TRANSNATIONAL POLLUTION AND COASIAN BARGAINING APPROACH - A COMPARISION BETWEEN THE CASE OF TRANSBOUNDARY HAZE POLLUTION IN SOUTH EAST ASIA AND TRANSFRONTIER WATER POLLUTION IN NORTH AMERICA

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SUMMARY

Pollution has been accepted as an unavoidable price of material advancement and an inevitable result of an expanding industrial base. In addition, pollution now has become not only a within country problem but also an international environmental issue. Compare to national environmental problems, transnational environmental pollution problems, have some similar characteristics but are far more complicated and need to be dealt with by applying special methods. One of the effective solutions is Coasian bargaining process. This paper compares and analyses the two case of transborder pollution problems, which are transboundary haze pollution in South East Asia and transfrontier water pollution (TWP) in North America. The result shows that the Coasian method is more efficient when applied in the case of TWP. The reasons are that TWP case has less parties involved, more appropriate cost sharing principle and lower transaction cost. Base on this comparison, the paper makes a recommendation that an institute should be established under the THP case to improve the enforcement and monitoring system and a revision on cost sharing system under THP case should also be conducted.

Keywords: Coasian bargaining, international environmental problems, transboundary haze, transboundary water pollution, transnational pollution.

I. INTRODUCTION

In the early day of environmental and resources economics, economists just concerned about the environmental problems taking place within national boundaries. However, since 1950s, there has been an emergence of interest in international environmental problems (Mitchell 2010). The transnational environmental problems are similar to national problems in negative externality feature and public good nature (Folmer & Mouche 2001). However, despite a heightened degree of public awareness and involvement in ecological rehabilitation, regulation of transnational pollution has been hampered by conflicting priorities and the lack of tangible incentives to mitigate injuries occurring in other nations (Cahalan, 2012). This leads to the fact that the transborder pollution have a distinguish characteristic which leads to the fact that they must be dealt with by taking the form of Coasian bargaining rather than traditional methods to internalize externalities (Frisvold 2009). In this paper, we are going to analyse two cases of transboundary environmental pollution, which are the transboundary haze pollution (THP) in South East Asia and transfrontier water pollution (TWP) in North America. We will focus on the application of Coasian bargaining rule in each case in order to explore some factors that may prevent countries from addressing the problem of transfrontier pollution effectively.

II. METHODOLOGY

Methods of data collection: Documents and data used in this article is mainly inherited and synthesized from the research and ideas that have been published in books, newspapers, magazines and official electronic sites.

III. RESEARCH RESULT AND DISCUSSION

3.1. Overview about transnational pollution and Coasian bargaining

Missfeldt (1999) defines that "transboundary pollution is pollution which is emitted in one country and deposited or causing harm in another country". The transnational pollution, therefore, can be seen as a type of cross-border environmental externalities (Rutz & Borek 2000). However, due to some of their unique aspects, such as national sovereignty and absence of an enforcement institution, they cannot be resolved by classical solutions for externalities (C. d'Arge 1975). When transnational pollution injures a foreign nation, the sovereign may

follow several diplomatic and international channels to obtain compensatory damages. Therefore, sovereignty relates to the relative autonomy of nation states to pursue their chosen policy goals free from outside interference (Golub 2001). Thus, command and control regulation, Pigou taxes or tradable permits cannot be enforces between sovereign nations. In addition, Sandler (1997) asserts that addressing cross-border externalities faces insurmountable challenges because supranational governments do not exist whereas the international judicial system is not effective (Rutz & Borek 2000). Consequently, the non-liability case or "victim must pay" principle generally dominates when dealing with transfrontier externalities (C. d'Arge 1997). Hence, the problem of transboundary pollution needs some forms of transnational collective action requiring the coordination of efforts by two or more nations (Sandler 1997).

Coase (1960) made a pioneering contribution to how mitigate inefficiencies associated with externalities. He finds that the parities affected by an externality can negotiate or bargain among themselves to achieve an efficient out come which is invariant to which externality – causing - party or affecting party has the right to compensation (Coase 1960). Some of the conditions to ensure this result are zero transaction costs, full information and no strategic behaviour. Although these conditions are almost never satisfied in the real world, the Coasian approach has inspired economists and regulators to propose a different way to traditional methods and to the use of regulations and command and control approaches to mitigate externality (Grafton et al. 2004). Therefore, in the context of transfrontier environmental externality with the dominance of nonliability case, dealing with such transboundary externalities must take the form of Coasian bargaining (Frisvold 2009). Bucholtz (1991) also asserts that Hardin's "tragedy of commons" may occasionally be resolved by applying a variant of Coase's theorem.

3.2. Transboundary haze pollution (THP) in South East Asia and transfrontier water pollution (TWP) in North America

Transboundary haze pollution (THP) in South East Asia

The THP is a severe and long-standing environmental problem affecting Indonesia and Southeast Asia. The problem originated from the fires that raged in Indonesia in 1997 and early 1998 and then reoccurred in 2002, 2006-2007 and 2009 (Murdiyarso et al. 2004). The haze produced from those severe fires spread and persisted over Indonesia and neighbouring countries, especially Singapore and Malaysia. The THP affects regional countries through health, transport, tourism and disruptions of economic activity while main global impact is carbon emission (Tacconi et al. 2006).

The main activities in the process of dealing with the THP can be summarized in the following table.

Year	Activities	Parties Involved
1995	Establishing of the Haze Technical Task Force under the ASEAN Senior Officials on the Environment	ASEAN
1997 and 1998	Intensifying cooperation efforts	ASEAN
2002	The ASEAN Agreement on Transboundary Haze Pollution (AATHP) was eventually signed by all ASEAN member states	ASEAN
2003	The Agreement came into force with ratification by a total of six member countries	Brunei Darussalam, Malaysia, Myanmar, Singapore, Thailand, and Viet Nam
2015	Indonesia submitted its instruments of ratification to the ASEAN Secretary General	Indonesia

Transfrontier water pollution (TWP) in North America

On the other hand, TWP is an earlier transfrontier pollution problem related to untreated sewage between Mexico and the US. The Rio Grande, an important water supply source for the US – Mexico border region, is influenced by treated wastewater effluents, untreated wastewater, andtributary flows (Frisvold & Caswell 2000). The polluted water flows northward Mexican to the US cities which causes seriously negative impact on health, life and economic activities of people on both sides of the border (Frisvold & Caswell 2000). Lack of access to safe drink water and sewage treatment in border cities, frequent beach closures in San Diego and quality degradation of the wetlands which act as the haven for endangered and threatened bird, fish, and plant species are some example of those negative effects (Fernandez 2006). The main sources of wastewater pollution problem are criticized to be the rapidly growing population of the Mexican side of the border and the rise of the *maquiladora* sector, which is proved to be ecological menace (CSIS 2003 and Frisvold & Osgood 2011).

The main activities in the process of dealing with the TWP can be summarized in the following table.

Year	Activities	Parties Involved
1944	The 1944 Water Treaty established the International Boundary and Water Commission (IBWC)	The United States and Mexico
1972	The United States and Mexico did agree to limit pumping within 5 miles of the border in the Yuma-San Luis Rio Colorado area where agricultural growth had led to overdrafting.	The United States and Mexico
1973	Both sides reached an agreement, the Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River (IBWC, 1973; Minute 242).	The United States and Mexico
1983	The United States and Mexico signed the La Paz Agreement, establishing a framework to discuss environmental issues, share information and coordinate pollution control within 100 km of the border	The United States and Mexico
1994	The United States and Mexico established the BECC and the NADBank, as side agreements to NAFTA. The NADBank arranges financing of border water and municipal solid waste projects that must be certified by the BECC, based on environmental, technical and financial criteria	NAFTA

Both THP and TWP have been attracted a lot of concerns from both economists and regulators. The Coasian bargaining in both cases mainly takes the form of negotiation under environmental agreements among parties involved. With respect to THP, initial measures have been taken when the problem was recognized in a series of dialogue sessions amongst Environmental Ministers of officials of ASEAN nations in the early 1990's (Jones 2006). After that, Regional haze action plan was drafted following the widespread forest burning in 1997 and then, ASEAN Agreement on Transboundary Haze Pollution (ATHP) was signed in November 2002 and came into operation a year later (Jones 2006). The agreement acts as a cooperative game, however, Indonesia has not ratified it (Tacconi et.al 2006). An ASEANCoordinating Centre for Transboundary Haze Pollution Control (hereinafter Haze Centre) was established under the Agreement to facilitate cooperation for fireandhaze-related work (Tan 2005). However, the Haze Centre plays no direct role in Indonesian fire-related reform and enforcement (Mayer 2006). After that, Singapore offered to collaborate with Jambi Province and Indonesia's State Ministry of Environment to develop a Master Plan to deal with land and forest fires in Jambi Province. Notwithstanding, the regional smoke haze problem continues to persist (Tacconi et al. 2006).

Compared with THP,TWP have a longer history of agreements and cooperation between parties involved. Since 1889, the International Boundary Commission (IBC) has been established, which is the world's first binational agency task with resolving disputes over the Rio Grande River (CSIS 2003). The agency's name was then changed to the International Boundary and Water Commission (IBWC) with the given authority of settling water disputes and coordinating water projects on the US – Mexico border (Frisvold 2009). Frisvold and Caswell (2000) examine the bargaining over waste water treatment problem between Mexico and US through IBWC and assert that it is the process of allocating costs between the two countries as they agreed on the least-cost principle. Initially, they applied equal cost sharing rule which soon led to discourage cooperation from Mexico. After that, US abandoned this rule, agreed to pursue a cost-effective rule and compensate Mexico for its incremental costs of meeting the higher US standard (Frisvold 2009). As the result, a larger joint sewage collection and treatment project in Sandiego was passed in 1990, which allowing that Mexico's costs were no greater than its costs under non-cooperation (Frisvold 2009).

Thanks to the effective operation of IBWC, the TWP is improved gradually. International waste water treatment plants have been constructed and improved in many border areas, such as the South Bay International Wastewater Treatment Plant in San Diego, the Mexicali II sanitation treatment plant in Baja California and the upgraded Nogales International Wastewater Treatment Plant in Arizona (IBWC Annual Report 2006). Consequently, these actions minimized the threat to public health and the environment from dry weather sewage flows considerably. In contrast, past efforts, including agreements, haze plan and cooperation between Singapore and Indonesia have so far failed to address the haze problem in Southeast Asia (Tacconi et al. 2006). The regular occurrence of the problem has not been reduced while its costs in terms of health, environmental and economic costs are continued to be generated at higher levels. It seems that, TWP is addressed more effectively by using Coasian bargaining approach than THP.

There are some factors contributing to the relatively better outcomes of dealing with TWP. Binding feature of the environmental agreements, number of parties involved and incentives to take action are some of these factors that will be considered.

Binding environmental agreements

Missfeldt (1999) asserts that when negotiating if all actors decide to cooperative, Pareto optimal outcome can be reached in which all the parties are better off than under non-cooperative case. Thus, binding agreements could lead to full cooperation and hence Pareto efficiency. Moreover, binding agreements may also help to reduce transaction costs in terms of monitoring and enforcement cost. The agreements on TWP seem to be more binding than those of THP. With respect to TWP, the IBWC has been the only permanent institution, conducting bilateral negotiations and planning of any kind, between the US and Mexico (CSIS 2003). Agreements to finance, construct and operate border water infrastructure under IBWCtake the form of binding commitments. Moreover, both countries involved in TWP insist on agreements with more binding provisions (Frisvold 2009).

On the other hand, most of regional responses to THP are non-binding or lack a system of enforcement and deterrence (Tan 2005). The Regional haze action plan is regarded as no more than recommendations which were not binding to members (Jones 2006). Similarly, the ATHP also has to be consistent with principles of the "ASEAN way" including non-interference and another standard requiring that consensus building and cooperative programs are preferred over legally binding treaties (Tacconi et al. 2006). The Agreement just calls for co-operative measures in preventing, monitoring and fighting transboundary pollution but has no specific prescription on enforceable obligations and consequences for non-compliance (Tan 2005). As the result, up to now Indonesia which is the host

of haze pollution still fails to ratify the ATHP. Consequently, ineffectiveness is an obvious outcome of the Agreement as the adoption of practical measures is undermined in dealing with the problem of transnational pollution (Jones 2006).

Number of parties involved and Free riding problem

About free riding problem, there are strong incentives for parties to free ride on other countries' efforts as it could make them still better off while not incurring any cost (Missfeldt 1999). At international level, free riding is unavoidable because of lack of enforcement and monitoring system and the absence of a supranational institution. If only one actor decide to free ride, then the cooperation would be foiled (Barret 1990). An empirical example is that the blue whaling hunting ban proposed by the International Whaling Commission in 1954 had no effect due to the objection of Japan (Barret 1990). Similarly, the ATHP has limited impact because it has not been ratified by Indonesia and Philippine (Tacconi et al. 2006).

Furthermore, according to Coase (1960), if the externality affects only one other country, then bargaining might be possible regardless who generates the negative effects. If more than two countries suffer from the harmful activities, the sufferers might be willing to make compensating payment. However, other countries could have incentive to free ride as a contribution by any one country would confer benefits on all others(Barret 1990). Mitchell (2010) shares the similar idea and states that as the number of actors who must cooperate increases, so does the likelihood of free riding and shirking by other actors who want the problem resolved but prefer to avoid contributing to its resolution. Therefore, the more states that must cooperate to address an environmental problem, the more difficult it is toachieve such cooperation. Moreover, Beckman (2002) regards transaction costs as an elementary coordination problem and claims that the costs are directly related to the number of polluters or victims. The conflict costs as a part of the transaction costs are likely to increase with the number of actors. The TFP case may require collective action from suffering countries, such as Singapore, Malaysia, Thailand and Indonesia itself while dealing with TWP takes into account just two parties, the US and Mexico. Consequently, TFP may be more difficult than TWP to achieve cooperation and higher transaction costs may be generated when taking Coasian bargaining under TFP.

Incentives to take action

One of the most important factors that influence the outcome of the Coasian bargaining process is the incentives to take action. The strength of the incentives, in turns, depends on the cost sharing principle and some other factors and capacity of the actors (Mitchell 2010).

With respect to the cost-sharing problem, Tacconi et al. (2006) claims that Indonesia would not ratify the ATHP because it would have to suffer most of the costs arising from implementing the Agreement. The Agreement adopts zero-burning to address the haze problem, which will have great impact on slash and burn farmers (Tacconi et al. 2006). However, Tacconi and Vayda (2005) assert that true slash and burn agriculture is only one of main sources of fire and probably not the most significant. The costs would be born too much by Indonesia and thus, the authors conclude that the Agreement does not provide appropriate incentives for Indonesia to act (Tacconi et al. 2006). In contrast, IBWC adopts apportioning costs in proportion to benefits for negotiations between the US and Mexico (Frisvold 2009). The downstream position of the US combining with the higher US standard and its greater willingness to pay for water treatment mean that the US would derive relatively larger benefits and hence, the US agrees to compensate Mexico (Frisvold 2009). Consequently, the application of cost-effective rule in TWP is consistent with a desirable outcome.

In terms of power and capacity of the actors, the fact that who the victims of environmental degradation are also influences both how capable and how motivated they are to address the problem (Mitchell 2010). TWP affects the United States so it tends to be addressed sooner and more

effectively. This is because nations that have power can influence the behaviour of weaker nations (Mitchell 2010). The US may threaten or use economic sanction to push Mexico to deal with sewage treatment while it is relatively harder for Singapore to take similarly measures towards Indonesia.

IV. CONCLUSION

Concern about transboundary environmental problems as a part of transfrontier externality has grown immensely recently. Due to the unique characteristic of transnational externalities, they are not likely to resolved by applying conventional methods of internalizing them by developing a well-defined market or controlling them through collective provision of regulations (C. d'Arge 1975). Therefore, it need some form of compensation and side payments under Coasian bargaining as a way of finding cooperation to deal with transboundary pollution problem (Frisvold 2009). When comparing the two cases of transfrontier pollution problem, which are THP and TWP, it can be concluded that the Coasian bargaining brings about a more efficient outcome for the latter case. This is because TWP has smaller number of parties involved. The other reason is Coasian bargaining in implemented under TWP case with more appropriate cost sharing principle under more binding agreements. These factors mean that the transaction costs incurring under TWP case is relatively smaller leading to more efficient and better outcome of Coasian bargaining process. From this analysis, some recommendations could be made to help increase the effectiveness of Coasian bargaining process in dealing with THP. The role of institutions established under THP case need to be strengthened. Thus agreements related to THP made under these institutions will be more binding while the enforcement and monitoring system is also improved. Hence, the free riding tendency and transaction costs can be reduced. Finally, the cost sharing rule under THP case should be revised to bring Indonesia and other countries appropriate incentives to take action.

In conclusion, the comparison between the two case can be summarised in the following table.

Contents	THP case	TWP case
1. Short description of the case	The case originated from the fires that raged in Indonesia in 1997 and early 1998 and then has become a long-standing environmental problem The THP affects regional countries through health, transport, tourism and disruptions of economic activity while main global impact is carbon emission.	The Rio Grande, an important water supply source for the US – Mexico border region, is influenced by treated wastewater effluents, untreated wastewater, and tributary flows. The polluted water flows northward Mexican to the US cities. The TWP causes seriously negative impact on health, life and economic activities of people on both sides of the border.
2. Coasian bargaining and side payments	Initial measures have been taken from early 1990s. ASEAN Agreement on Transboundary Haze Pollution (ATHP) was signed in November 2002. However, Indonesia has not ratified it. The Haze Centre was established under the Agreement but did not really work. Singapore offered to collaborate with Indonesia to develop a Master Plan to deal with land and forest fires in Jambi Province. The regional smoke haze problem continues to persist.	Initial measures have been taken since 1889 by establishing International Boundary Commission. Initially, they applied equal cost sharing rule which soon led to discourage cooperation from Mexico. Then they pursued a cost-effective rule and compensate Mexico for its incremental costs of meeting the higher US standard. The TWP is improved gradually.
3. Binding environmental agreements	The agreements seem to be less binding than those of TWP	More binding agreements.

4. Number of parties involved & free riding problem	More than two parties involved. It is more difficult than TWP to achieve cooperation. THP has higher transaction costs.	Only two countries involved. It is easier than TWP to achieve cooperation. THP has lower transaction costs.
5. Incentives to take action and cost sharing system	The costs would be born too much by Indonesia and thus, the Agreement does not provide appropriate incentives for Indonesia to act.	The US would derive relatively larger benefits and hence, the US agrees to compensate Mexico

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Ô NHIỄM MÔI TRƯỜNG XUYÊN QUỐC GIA VÀ CÁCH TIẾP CẬN THƯƠNG LƯỢNG Ô NHIỄM COASIAN – SO SÁNH TRƯỜNG HỢP Ô NHIỄM KHÓI BỤI XUYÊN QUỐC GIA Ở ĐÔNG NAM Á VÀ Ô NHIỄM NGUỒN NƯỚC XUYÊN BIÊN GIỚI Ở BẮC MỸ

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TÓM TẮT

Ô nhiễm đã được coi là một hệ quả tất yếu của phát triển sản xuất và mở rộng hoạt động công nghiệp. Ngoài ra, tình trạng ô nhiễm hiện nay đã trở thành không chỉ là một vấn đề trong nước mà còn là một vấn đề môi trường quốc tế. So sánh với các vấn đề môi trường quốc gia, vấn đề ô nhiễm môi trường xuyên quốc gia có một số đặc điểm tương tự nhưng phức tạp hơn và cần phải được giải quyết bằng cách áp dụng các phương pháp báo này so sánh và phân tích hai trường hợp điển hình của vấn đề ô nhiễm xuyên biên giới, bao gồm ô nhiễm khói mù xuyên quốc gia (THP) ở khu vực Đông Nam Á và ô nhiễm nước xuyên biên giới (TWP) tại Bắc Mỹ. Kết quả cho thấy rằng phương pháp Coasian là hiệu quả hơn khi áp dụng trong trường hợp của TWP. Nguyên nhân do TWP là trường hợp có ít bên liên quan hơn, có nguyên tắc chia sẻ chi phí phù hợp hơn và có chi phí giao dịch thấp hơn. Trên cơ sở so sánh này, bài báo đưa ra khuyến nghị với trường hợp THP, để nâng cáo tính hiệu quả, nên thành lập một tổ chức hay một cơ quan chuyên trách để cải thiện việc thi hành và giám sát các thương lượng và nên tiến hành một hệ thống chia sẻ chi phí.

Từ khóa: Ô nhiễm khói mù xuyên quốc gia, ô nhiễm nguồn nước xuyên biên giới, ô nhiễm xuyên quốc gia, thương lượng Coasian, vấn đề môi trường quốc tế.

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