are legally obliged to: (1) reduce the amount of raw materials used in manufacturing products such as car, home appliances, personal computers, gas and kerosene appliances, etc.; (2) design products to improve durability; (3) standardize and share the parts; and (4) promote long-term use through repair. In addition, from the viewpoint of promoting recycling, companies were legally obliged to take systematic measures to promote the use of by-products such as slag and sewage sludge generated by factories.

Besides, individual waste recycling laws such as Construction Material Recycling Law (2000), Law for

Promotion of Recycling and Related Activities for Treatment of Cyclical Food Resources (2000), and Law for the Recycling of End-of-Life Vehicles (2002) were adopted subsequently, in addition to the existing recycling laws such as containers and packaging and home appliances. Most recently, Law for the Recycling of Small Electronics just came into force in April 2013. The law aims to build a new recycling system to extract rare, precious and other reusable metals from 96 small home electronic devices, including mobile phones and digital cameras.

Developments in Waste Recycling Regulations in China

Next, this section verifies the history of waste regulation in China (Yoshida, 2006, 2011; W. J. Gao, & Y. Z. Gao, 2011; Kataoka, 2011).

In China, the Law on the Prevention and Control of Environmental Pollution by Solid Waste, which defines the provisions governing the disposal of industrial waste, household waste, and hazardous waste, was enacted in 1995 as the basic law on the overall waste disposal. The law was amended in 2000 to articulate the obligation of product manufacturers to prevent pollution caused by their waste.

The Cleaner Production Law enacted in 2002 requires companies to adopt production processes with minimal discharge of pollutants, and to produce products that are easy to repair, recycle, and reuse throughout the production life cycle. The Recycling Society Promotion Law enacted in 2008 also defines the provisions governing the recycling of renewable resources, the overall use and reuse of industrial waste, and extended producer responsibility regarding waste recycling.

Under this basic law, individual recycling regulations have been developed in the areas such as electronic waste and car waste, in which the amount of waste is expected to increase and substantial economic benefits can be expected from recycling.

For car recycling, the Regulation on the Disposal of End-of-Life Vehicles was enacted in 2001¹. In China, illegal sales of retired cars and reuse of degraded parts have resulted in transport safety problems. As a result, this law governs the recovery and recycling of cars and motorbikes under the supervision of the government. Specifically, the reuse of the main components such as the engine, direction indicators, shifting gears, suspension, and frame is prohibited. Car dismantling companies are required to recycle these parts as scrap metal.

As for electronic waste, after the draft regulation was disclosed and reviewed for public comment in 2004, the Regulation on the Disposal of Waste Electrical and Electronic Equipment was finally promulgated in 2009 after many twists and turns. This is the Chinese version of the Home Appliance Recycling Law. The regulation covers five product types—washing machines, refrigerators, televisions, air-conditioners, and personal computers. For this type of waste, the regulation mandates that: (1) the home appliance sales store is obliged to collect them back; (2) the dismantling companies are subsidized by funds collected from the manufacturers; and (3) the dismantling companies operate under a license system.

In addition, like the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS in the EU), the regulation on RoHS was implemented in 2007. The regulation covers a wide range of electrical and electronic products and requires companies to reduce the content of toxic substances such as silver and lead in products below the safety standards.

¹ In the legislative system in China, “laws” refer to “legislative laws” enacted by the National People’s Congress while “regulations” refer to “administrative regulations” or “ministerial regulations.”

Comparison of the Waste Recycling Regulations in China and Japan

Upon comparing the developments in the waste recycling regulations of China and Japan, the following differences can be pointed out.

First of all, there is a difference in the type of waste being regulated. The Waste Management and Public Cleansing Law in Japan and the Law on the Prevention and Control of Environmental Pollution by Solid Waste in China are both basic laws covering waste in general. At least judging from these basic laws, it seems that there is no difference in the type of waste being regulated between in Japan and in China. However, there is a difference in the type of products regulated under the individual waste recycling laws.

In Japan, as seen above, since the end of the Second World War until now, various waste recycling regulations have been adopted to address the changes in the type and quantity of waste that accompanies the changes in socio-economic circumstances. With the establishment of the Law for the Promotion of Sorted Collection and Recycling Containers and Packaging and the Law for the Recycling of Specified Kinds of Home Appliances in the 1990s, legislation on recycling measures for home appliances (air-conditioners, televisions, refrigerators, and washing machines) and containers (packaging, glass bottles, pet bottles, etc.) began to be developed. Furthermore, related laws on waste recycling became more extensive in the 2000s and regulated items extended beyond the existing containers, packaging, and home appliances to include construction waste (asphalt, wooden materials, etc.), food waste, and retired cars.

On the other hand in China, only automobile related waste and electronic waste (air-conditioners, televisions, refrigerators, washing machines, and personal computers) are individually regulated. The key factor here could be that these types of waste are not only expected to increase, but also have the substantial economic gains from recycling. However, the recycling regulations on containers, packaging, construction waste, and food waste are still underdeveloped. Since these items also impose heavy load on the environment, many advanced countries such as Japan have individual regulations on them. But, it is more difficult to extract the substantial economic gains from recycling compared with automobile related waste and electronic waste.

There is also a difference in the comprehensiveness of the waste recycling regulations between China and Japan. In Japan, awareness of environmental conservation and effective use of resources have increased since the 1990s, and various laws and regulations on waste recycling have been adopted. Movements to promote the use of renewable resources and the recycling of waste so as to reduce the load on the environment were seen on the policy front after the 1990s. In particular, after early 2000s, as the enactment of the Basic Law for Establishing the Recycling-Based Society shows, comprehensive strategy encompassing the "3R" measures to reduce and reuse waste along with more stringent measure for recycling was considered to be essential in order to curb the increasing amount of waste generated.

On the other hand, awareness of the effective use of renewable resources has become very prevalent in China too. As can be seen in the Cleaner Production Law and the Basic Law for Establishing the Recycling-Based Society, the rules on the recycling and reuse of waste have been developing. However, unlike Japan, regulations in China still lack the comprehensiveness of "3R" measures to reduce, reuse, and recycle waste in an integrated manner. This might show that awareness of minimizing the environmental load by reducing the amount of waste generated has still not spread sufficiently in China.

Conclusions

It superficially seems that China has adopted waste recycling laws and regulations that are on par with developed countries like Japan. However, in terms of per capita GDP, China had barely reached the levels in middle developing countries. Under such a circumstance, have the waste recycling regulations in China really achieved the level seen in advanced countries? Since economic development remains the Chinese leadership's foremost priority, does the environmental concern not fall under the agenda of sustainable development?

As shown in section one, in China where the per capita GDP (adjusted on a purchasing power parity basis) has not reached USD 10,000, the per capita volume of un-recycled industrial waste has been increasing rapidly in line with economic development and shows no sign of reversal. On the other hand, since the mid-1990s when per capita GDP (adjusted on a purchasing power parity basis) exceeded USD 20,000 in Japan, the per capita volume of un-recycled industrial waste has been on a decline until now.

According to the arguments on the environmental Kuznets curve hypothesis, two explanations can probably be derived intuitively from the results of this survey. The first one is that the per capita volume of un-recycled industrial waste in Japan has declined as a result of measures being taken in response to mounting concerns over the environmental load caused by the increase in industrial waste output in line with economic development. The second one is that the measures in China to address the environmental load caused by the increasing amount of industrial waste are not fully developed compared to advanced countries like Japan because the country's socio-economic development is still insufficient.

In order to examine these hypotheses, this study compared the actual development processes of waste recycling regulations between China and Japan in section two to section four. Consequently, the following two characteristics of the waste recycling regulations in China were highlighted. Firstly, although individual recycling regulations are established for car and electronic waste, unlike Japan, the recycling regulations embracing the extensive range of waste items still do not exist. Secondly, although recycling regulations in China include rules for the reuse and recycling of waste, unlike the "3R" measures in Japan, there are a few measures which aim to decrease the environmental load by reducing the amount of waste generated.

What can be said about these two characteristics is that waste recycling regulations in China are still lacking in terms of the width and comprehensiveness. It cannot necessarily be said to be on the same level as advanced countries like Japan. More importantly, it must be pointed out that the waste recycling regulations in China do not primarily aim at reducing the environmental load by reducing the amount of waste. Rather, the main purpose of China's recycling policies is reusing resources effectively for the sake of economic development.

While the Chinese government is showing its willingness in addressing the waste treatment issue, under the current situation where the per capita national income on a purchasing power parity basis has still not reached USD 10,000, economic development is considered to be still prioritized in reality.

China's main contention is that it is still a developing country. Thanks to economic reforms launched in the late 1970s by Deng Xiaoping, the Chinese economy has grown tremendously, surpassing Japan as the world's second largest economy in 2010. Nevertheless, China ranks only the 133rd in the world in per capita income (United Nations Development Programme, 2012). Although the economic reforms have transformed the lives of its citizens, 13.1% of its population still lives in poverty, earning less than US\$1.25 a day (United Nations Development Programme, 2012). Millions of Chinese still lack access to clean water, electricity, and

other basic infrastructure that the industrialized world takes for granted. China's emissions-intensive economy has grown rapidly in recent years, fueling the swift development in industries and infrastructure resulting from the country's growing affluence.

However, such an emissions-intensive socio-economic system in which a huge amount of natural resources is consumed and a large volume of waste is generated will affect the environment negatively in the long term. Due to urbanization and developments in industrial activity in China, the volume of waste has also increased and in 2005, the volume of urban waste became the largest in the world. In Beijing, the city which has seen the substantial population increase, the amount of city waste reached 18,000 tons a day and is still increasing at 8% a year (Ministry of the Environment, 2011). Moreover, the lack of landfill sites is a concern as most of these city wastes are being buried in landfills.

As an implication of this study, it can be proposed that China should adopt a comprehensive recycling policy like Japan's "3R" measures aiming to "Reduce," "Reuse", and "Recycle" waste in order to reduce the environmental load created by the emissions-intensive society and realize a sustainable society.

As mentioned in this paper, Japan has experienced and solved various waste problems depending on its stage of economic development over the course of its history. Given such a history, various industry in Japan has accumulated a diverse range of technology, from the minimum level of technology required to the most advanced technologies available. By learning the history of Japan and adopting its technology, hopefully China will aim to build a truly recycling-based society with comprehensive waste recycling measures. In addition, Japan is also expected to continue cooperating in areas such as development of legal systems that are involved in building a recycling society.

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