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TERRITORIAL DISPUTES AND SEABED PETROLEUM EXPLOITATION:

SOME OPTIONS FOR THE EAST CHINA SEA

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Abstract:[1] This paper analyzes the critical analytical and policy issues relating to the management of seabed hydrocarbon exploitation in transboundary and disputed areas. First, I examine various domestic and external factors that either promote or prevent the Sino-Japanese joint/cooperative development of seabed oil/gas deposits in the East China Sea. I will then define some principles and rules of cross-border petroleum exploitation and classify into five development models existing international agreements and treaties relating to seabed oil/gas exploitation in various disputed areas throughout the world. On the basis of the simplified spatial cost-benefit analysis of seabed oil/gas exploitation, different development models are suggested to fit in with the various zones of the East China Sea. Finally, I put forward several policy options for bilateral or multilateral cooperation on the exploration, exploitation, and transportation of the seabed oil/gas deposits in the East China Sea.

1. Introduction

Throughout history, physical terrain, political fiat, and conquest have divided states into separate political entities just as much as race, ethnicity, language, and religion. One result is man-made and sometimes arbitrary or even imposed boundaries. Compared to other kinds of cross-border areas, internationally disputed areas are always characterized by undemarcated boundaries as well as political and institutional uncertainties. Boundary and territorial disputes refer to disputes over the division of land or water bodies among two or more independent countries. Boundary disputes may evolve from historical and/or cultural claims, or they may be brought on by competition for resource exploitation. Ethnic clashes continue to be responsible for much of the territorial fragmentation around the world. Disputes over islands at sea or in rivers frequently form the source of territorial and boundary conflicts. Other sources of contention include access to water and mineral resources (especially petroleum), fisheries, and arable land. Issues pertaining to the territorial control of seawaters have long been the subject of international law.

Boundary and territorial disputes are often the result of divergent material claims, especially regarding land, freshwater, and mineral and energy resources. This has particularly been the case in the international context, where sovereign control within one's territorial boundaries is thought to be a defining characteristic of a state (Wendt, 1999, pp. 201–14). Thus,

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reasonable disagreements over determining boundaries, where one entity's control begins and another ends, may lead to open violence. Although there are some generally accepted rules of boundary demarcation and extension of a state's territorial sea limits, emphasis on potential underground and undersea resources has generated a number of inter-state disputes around the globe. In the coming decades, as a result of growing energy demand, it can be seen that undersea oil/gas exploration will become more contentious.

In cross-border areas, especially disputed areas, natural and human systems usually interact under conditions of uncertain, imperfect information and, in certain circumstances, human actions on one side of a border can have irreversible effects on resources and environment on the other side.[2] As a result, even a tiny disputed area could become the source of a large, regional and international clash. Disputed areas usually have been the most important topics in cross-border and area studies. Also, they have been one of the major obstacles for developing and transitional nations with differing economic, political and cultural systems and different capacities for implementing sustainable development strategies (Guo and Yang, 2003). Boundary and territorial disputes vary in intensity from managed or dormant to violent or militarized. Sometimes, conflicts may arise when national interests differ and nations develop diverging policies and plans which are not compatible.[3] In all cases, nations wishing to exploit the resources at their marginal territories need to precisely identify their international boundaries and to be able to peacefully resolve territorial disputes as well as to cooperatively manage cross-border resources with their neighbors.

This paper sets out to analyze the critical analytical and policy issues relating to maritime boundary disputes and undersea hydrocarbon exploitation in the East China Sea. In Section 2, I will address such question as why China and Japan have found it so difficult to cooperate. To this end, various domestic and external factors that either promote or prevent the joint/cooperative development of the East China Sea are examined. Section 3 defines some principles and rules of cross-border petroleum exploitation and, after reviewing existing international agreements and treaties relating to seabed oil/gas exploitation in various disputed areas throughout the world, constructs five joint/cooperative development models (solo development, parallel development, joint venture, joint authority, and trustee development). In Section 4, according to the spatial cost-benefit analysis of seabed oil/gas operations, the appropriate development models are suggested for the various zones of the East China Sea. Also, the political and economic feasibilities of moving the current bilateral structure (China-Japan) of joint hydrocarbon exploitation to a trilateral structure (China-Japan-Taiwan) are assessed. Finally, this paper concludes with some policy suggestions for China and Japan in their approaches to the resources

[2] A typical example is for uppermost riparian countries to over-exploit the waters flowing through its territory, which could affect countries downstream (Guo, 2005, pp. 55-6).
[3] See, for example, Kirmani (1990), Frey (1993), Wolf (1998), and Savenije and van der Zaag (2000).

under the East China Sea.

2. Resource Scarcity, Territorial Disputes and the East China Sea[4]

The idea that resource scarcity enhances possibilities for conflict is not new in the literature of international and area studies. It can be traced back to early theorists such as Choucri and North (1975 and 1989) who contend that internal demands on resources push states toward outward expansion, increasing the possibility for conflicts to arise through hostile lateral pressure. Resource-poor regions will create environments that are highly competitive, but the creation of institutions to manage conflict often will be lacking and/or ineffective. Resource-rich regions, on the other hand, will be faced with fewer potential conflict situations overall, which will enhance the prospects for the creation of institutions to manage conflicts that do arise (Hensel et al., 2008). There is also a nice summary for these Malthusian type arguments: population growth and high resource consumption per capita (demand-induced scarcity) lead to deteriorated environmental conditions (supply-induced scarcity), which increase resource scarcity further and create harsher resource competition. This process, when combined with inequality with respect to resource access (structural scarcity), increases the chances for violence (Gleditsch, 2001, p. 253).

There is an obvious linkage between resource scarcity and territorial disputes. The resource scarcity involves real threats to agricultural and industrial production, as well as national security. Clearly, as population increases the demand for the resources increases as well. If a relatively resource-rich country is adjacent to the resource-poor country, a dependent relationship is established on both sides of the border. Control over the cross-border resources by one party usually indicates a decrease in the amount of the resources for the other party, which can be described as a zero-sum game. There has been an argument that resources directly result in conflict when (i) they are becoming increasingly scarce in a region, (ii) they are essential for human survival, and (iii) the resource can be physically seized or controlled. Critchley and Terriff (1993, pp. 332–3) assert that direct conflict over renewable resources might be rare, but competition over scarce resources would have a strong indirect effect on the propensity for conflict. Limited availability of resources places stress on society, which makes the society less stable and more conflict-prone.[5]

In addition to land-boundary and territorial disputes, disputes over maritime boundary and islands often stem from historical and/or cultural claims; sometimes they may also emerge as a result of fundamental geopolitical changes. Just as on land, in certain circumstances maritime

[4] The first two paragraphs of this section are heavily based on my early work (Guo, 2005, pp. 107-8).
[5] Like Critchley and Terriff (1993), Homer-Dixon (1999) believes that the probability of conflict rises due to "decreased agricultural production, economic decline, population displacement, and disruption of legitimate institutions and social relations." – Cited from Guo (2005, p. 108).

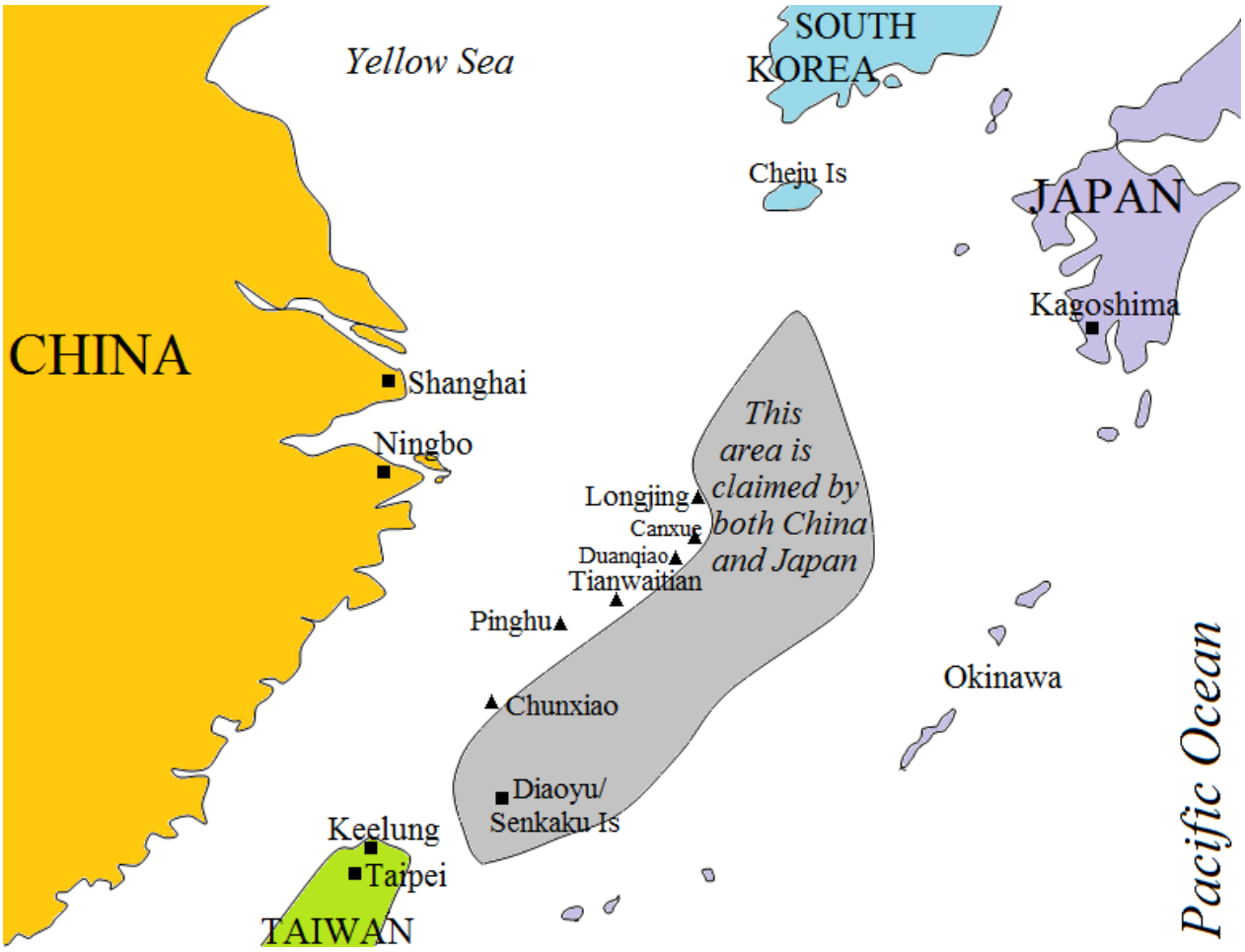
boundary and island disputes may even evolve into situations of big-power rivalry competition for scarce seabed resources. The intensifying "tit-for-tat" competition between China and Japan for oil/gas exploitation in the East China Sea could become just such a situation.

An arm of the Pacific Ocean bordering on the East Asian mainland, the East China Sea extends to the east of the chain of the Ryukyu islands; northeast to Kyushu (the southernmost of Japan's main islands) and north to Cheju island off the Korean peninsula; and hence west to China's eastern coast. On the south, the Sea extends to the South China Sea through a shallow strait between Taiwan and mainland China. Over the course of the past decades, competition for hydrocarbon resources in the East China Sea has been intensifying and has hampered the improvement of relations between these East Asian neighbors. Under UNCLOS,[6] China has the right to claim a continental shelf as far as 350 nautical miles. However, Japan also has the right to an EEZ extending 200 nautical mile from its shore. Since China's coast is within 400 nautical miles of the nearest undisputed Japanese island, China and Japan's claimed EEZs overlap in the East China Sea (see Figure 1). In addition, in the southern part of the Sea, several uninhabitable islets, called Senkaku by Japan, Diaoyu by China, and Diaoyutai by Taiwan, also are at the center of long-lasting disputes between China (including both Taiwan and mainland China) and Japan.[7]

[6] The full text of the United National Convention on Laws of the Sea (UNCLOS) can be accessed at http://www.un.org/Depts/los/convention_agreements/convention_overview_convention.htm.

[7] More discussions about the Diaoyu/Senkaku issue can be found in Ching (1996), Drifte (2008), Dutton (2007), Fox (2008), Ji (1994), Ma (1984), Park (2005), Su (2005), Shaw (1999), and Valencia (2007), among others.

Figure 1: The Chinese-Japanese maritime boundary disputes at the East China Sea



China and Japan have been arguing for a long time over the settlement of their maritime boundary and territorial disputes and the development of the seabed hydrocarbon resources in the East China Sea.[8] China is developing many oil/gas fields just to the west of what Japan claims is the median line separating the two countries' EEZs. This makes the Japanese government nervous, as it believes that China may be exploiting gas reserves located on the Japanese side.[9] After much consideration China and Japan have deemed that joint development may be the only solution to the dispute; and they have basically agreed to proceed in this direction. The problem is that the

[8] The East China Sea contains large amounts of seabed resources including sand and gravel, shell and carbonate sand, heavy-metal sand, phosphorus, precious coral, rock salt, as well as varying amounts of titanium, gold, platinum, zircon, and other heavy metals. This paper focuses only on oil and natural gas.

[9] See "Oil and gas in troubled waters," *The Economist*, Vol. 377, Iss. 8447 (October 8, 2005), p. 72.

two sides have different interpretations of what joint development means and which areas should be jointly developed. Japan believes that China must cease its current operations and that joint development can only be conducted along and around the median line claimed by Japan. But China thinks that the area for joint development is that between the Japanese-claimed median line and the continental shelf boundary claimed by China, including the area around the disputed Diaoyu/Senkaku islets.

China's state-owned oil companies have been producing oil and gas in three fields – namely, Pinghu, Chunxiao (named "Shirakaba" by Japan), and Tianwaitian (named "Kashi" or "Kashiide" by Japan) – and has begun to construct oil/gas platforms in several others including Longjing (called "Asunaro" by Japan), Canxue or Lengquan (called "Kikyo" by Japan), Duanqiao (called "Kusunoki" by Japan), and so on in the East China Sea (see Table 1 for more information about these oil/gas fields). To counter China's moves, Japan's Ministry of Economy, Trade and Industry has granted permission to a major Japanese private oil developer, Teikoku Oil Company, to conduct experimental drilling in an area just on the eastern side of the median line. If the company actually begins drilling in the disputed area, Japanese Coast Guard and Self-Defense Force escorts may be needed for security reasons since the Chinese navy would probably approach this area as well. This would be an unproductive and dangerous game for both sides.[10]

[10] The major events relating to petroleum exploration and exploitation activities in the East China Sea are shown in the Appendix.

Table 1 Summary of China's current oil/gas fields[a] in the East China Sea

	Pinghu	***Chunxiao*[b]**	***Tianwaitian*[c]**
Est. oil reserves (MMbbl)	2.4	3.8	0.5
Est. gas reserves (mil. cu.m)	736.2	4774.2	985.4
Investors (shareholders)	Shenergy (40%), CNOOC (30%), Sinopec (30%)	CNOOC (50%), Sinopec (50%)	CNOOC (50%), Sinopec (50%)
Operator	SOGC	XOGOC	XOGOC
Date(s) of construction	1996 (2005)	5/2003	NA
Date(s) of production	11/1998 (11/2006)	10/2005	9/2005
Daily output (mil. cu.m for gas; bbl for oil)[d]	1.8 (gas, 2009); 1422 (oil, 2006)	9.1 (gas, 2009); (NA for oil)	0.5 (gas, 2007); 42 (oil, 2006)
Pipeline connected to	Shanghai	Ningbo (Zhejiang)	Ningbo (Zhejiang)

Sources: EIA (2008); websites of CNOOC, SOGC and XOGOC; and the author's estimates.

Notes: ([a]) Other oil/gas fields include (1) Longjing (Japan names it as "Asunaro"), (2) Canxue (also with a Chinese name "Lengquan", and Japan uses another name "Kikyo"), (3) Duanqiao (Japanese name: Kusunoki), (4) Baoyunting, (5) Kongque, (6) Wuyunting, and (7) Yuquan. ([b]) Japan uses the name "Shirakaba". ([c]) Japan uses the name "Kashi" or "Kashiide". ([d]) As of 2009.

Abbreviations: CNOOC= China National Offshore Oil Corporation; Shenergy= Shenergy Company Limited, China; Sinopec= China Petrochemical Corporation Group; SOGC= Shanghai Oil and Gas Operating Company Limited, China; XOGOC= Donghai Xihu Oil and Gas Operating Company (a subsidiary of CNOOC).

From 2004 to 2008, China and Japan had held a series of high-level meetings to address their growing maritime boundary disputes and joint/cooperative development of the hydrocarbon resources in the disputed area. On June 18, 2008, after 12 rounds of talks, China and Japan reached an agreement concerning (i) the joint development of a zone straddling both sides of the median line proposed by Japan, including the oil/gas field called "Longjing" by China and "Asunaro" by Japan, and (ii) Japan's participation in China's Chunxiao ("Shirakaba" to Japan) gas field (shown in Figure 1). However, little progress toward the joint/cooperative development has been achieved since then.

China has become the world's second-largest oil consumer, next to the United States. With more than half of its oil demand being met by imports, China's energy security is a

much-discussed issue. Japan is also among the world's biggest energy consumers – it too relies on imports, mainly from the Middle East, for most of its oil consumption – as it tries to keep its huge economy running. At present, China needs more energy to fuel its rapidly growing economy and Japan, wishing to reduce its high dependence on oil from the unstable Middle East, is eager to seek different energy suppliers. But the two have found it difficult to cooperate in the East China Sea. One possible explanation is that, from the economic point of view, China is much more interested in the exploitation of oil/gas resources than Japan. This is directly perceived through the following factors.

First of all, the PRC government had a very serious problem with petroleum supply during the 1950s and 1960s. After the break-through discovery of several oil fields in northern China during the 1960s, China implemented a new, oil-oriented energy policy entitled "replacing coal by oil" ("yi you dai mei") in order to reduce its coal-dominated energy consumption.[11] However, in the following decades, China's exploitation of petroleum within its borders had not achieved as much positive progress as expected. Naturally, its exploration task for oil/gas deposits began to shift from inland to continental shelf sources (including in the East China Sea) in the mid-1970s.

Second, Southeast China's coastal areas, particularly Shanghai municipality and Zhejiang province, are China's most important industrial (and thus energy-consuming) bases. Unfortunately, they have almost no hydrocarbon resources on their own territories. Consequently, their domestic oil/gas supply must rely on imports from the far northern and western provinces[12] and is therefore both costly and insufficient. By contrast, the transportation of oil and gas from the East China Sea's continent shelf is much easier and cheaper (located within five hundred kilometers or so).

Third, the proven hydrocarbon reserves found in the East China Sea are located much farther from Japan's main islands (where Japan's central marketplaces are located) than they are from mainland China. Furthermore, given that an agreement on the joint development is reached with China, the deep Okinawa Trough would make Japan's transportation of the gas exploited in the East China Sea to its main islands either technologically infeasible or economically unprofitable (this will be discussed in more detail in Section 4).

The above economic factors are not enough to completely explain the current difficulties

[11] This policy seemed to be quite effective. For example, the consumption share of crude oil in the total primary energy ranged from 1% to 8% from 1952 to 1965; however, it rose sharply to nearly 25% during the 1970s (Guo, 2009, p. 248).

[12] The major oil/gas fields include, in the order of annual output, Daqing (Heilongjiang province), Shengli (Shandong province), Liaohe (Liaoning province and Inner Mongolia), Karamay (Xinjiang autonomous region), Sichuan (Sichuan province), and Dagang (Tianjin municipality), among others.

in the East China Sea. Other factors are also responsible for the fruitless Sino-Japanese negotiations:

- Tactical asymmetry - Even without cooperation with Japan, China can still unilaterally exploit the hydrocarbon deposits on its part (i.e., the western part) of the East China Sea, though the exploitation cannot be economically maximized; however, this is not the case for Japan since all of Japan's claims of the seabed resources have been located in the disputed area.
- Nationalist politics - This includes (1) China's tough territorial-dispute negotiations with Japan[13] and (2) Japan's traditional uncompromising attitude toward territorial negotiations with its neighbors.[14]

The Chinese name of the disputed islets – Diaoyutai – means "fishing platform." This immediately reminds me of a popular Chinese idiom ("yu bang xiang zheng"). In the middle of the Warring States Period (475–221 BC), seven Chinese states were being locked in battle. The Duke Hui of the State of Zhao wanted to conquer the State of Yan until Su Dai, one of his advisers, told him a story:

> On a fine day, a clam went out to the beach to sunbathe. A snipe (a kind of bird with a long bill) caught sight of the tasty tidbit and plunged to bite the meat. But the clam immediately closed up. The snipe said: "If it does not rain today and tomorrow, you will become a dead clam." "If you cannot feed yourself today and tomorrow, you will become a dead snipe," replied the clam. The two refused to budge and became locked in stalemate. Along came a fisherman and bagged them both.[15]

Sixty years ago, when the Communists and Nationalists were fighting fiercely against each other on mainland China and across the Taiwan Strait, the Diaoyu/Senkaku islets and the surrounding waters were under the control of the United States. When the U.S. ended its occupation of these islets in 1971, the two sides of the Taiwan Strait were locked in a tense standoff. As a result, Japan was able to "sit," like a fisherman, on the Diaoyu platform. However, with regard to the current Sino-Japanese struggle over the ownership of the East China Sea,

[13] China adopted a soft and compromising attitude toward the territorial disputes with its neighboring states including Mongolia and North Korea in the 1960s and Russia in the 1990s (Fravel, 2008, pp. 300-5 and 313-5), as well as on the South China Sea (Buszynski and Sazlan, 2007). It also did so with Japan in the 1970s and the 1980s; however, China's position on the East China Sea disputes has become increasingly tough since the early 1990s – see, for example, Ishii (2006, pp. 137-59), Ishii et al. (2003), and Drifte (2008).

[14] Examples in this regard can be found in Japan's fruitless negotiation with Russia on the Northern Territories/South Kurils – see, for example, deVillafranca (1993) and Kimura (2008).

[15] This story was originally cited in *Zhangguoce* – a book published during the late Warring States Period in ancient China.

perhaps there would be no winner if both sides cannot compromise with each other. In such a situation, all of the stakeholders in the East China Sea, including the United States, would become either "snipes" or "clams"—but not "fishermen."

Where there is patience, there is hope. And the hope usually emerges when there are changes in favor of the creation of a fairly relaxed atmosphere under which each and all stakeholders can benefit from compromise and cooperation. At the very least, the current situation in the East China Sea will not worsen if the policymakers from China and Japan are well aware of the "snipe-clam" story told by Su Dai 2000 years ago.

3. Cross-Border Petroleum Exploitation: Principles and Options

There has been an emerging interest in the research of management of transboundary natural and environmental resources in seas or lakes. Previous studies pertain to either pollution control or specific natural resources such as fisheries.[16] Since the 1990s, there has been a growing body of literature on the joint development of common offshore oil and gas deposits.[17] From the legal point of view, a deposit of natural or environmental resources may be internationalized if one single state does not have complete power to exercise exclusive control over it. The nonexclusive or common nature of cross-border resources is manifest in multiple claims to property rights. Lagoni (1979, p. 217) describes the problems as follows:

> These deposits are characterized by a complicated "equilibrium of rock pressure, gas pressure and underlying water pressure" (Ely, 1938, p. 1219), so that extracting natural gas or petroleum at one point unavoidably changes conditions in the whole deposit. One possible result is that other states cannot extract the minerals from their part of the deposit, even if the first state has extracted only that portion originally situated in its territory or continental shelf.

Early doctrines can be used in cross-border resource management. The doctrine of absolute integrity stipulates that a country may not alter the natural state of natural and environmental resources passing through its territory in any manner that will affect the resources in the other countries (Kliot et al., 2001, pp. 232-33). In fact, the doctrine of limited territorial sovereignty has been the most widely accepted in various international treaties. It conforms to the general legal obligation to use one's property in a manner that will not cause injury to others. The

[16] See, for example, Young (1977), Pinkerton (1989), SUNCE (1994), Dubbink and van Vliet (1996), Pomeroy (1996), Symes (1997), Klooster (2000), and Castro and Nielsen (2001).

[17] Major studies in this regard would include Park (1993, pp. 3-14; 2005), Denoon and Brams (1997), Harrison (2005), Jiang (2006), Koo (2010), Lee (2006), Masahiro (2005), Ong (1999), Buszynski and Sazlan (2007), and Valencia (2007), among others.

doctrine of the communality of international resources stipulates that the entire cross-border area constitutes a single geographic and economic unit that transcends national boundaries, and therefore the cross-border resources are either invested in the whole community or shared among the countries concerned (Guo, 2005, p. 92).

Some principles drawn from the above doctrines have been accepted today as legal norms which are binding on the management of cross-border resources in many countries. Specifically, they are threefold:

A. *The prohibition of management practices likely to cause substantial injury to other states*. This principle includes the duty of preventive and cooperative actions. The 1988 Report to the International Law Commission suggests that appreciable harm resulting from water pollution is a violation of the principle. In addition, the World Bank statement for international projects requires the assessment of potential significant harm before approving projects on international waterways (Solanes, 1992; Caponera, 1995; and McCarrey, 1996).

B. *The duty of prior consultation and coordination in good faith*. Joint/cooperative development is an ideal pattern for the exploitation and utilization of natural and environmental resources in cross-border areas. However, in most circumstances it is difficult to achieve because of questions of sovereignty, ownership, jurisdiction, financing, scope of cooperation, and so on. In international border areas, especially in disputed areas, joint development schemes cannot be stable and efficient without enforceable treaties and workable schemes agreed to by all parties concerned.

C. *The principle of equitable utilization of shared resources*. The principle of equitable use requires the interests of all countries concerned to be taken into account when exploiting and allocating the internationally shared resources. According to Dellapenna (1999, p. 1314), restricted sovereignty goes by the name of "equitable utilization" of the shared resources. The principle has been applied by international courts and also by national courts of various federal countries. It is also embraced by nongovernmental organizations (NGOs) and academics (see, for example, Green Cross, 2000; Raj and Salman, 1999; and Savenije and van der Zaag, 2000).

However, not all of the abovementioned principles have worked well internationally, especially in areas that are claimed by two or more states. International laws and regulations provide the normative framework and procedures by which to coordinate behaviors, to control conflicts, to facilitate cooperation, and to achieve common values among independent countries concerned. International laws and regulations on natural and environmental resources are

designed to regulate relationships between countries with respect to the exploitation and utilization of their shared common or cross-border resources. Usually, the continuation of international conflict is due to a perpetually self-reinforcing dynamic: each side responds to the other's last provocation with a new provocation of its own. One solution is to find a central authority to police both sides, imposing a rule of law (Axelrod, 1984, p. 186). Unfortunately, this solution is often not available, especially when either or both sides don't welcome this kind of authority or are (partially) free of the rule of law, such as the jurisdiction of the International Court of Justice (ICJ).[18]

The past lessons and experiences from the Sino-Japanese negotiations of the East China Sea disputes (see Appendix) reveal that a single, comprehensive solution to the joint/cooperative development of the entire disputed area cannot be found easily. This is determined not only by the geopolitical relations between all the interested nations but also by the geological features of the East China Sea per se. However, this doesn't mean that there are no pragmatic solutions. Over the course of the past decades, various agreements and treaties have been arranged for the joint and/or cooperative development of many disputed territories throughout the world. Many of these agreements and treaties have also successfully established various mechanisms for the joint/cooperative exploitation and utilization of seabed resources. These mechanisms, or models in the following discussion, are considered in terms of the sophistication of their cooperative arrangements from the simplest to the most complex.

For the sake of comparison, I will try to divide them into five categories: (i) the solo development model, (ii) the parallel development model, (iii) the joint venture model, (iv) the joint authority model, and (v) the trustee development model. Two models, the "joint venture model" and the "joint authority model," were also mentioned in several other studies including the one by Ong (1999); but the others are now discussed with new and different definitions. These models are varied in terms of institutional complexity, participatory status, ease of implementation, as well as in terms of the features of the disputed areas designated for development and of the states interested in the disputed areas. The models are briefly described below and a summary is shown in Table 2, also below.

(1) *Solo development model*. Under this model only one state, acting on behalf of all of the interested states related to a disputed area, manages the exploration and exploitation of natural resources in the disputed area. The other state(s) receive(s) a share in the proceeds from the exploitation after the costs stemming from the first state's exploitation activities are deducted. Examples of this model include the 1958 Saudi Arabia-Bahrain Agreement and the 1969 Abu Dhabi-Qatar Agreement. In the 1958 Agreement a disputed

[18] For example, as of 2010 China doesn't accept ICJ jurisdiction; and Japan's acceptance still has reservations – cited from CIA (2010).

area of the continental shelf in the Persian Gulf was divided between Saudi Arabia and Bahrain.[19] "The 1969 Agreement provides that both Abu Dhabi and Qatar shall have equal rights of ownership over a single oil field, the Hagl El Bundug, even though the delimitation places most of the field within the maritime jurisdiction of Qatar. The field is developed by the Abu Dhabi Marine Areas Co., in accordance with the terms of the concession granted to it by the ruler of Abu Dhabi, with all revenues, profits and benefits divided equally between the two Governments" (Ong, 1999, p. 798). The 1989 Timor Gap Treaty affords another example of the solo development model: Australia controlled 85% of the waters and most of the petroleum in the Timor Sea.[20]

(2) *Parallel development model*. In this model each of the states interested in a disputed area will conduct its own exploration and exploitation activities independently. It seems that the petroleum exploration and exploitation in the South China Sea follows, at least partly, a "parallel model." At present, each of the coastal states (including Brunei, Indonesia, Malaysia, Philippines, and Vietnam) has its own oil/gas operations in an area that is also claimed – wholly or partially – by one or more of the other states. Despite the territorial disputes and uncertainty over the South China Sea, these coastal countries have involved energy companies in exploration and exploitation in their respective claims. Cooperation arrangements between national petroleum companies, including Chinese state-owned oil companies, "have been negotiated which hold out the prospect of greater security, even in the absence of a settlement of the maritime claims" (Buszynski and Sazlan, 2007, p. 1). The primary advantage of this model is that sometimes it doesn't need any institutional agreement and is therefore fairly user-friendly. However, the "parallel model" may induce irrational competition between all of the states in the disputed area. This would affect the effectiveness of the "parallel development model." Even worse, when the stock of a disputed area's natural resources decreases, this model could even intensify – not resolve – existing boundary and territorial conflicts.

(3) *Joint venture model*. This is a popular option for the joint or cooperative development of disputed areas. In general, the joint venture model "consists of an agreement establishing a system of compulsory joint ventures between the interested states and their ... nominated oil companies in designated joint development zones" (Ong, 1999, p. 789). In this model all subsequent contracts will follow the production-sharing principle of petroleum exploration and exploitation. Successful examples of the joint venture model

[19] Even though the Agreement "provided for the equal sharing of net income derived from the exploitation of the Fashtu bu Saafa Hexagon, an area lying on the Saudi side of the delimited continental shelf boundary," it "did not provide for, or even acknowledge, the rights of Bahrain" (Ong, 1999, p. 789).

[20] See www.austlii.edu.au/au/other/dfat/treaties/1991/9.html#fn0. Accessed on August 6, 2010. This treaty was replaced by the Timor Sea Treaty after East Timor's independence; in 2002, the new treaty transformed the agreement from a solo development model into one of joint authority, as will be discussed later.

include the 1965 Kuwait-Saudi Arabia Agreement, the 1974 Convention in the Bay of Biscay between France and Spain, the 1992 Memorandum of Understanding (MOU) between Malaysia and Vietnam, and the 1993 Colombia-Jamaica Treaty. the oil/gas exploitations in the Niger Delta, which consists of, as of the year 2000, six states of Abia, Akwa-Ibom, Cross River, Edo, Imo and Ondo, are in fact organized through the "trustee model." The Shell Petroleum Development Company of Nigeria Ltd is the largest petroleum producer. The portion of the federation account allocated to the states has been allocated on the basis of five criteria: equality (equal shares for all states), population, social development, land mass and terrain, and internal effort at generating own revenue. Allocations have varied from as much as 50%, owing to the First Republic's high degree of regional autonomy, and as low as 10% during the military dictatorships (Barkan et al., 2001).

(4) *Joint authority model*. Institutionalized to the highest level, the joint authority model consists of a comprehensive agreement by all of the states concerned. This model "consists of an agreement by the interested states to establish an international joint authority or commission legal personality, licensing and regulatory powers, and a comprehensive mandate to manage the development of the designated zone on these states' behalf" (Ong, 1999, p. 791). Usually, the joint authority model establishes a joint commission charged with more powers and functions than those of the "joint-venture model," although in both models all interested states follow the production-sharing principle of petroleum exploitation. The 1974 Sudan-Saudi Arabia Agreement is an early example of the joint authority model. Under this Agreement, "the Joint Commission has legal personality as a body corporate in both Saudi Arabia and Sudan" (Ong, 1999, p. 791). In addition, "the commission is empowered to consider and decide on ... the applications for licenses and concessions concerning the exploration and exploitation" of the seabed resources in common zone (Ong, 1999, p.791). Other examples of this model include the Malaysia-Thailand Joint Authority (which is based on the Malaysia-Thailand Joint Development Agreement of 1979-1990) and the Management and Cooperation Agency for Maritime Spaces (which was jointly established by Senegal and Guinea Bissau in 1995).[21] The Timor Sea Treaty, signed by Australia and East Timor on May 20, 2002, led to the establishment of the Timor Sea Designated Authority (TSDA) that is responsible for the administration of all petroleum-related activities in the disputed area of the Timor Sea.

[21] The purpose of this Agency is to supervise "joint exploration and exploitation activities within the designated Joint Exploitation Zone in accordance with proportions agreed upon in relation to the living (50:50) and nonliving (85:15 in favor Senegal) continental shelf resources." In addition, it is "responsible for environmental protection in the designated Joint Exploitation Zone." Cited from Ong (1999, p. 792).

(5) *Trustee development model*. According to this model, all interested states in a disputed area will surrender their rights of resource exploration and exploitation to a third party. In exchange, they each will receive an allowance (in cash or by kind)—the amount of which depends on an agreement—from the third party. The third party should have sufficient economic and technological capacities to "take care" of the natural resources of the disputed area. The advantage of the "trustee development model" is that, after implementation, which is based on a package of agreements signed between all the interested states and with an appropriate third party, it can resolve resource-related disputes definitively, thus making it easier to get businesses to invest in the follow-on development needed.

Table 2: Summary of five joint/cooperative development models: characteristics and (dis)advantages

	Solo development model	***Parallel development model***	***Joint venture model***	***Joint authority model***	***Trustee development model***
Institutional complexity	Simple	Simplest	Complex	Most complex	Simple
Participatory status	Single state	Bi/multi-lateral	Bi/multi-lateral	Bi/multi-lateral	Third party
Features of disputed area designated for development	Imbalanced distribution of natural resources	With vast size or rich natural resources	With limited size and scarce natural resources	With limited size and scarce natural resources	Not strategically critical to all interested states
How interested states are characterized	One state has obvious advantages over the other(s)	All with similar technological conditions	With experiences in setting up joint ventures	All with similar political or juridical systems	All with similar technological conditions
Easiness of implementation	Easy	Easiest	Difficult	Most difficult	Difficult
Effect on boundary-dispute resolution	Great	Smallest	Small	Small	Greatest

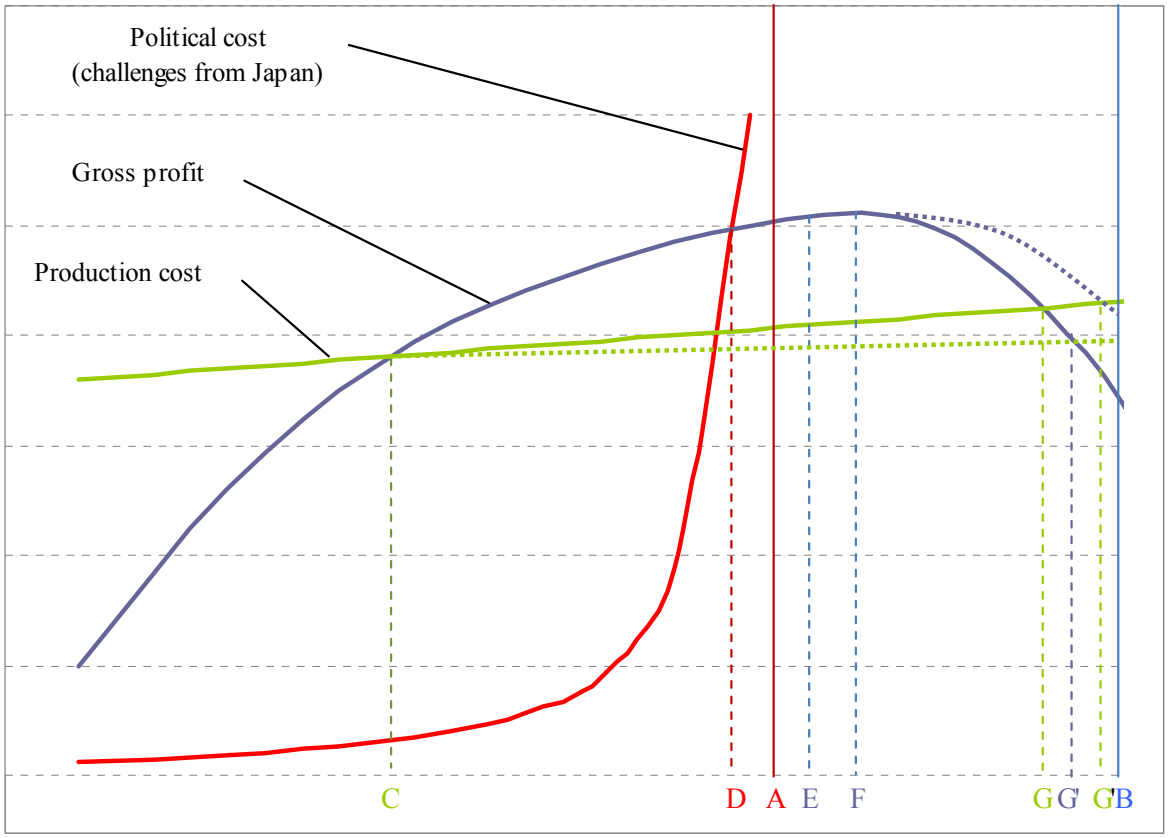
Source: Defined by the author.

4. Is There a Win-Win Solution to the East China Sea?

The East China Sea is a strategic area for China, Japan, South Korea, and the United States. Because of domestic as well as geopolitical issues, it is unlikely that China and Japan could make any substantial concessions to each other in the near future. Is it possible for the two sides to shelve their long-standing maritime boundary demarcation disputes and find a pragmatic solution leading to the joint or cooperative development of the disputed area in the East China Sea?

To answer this question, let us first conduct a spatial cost-benefit analysis of the Chinese oil/gas operations in the East China Sea, which can be summarized diagrammatically in Figure 2. On the basis of this simplified model, the whole area with potential oil/gas deposits can be divided into different zones (i.e., CD, DA, AE, EF, FG, and GB). Since these zones have different geological features and changing cost-benefit coefficients on seabed oil/gas exploitation with respect to the distance from mainland China (shown in Figure 2), different joint/cooperative models (as shown in Table 2) can be adopted to fit in with them, respectively. Specifically, this can be arranged as in Figure 2, below:

Figure 2: Cost-benefit analysis of China's oil/gas operations at the East China Sea



Notes: (1) All curves can be used to characterize both oil- and gas-field operations except the dotted curves that are used to represent the oil-field operations as compared to gas-field operations. In addition, the dotted curves can also be used to denote technological progress in seabed oil/gas production and transportation, through which the cost and profit curves can move away downwardly and upwardly, respectively. (2) "Production cost" refers to a positive function with respect to distance from mainland China. (3) "Gross profit" roughly follows an inverted-U shape curve with respect to distance from mainland China (since most of the hydrocarbon deposits are found around the center of the East China Sea). (4) "Political cost" refers to political or, in the worst situation, military actions that would stop or seriouly affect China's oil/gas operations (it grows slowly at first but rises sharply near the boundary (i.e., "A") claimed by Japan). (5) A= boundary claimed by Japan; B= boundary claimed by China; C= boundary beyond which oil/gas operations become profitable; D= boundary beyond which China's oil/gas operations cannot be conducted due to the political and military protests from Japan; E= boundary in which the net profit (i.e., gross profit minus production cost) of oil/gas operations is the highest; F= boundary in which the gross profit of oil/gas operations is the highest; G(G')= boundary beyond which oil/gas operations are not profitable; AB= area claimed by both China and Japan; CD= area in which China has unilaterally conducted oil/gas operations.

Zone CD: This zone, in which the Pinghu oil/gas field is located, is under the full jurisdiction of China and is not claimed by Japan. Therefore it is excluded from my analysis of possible cooperation between China and Japan.

Zone DA: This zone is not claimed by Japan. However, China's oil/gas operations in this zone have been protested by Japan, since Japan fears that China will siphon off gas from its side of the "boundary" (denoted by "A" in Figure 2). Current Chinese oil/gas fields in this zone include Chunxiao and Tianwaitian, among others (each of which also has a Japanese name, as shown in the notes to Table 1).[22] The solo development model (in which China is the only operator and Japan receives a share of profit) may be applied to this zone. In fact, China has decided to welcome, as shown in its June 18, 2008 agreement with Japan, to Japan's participation in the project in the Chunxiao field. Both sides have also agreed to discuss cooperation on the Tianwaitian oil/gas field.

Zone AE: This is the highest oil/gas-yielding zone in the East China Sea. China and Japan could apply the joint venture model or the joint authority model to this zone. The joint exploitation of the Longjing/Asunaro oil/gas field and its surrounding areas straddling both sides of Japan's claimed median line, as defined in the 2008 Agreement, may be a good example of these kinds of cooperation between China and Japan. Besides, if Japan's exploitation of this zone is not economically feasible (due to its relatively long distance from this zone and the costl of deploying a pipeline connecting it to Japan's central marketplace[23]), Zone AE may also be exploited under the solo development model. In this case, China would be the only operator and Japan would receive a share of the profit.

Zone EF: China's *net* profit of oil/gas exploitation within this zone follows a decreasing marginal rate (with respect to the distance from E to F). On the other hand, this zone is located closer to the Japanese side than Zones DA and AE. Thus, China and Japan may consider applying the joint venture model, the joint authority model, or the trustee development model to this zone.

Zone FG: In this zone, China's *gross* profit from the exploitation of the seabed oil/gas will follow a decreasing marginal rate (with respect to the distance from F to G). Therefore, the joint venture model, the joint authority model, or the trustee development model would be ideal choices.

Note that since China and Japan have different political and juridical systems from each

[22] More precisely, these oil/gas fields are defined to be located around boundary "D" (shown in Figure 2) beyond which China's oil/gas operations cannot be conducted due to the high costs and risks stemming from political and military protests from Japan.

[23] Since most of the proven hydrocarbon deposits in the East China Sea have been natural gas, we assume that production costs are highly dependent on the length of the pipeline connecting the gas field and central marketplaces.

other, the joint venture model may be more easily adopted to the joint development of the East China Sea than the joint authority model. In addition, if the oil/gas exploitation of the southernmost part of the East China Sea, including the Diaoyu/Senkaku islets, is arranged by using Taiwan as the marketplace then the profit curve would not follow such a decreasing marginal rate as those mentioned in the above cases in which oil/gas exploitation is conducted by treating mainland China as the marketplace. (Later I will discuss the political and economic feasibilities of Taiwan's participation in the oil/gas exploitation in the East China Sea.)

Zone GB: China's oil/gas operations would lose money (as shown in Figure 2). By contrast, Japan would become more interested in this zone because of its proximity to Japan's marketplace.[24] Thus, the development of this zone may follow either the solo model (in which Japan is the only operator and China receives a share of profit from it) or the trustee model.

So far, this paper has only discussed two stakeholders. In addition to China and Japan, there are other stakeholders that may play a role in the peacekeeping and resource management in the East China Sea (see Table 3, below).

[24] If a spatial economic model is built for Japan's oil/gas operations in the East China Sea, the cost-benefit pattern will be similar to that of Figure 2.

Table 3: Matrix of the bilateral boundary and territorial claims in the East China Sea (ECS)

Target / Challenger	*China (PRC)*	*Japan*	*South Korea*	*Taiwan (ROC)*
China (PRC)		Continental shelf covers Japan's EEZ; Diaoyu/ Senkaku islets[a]	Continental shelf covers South Korea's EEZ; Suyan/ Ieodo reef	All that Taiwan claims
Japan	Overlapping EEZs in middle ECS; Senkaku/ Diaoyu islets[b]		Overlapping EEZ in northeast ECS[c]	Overlapping EEZs in south ECS; Senkaku/ Diaoyu islets[b]
South Korea	Overlapping EEZs in northwest ECS; Ieodo/ Suyan reef	Continental shelf covers Japan's EEZ in northeast ECS[c]		Dormant claims
Taiwan (ROC)	All claims are dormant[d]	Overlapping EEZs in south ECS; Diaoyutai/ Senkaku islets[a]	Dormant claims	

Notes: (1) All of China's claims apply to Taiwan since China claims Taiwan as part of China. (2) Taiwan has not ratified the 1982 UNCLOS. ([a]) No continental shelf or EEZ extending from these islets is claimed. ([b]) An EEZ extending from these islets has purposely been left vague (Ueda, 1996). ([c]) According to the agreement signed in 1974, the major part of the overlapping EEZs will become the joint development zone (JDZ) for fifty years. ([d]) Based on Taiwan's decision, made on February 27, 2006, that the National Unification Council (NUC) would cease to function and the National Unification Guideline (NUG) would cease to apply.

Abbreviations: EEZ= exclusive economic zone; ECS= East China Sea; PRC= People's Republic of China; ROC= Republic of China; UNCLOS= United Nations Convention of the Law on the Sea.

Unlike China (which uses the natural prolongation principle) and Japan (which uses the equidistant line principle), South Korea bases its claims on different UNCLOS principles. Specifically, South Korea uses the equidistant line principle when negotiating its EEZ with China and the natural prolongation principle when negotiating with Japan. South Korea and China have a dispute over a submerged reef (called Ieodo by South Korea and Suyan by China) in the northwest part of the East China Sea. The Ieodo/Suyan rock, which is 4.6 m below sea level at low tide, is 149 km southwest from Marado Island, South Korea, and 245 km northeast of Haijiao Island in the northeast corner of Zhoushan archipelago, Zhejiang province, China. It currently serves as a foundation for the Korean Ieodo Ocean Research Station (KIORS). If any seabed hydrocarbon resources were discovered around this area in the future, it seems very likely that the

current, dormant dispute would be activated between South Korea and China accordingly. In addition, South Korea and Japan have overlapping claims in the northeast part of the East China Sea. This dispute is now dormant, subject to a bilateral agreement that will remain in force for fifty years following 1978.

Taiwan has long-standing fishery disputes with Japan in the East China Sea, especially in the area around the Senkakus/Diaoyutai where Japan often detains or fines Taiwanese fishing boats operating (Valencia, 2007, p. 133). Since the 1990s, Taiwan and Japan have held various talks but no agreement has been reached on the joint management of their overlapping zones. On the other hand, since the Diaoyu/Senkaku islets are much closer to Taiwan than to either Japan or mainland China, the most efficient way of exploiting the oil/gas resources around these islands is to treat Taiwan as the major marketplace. For example, the cost for transporting the gas to Keelung in northern Taiwan is about one-third that of transporting it to Ningbo in mainland China, and only 10 percent of the cost to transport it to Kagoshima on the southernmost of the Japanese main islands (see Table 4 for more detailed analysis).

Table 4: The potential marketplaces for oil/gas produced around the Diaoyu/Senkaku islets

City (town)	*Urban population ('000 persons)*[a]	*Hinterland availability*	*Distance to Diaoyu/ Senkaku islets (km)*[b]	*Relative cost of seabed pipeline transportation*[d]
Shanghai, China	18,400	Yes	650	100
Taipei, Taiwan	2,600	Yes	200	31
Ningbo, Zhejiang	2,201	Yes	500	77
Kagoshima, Japan	606	Yes	1,000[c]	256
Keelung, Taiwan	389	Yes	170	26
Okinawa, Japan	129	No	410[c]	105

Notes: ([a]) As of 2008 or 2009. ([b]) The author's estimates. ([c]) The distance may be even longer since a huge detour is needed in order to avoid laying seabed pipelines across the deepest section of the Okinawa Trough. ([d]) The estimates are based on the following: "Shanghai" is set at 100. As a reference, laying one kilometer of pipeline on the seabed would cost US$1.6 million for the Langeled pipeline across the North Sea and US$2.2 million for the trans-Adriatic pipeline (Terletski, 2010). Since the average depth of the North Sea is 95m (with the max depth of 700m) and that of the Adriatic Sea is 444m (with the max depth of 1,000m), I assume that the average cost of the seabed pipelines is US$1.5 million per kilometer for both Taiwan and mainland China and US$2.5 million per kilometer for Japan.

Since 2008, there has been a substantial easing of the strained relations between the two sides of the Taiwan Strait. Examples of the increased cooperation across the Taiwan Strait include China's *approval* for Taiwan to secure observer status at the UN's World Health Assembly in 2009 and the tacit agreement that neither side will steal the other's existing diplomatic partners. In the Chinese mainland, there have also been discussions, on various occasions, about the possibility of inviting Taiwanese companies to join its seabed oil/gas exploration and exploitation in the East China Sea. For example, the following is reported in the *Ta Kung Pao* (a Hong Kong-based, pro-China newspaper):

> "A few days ago two major energy enterprises in the mainland and Taiwan decided to join hands in prospecting for and exploiting oil and gas resources in China's Diaoyu Islands waters. This move marks the rise of cross-Strait energy cooperation to a new height and also deals a heavy blow to some Japanese energy experts' wild ambition to encroach on the energy resources at China's Diaoyu Islands." (Yi, September 15, 2008)

Frankly, the possibility of closer cross-Strait political cooperation does exist if some institutional and technical agreements are arranged by both sides of the Taiwan Strait.[25] But it would not be good for Japan if the status quo is maintained either, since China has been producing oil and gas – some of which may have been, as Japan believes, stolen from the Japanese side. Japan, in order to break the deadlock, needs to be more pro-active – time is now on the Chinese (if not the Taiwanese) side. Japan should welcome and try to negotiate a larger share of benefit from Taiwan's participation in the exploration and exploitation of resources in the southern part of the East China Sea, where Japan cannot maximize the economic benefits from its own gas exploitations. As a political tactic, Japan needs to embrace Taiwan in order to deter Taiwan and mainland China from unifying and together taking a tougher stance toward Japan.

Technologically, Japan's possible oil/gas exploitation of the East China Sea still lacks an appropriate marketplace with close proximity to the oil/gas fields. At present, the most common way to transport natural gas is using pipeline. It is extremely dangerous to liquefy gas using high pressure on a drilling platform and to transport the liquefied natural gas (LNG) by tankers.[26] The deepest point in the Okinawa Trough, which a pipeline from the East China Sea oil/gas fields to Japan would have to cross, is 2940m under sea and the slope on Japan's side is very steep. The

[25] One of China's official expressions for cooperation with Taiwan on the joint maintenance of the sovereignty and jurisdiction of the Diaoyu/Senkaku islets was made by Ms. Chen Yue, Deputy Director General of International Cooperation, State Oceanic Administration of China, at the "Strait Marine Forum," held in Taipei on March 29-30, 2010. Available at http://news.xinhuanet.com/tw/2010-03/30/c_126898.htm. Accessed on April 23, 2010.

[26] Over a distance of about 180 km, the cost for the production and transportation of the LNG by tanker is 5 times higher than that via pipeline (Jensen, 1998).

world's deepest undersea gas pipeline completed so far is only 2100m below the surface of the Black Sea.[27] Unless there is a technological breakthrough or the pipeline takes a huge detour north via the northeast part of the East China Sea (also impractical without an agreement with South Korea since it would pass through South Korea's claimed EEZs), there is no way Japan can get that gas back to its main islands.

Japan could conduct an early-phase feasibility study for the oil/gas exploration in the eastern part of the East China Sea. To this end, Japan requires, on the one hand, to compromise with China on the western part of the Sea and, on the other hand, to obtain an endorsement and/or participation by the United States. Strategically, the United States would not see any intensified or "unmanaged" conflicts in the East China Sea since both China (economically) and Japan (politically and militarily) will still remain important American partners for the foreseeable future. As a preliminary proposal, Japan should consider transporting the gas produced in the East China Sea to the nearest island where the gas can be converted into liquid and transported to Japan.

To be sure, the U.S. involvement in the bilateral (Japan-China) or trilateral (Taiwan-Japan-China) cooperation in the East China Sea would be good news for Japan. But China would also welcome it if the United States would allow its oil companies to set up joint ventures with China (since the Chinese oil companies are still technologically backward compared to their U.S. counterparts). Above all, economic cooperation (instead of military competition) in the East China Sea will be good for all of these nations—especially when energy shortages become an increasingly critical problem.

4. Concluding Remarks

In the evolution of international confrontations, a state's "tit for tat" response usually results in an amount of action or reaction equal to the other's provocation. In many circumstances the stability of cooperation would be enhanced if the response were slightly less than the provocation. Otherwise, it would be all too easy to get into a rut of unending responses to each other's last action (Axelrod, 1984, p. 187). With regard to the East China Sea dispute, China's and Japan's provocative actions and reactions have tended not to be a regular feature designed to achieve the "tit-for-tat" responses. For example, in the 1990s the Sinopec Exploration and Production Research Institute (PEPRIS) was entitled to determine the drilling locations of the Chunxiao/Shirakaba field. PEPRIS conducted very careful consultations and calculations, before

[27] Cited from www.encyclopedia.com/doc/1P1-68848877.html (accessed on April 15, 2010). Generally, as seabed oil and gas development expands farther in deeper waters, construction and operating costs will increase due to the logistical requirements of operating farther from land. As a result, production configurations are likely to change to more-wells per platform, more processing facilities, and fewer but larger platforms. As the capital investment and population per platform increases, the knowledge requirements for platform design and the operational environment will become even more exacting (CEPUS, 1989, p. 23).

finally fixing the last exploration well 5km away from the median line claimed by Japan – a distance much farther than what had been previously decided.[28] Japan's reaction to China's production at the Chunxiao/Shirakaba gas field has so far shown restraint.

However, the current, dormant Sino-Japanese disputes over the East China Sea could be activated anytime in the future when global energy security becomes a more crucial problem. The stakes are high, given the possibility that supposedly "managed" conflicts can always result in unintended war. At present, China and Japan, regardless of their preliminary agreement signed in 2008, still see each other's stance over their maritime boundary demarcations and the joint development of the East China Sea as uncompromising. Notwithstanding their geopolitical differences, the countries with territorial disputes in the East China Sea should learn to find a cooperative approach that can maximize their respective benefits. Clearly, if this is determined solely by economical principles, then there will be no zero-sum mentality that both China and Japan bring to energy security. With regard to this proposed multilateral cooperation in the East China Sea, the following compromises must be reached.

First of all, China, in order to achieve a better economic result from the exploitation of the oil/gas resources in the East China Sea, needs Japan's active cooperation.[29] China should welcome Japan's input of capital and technology in its claimed EEZ (as it did in the early case in which Royal Dutch/Shell and U.S.-based Unocal Corporation were invited as partners in the exploitation of the Chunxiao/Shirakaba gas field in 2003). What is more important, Japan's participation can reduce (or share) China's potential risks – seabed exploration and exploitation are both costly and risky, especially at the early stage.

Second, Japan, in order to make more substantial progress toward the joint/cooperative development of the East China Sea, should adopt a more moderate stance toward its territorial claims, including the ownership issue of the Diaoyu/Senkaku islets. Unlike China, which has claimed islets but agreed to shelve the dispute over them with Japan, the Japanese government has treated these tiny, uninhabited islets or rocks as Japan's "indisputable" territory. Japan's current dilemma is that its unilateral development of the disputed areas is technologically infeasible and that it cannot effectively prevent China from exploiting the oil/gas on the western side of the median line.

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[28] Cited from the conversation of Mr. Zhang Kang, Deputy Director of the Consultative Center of the PEPRIS, with the correspondent of *International Herald Tribune*. Available at: http://news.sohu.com/20100119/n269673121.shtml. Accessed on April 1, 2010.

[29] For example, as shown in Table 1, in 2009 the daily output of natural gas is only 1.8 million cubic meters in the Pinghu field but as high as 9.1 million cubic meters in the Chunxiao/Shirakaba field. This supports the general pattern specified in Figure 2 (i.e., the gross profit of gas exploitation can be maximized in the central part of the East China Sea – it is there that China and Japan have disputes).

Third, China and Japan should invite other stakeholders to participate in their cooperative efforts in the East China Sea. When more partners or stakeholders are included it can sometimes bring about more constructive ideas and more opportunities toward a final, win-win agreement, especially in situations like the East China Sea where China and Japan currently have no common interests. To this end, South Korea (with regard to the possible development of the northern part of the East China Sea), Taiwan (with regard to the development of the southern part of the East China Sea) and the United States (with regard to the development of the eastern part of the East China Sea, especially the area near the U.S. military bases) can all serve as constructive stakeholders.

Lastly, given that a swift resolution to the ownership disputes in the East China Sea is unlikely, the most immediate task is to shelve the issue and find a pragmatic solution to joint development of the resources there. The decision-making regarding undersea resource exploitation should be treated simply as a joint economic venture by all of the stakeholders in East Asia. Only if this principle is adhered to, can a win-win development scheme be smoothly achieved in the East China Sea. Above all, this can promote development and stability, prevent violent conflicts, and increase peace-building capacity, tools, and intellectual capital worldwide. Furthermore, the successful accomplishment of bilateral or multilateral cooperation in the East China Sea will prove to be a useful example for practitioners and policymakers seeking measures to minimize or reduce the risk of conflicts and wars stemming from undersea resource exploitation in other disputed areas.

Substantial economic and political benefits could be derived from a cross-sea détente, but this would require the joint and cooperative actions by all of the coastal states in the East China Sea. If a negotiated settlement of territorial disputes cannot be reached, China and Japan could, as suggested by Dutton (2007, p. 67), demonstrate their commitment to the rule of international law by agreeing to submit their disputes to international arbitration, as Canada and the United States did in the Gulf of Maine in 1984 and Romania and Ukraine did in the Black Sea in 2009.

When the Sino-Japanese Treaty of Peace and Friendship was signed in 1978, then Chinese Vice-Premier Deng Xiaoping (1904 –1997) said:

> "It is true that the two sides maintain different views on this [Diaoyu/Senkaku] question... It does not matter if this question is shelved for some time, say, ten years. Our generation is not wise enough to find common language on this question. Our next generation will certainly be wiser. They will certainly find a solution acceptable to all."[30]

[30] Cited from Lo (1989, pp. 171-2).

Yes, the 21st century generations should be wiser than their predecessors. In China there is a very popular proverb: “sange chou pijiang ding yige Zhuge Liang” (three cobblers with their wits combined equal Zhuge Liang, the master mind). Arguably, given that the two sides (China and Japan) cannot reach an agreement on the joint/cooperative exploitation of the East China Sea and that the development of the southern East China Sea is not profitable to either side alone, why don’t they invite one more cobbler (stakeholder) to join in? If they are able to do so, then they will be wiser than Zhuge Liang (AD 181–234), a famous political adviser during China’s Three Kingdoms period. More often than not, a disposition toward the negotiation of dispute settlement in the East China Sea is the only way to win.

Appendix: Chronology of oil/gas exploration and exploitation in the East China Sea

- 1969: In May, the Committee for Coordination of Joint Prospecting for Mineral Resources in Asian Offshore Areas (CCOP), under the auspices of the UN Economic Commission for Asia and the Far East (ECAFE) reports possible large hydrocarbon deposit in the seabed around the Diaoyu/Senkaku islands in the East China Sea.
- 1970: On December 4, when Japan and South Korea, together with Taiwan, hold talks as to how the maritime boundaries should be delimited in the East China Sea, regarding the areas with overlapping claims, China makes its first official protest.
- 1971: The United States and Japan sign the Okinawa Reversion Treaty which includes the Diaoyu/Senkaku islands as part of Okinawa to be returned to Japanese rule – both the Taiwanese and Chinese governments immediately challenge this Treaty. In February, and on December 30, China repeats its protest by publishing a number of historical or legal grounds for its claim to the Diaoyu/Senkaku islands.
- 1972: On May 15, the United States ends the occupation of the Diaoyu/Senkaku islands, and returns them, together with Okinawa and Daito Islands, to Japan.
- 1974: Japan and South Korea signs a joint development agreement that makes the disputed area (i.e., the northern part of the East China Sea) a "joint development zone." China protests this agreement. The exploration was abandoned when no commercially viable resources are found. In September, China begins to conduct oil/gas explorations on its continental shelf in the East China Sea.
- 1978: Japan establishes official diplomatic relations with the PRC. The two governments agree to shelve the issue of sovereignty over the disputed Diaoyu/Senkaku islands. On June 22, the joint development agreement in the northeast part of the East China Sea, signed by the ROK and Japan in 1974, goes into effect and will remain in force for the following fifty years.
- 1980: China, for the first time, successfully drills a well at the Longjing/Asunaro field (called No. 1 well). Japan and South Korea begin to conduct explorations in the northeast part of the East China Sea.
- 1982: On the western side of the Xihu Trough, Chinese exploration staff identify an oil-bearing geological formation, which is named “Pinghu.” On November 27, a survey ship begins to drill No. 1 well of the Pinghu field.
- 1983: On April 10, the drilling is completed at the Pinghu oil/gas field, which has a stable oil flow.
- 1985: The CNOOC is nominated by the Chinese government to negotiate with its Japanese counterpart, Teikoku Oil Company, on possible joint operations in the East China Sea.
- 1986: China drills two wells in the Pinghu oil/gas field. Japan and South Korea, after five years of exploration in the northeast part of the East China Sea, abandon the search since

there are no findings of any economically viable fields.

- 1988: On April 16, the drilling of No. 4 well of Pinghu oil/gas field starts and is, on December 11, completed, which has a high-yield flow of oil and natural gas.
- 1988: On April 19, the Chinese Ministry of Foreign Trade and the U.S. Trade and Development Office (TDO) sign an agreement in which TDO provides US$660,000 of funding for the exploration and early feasibility studies of East China Sea gas.
- 1989: On June 8, the American company, Bechtel Corporation's final report entitled "feasibility study of use and early development of the natural gas of East China Sea" is adopted by China.
- 1990: New Star Petroleum (a subsidiary of Sinopec), CNOOC, and Shenergy Company, Ltd. (owned by the Shanghai municipal government) jointly set up the Shanghai Oil and Gas Operating Company Limited (SOGC) to develop the Pinghu oil/gas field, which is approximately 400 kilometers away from Shanghai.
- 1992: On February 25, the PRC government passes the territorial sea law that includes the Diaoyu/Senkaku islands as part of China's territory. The Pinghu gas field is owned by the SOGC. CNOOC is responsible for exploitation.
- 1993: China shifts to oil importer status. Exploration of the East China Sea becomes energy security priority.
- 1994: In January, SOGC proposes a scheme for pipeline transportation of natural gas.
- 1995: The State Council of China approves the SOGC's proposal. The New Star Company conducts successful drilling in the Chunxiao/Shirakaba area.
- 1996: Hong Kong activist David Chan, in an attempt to reach the Diaoyu/Senkaku islets, is forced back by a Japanese water cannon and drowns. In October, China warns the United States not to intervene in the Diaoyu/Senkaku dispute. In the fall, the Pinghu oil/gas field construction begins.
- 1997: Japan co-finances – through its contribution to the ADB, as well as directly through its ExportImport Bank (renamed Japan Bank of International Cooperation in 1999) – two oil/gas pipelines from the Pinghu field to the Chinese mainland.
- 1998: In November, China began full operation of its first oil and natural gas field in the Pinghu field, about 70 km from the median line, on the Chinese side.
- 1999: Formal completion of the Pinghu oil/gas field, with 1.2 million cubic meters of natural gas per day, to be supplied to the Shanghai market, mainly for use in residential areas. In April, natural gas reaches Shanghai.
- 2000: CNOOC obtains a monopoly on all offshore oil and gas operations. The New Star Company is acquired by CNOOC and is re-named XOGOC.
- 2001: On June 1, the Fisheries Agreement between China and Japan, signed on November 11, 1997, enters into force.
- 2002: On March 20, the State Planning Commission convenes the East China Sea natural gas conference in Shanghai. Sinopec and CNOOC announce a collaboration to set up the Joint

Management Committee on East China Sea Natural Gas Exploitation, and officially launch the joint development of the East China Sea natural gas.

- 2003: In May, Sinopec, CNOOC, Pecten Orient (a subsidiary of Royal Dutch/Shell), and Unocal East China Sea Limited (a subsidiary of Unocal Corporation) sign a contract on the joint development of natural gas in the Chunxiao/Shirakaba gas field, with shares of 30%, 30%, 20%, and 20%, respectively. In October, the Pinghu gas field completes the first phase expansion project, named "Fangheting." The production capacity rises to 1.8 million cubic meters per day.
- 2004: In July, Japan sends a tracking ship to the Japanese side of the middle line. In August, South Korea's Hyundai Heavy Industries Co., Ltd. starts laying pipelines for the Chunxiao/Shirakaba project, with a total length of 470 km. On September 29, Royal Dutch/Shell and U.S.-based Unocal Corporation announce that they have withdrawn from the large-scale gas project for joint exploration, development, and marketing of natural gas resources in the Xihu Trough of the East China Sea citing "commercial reasons." The pull-out by their overseas partners leaves Sinopec and CNOOC -- the second and third largest domestic oil firms – as the only operators in the project. In September, the Norwegian research vessel Ramform Victory is contracted by the Japanese government to conduct seismic surveys and gather data on oil and gas reserves in the disputed area. On October 13, the Chinese marine surveillance ship "Haijian" enters into the disputed area and exchanges warnings with a Japanese ship, and the Japanese ship leaves the area upon the appearance of Chinese warships. On October 25, the 1st round of talks on the Sino-Japanese joint development of the East China Sea starts in Beijing.
- 2005: In February, Japan once again urges China to stop the Chunxiao/Shirakaba project, which is rejected by the Chinese side. In April, the Japanese government approves a private enterprise (Teikoku Oil Company) to prepare for the East China Sea oil exploration. On May 30, the 2nd round of talks start in Beijing. In October, the Chunxiao/Shirakaba gas field goes into production, with daily processing capacity of 9.1 million cubic meters of natural gas. The gas is supplied primarily to Ningbo's urban area and, after expansion, it will be extended to Shanghai and other places in the future. On September 30, the 3rd round of talks start in Tokyo.
- 2006: The Pinghu oil/gas field goes through a third-phase of expansion construction. On March 6, the 4th round of talks start in Beijing. In mid-April, China issues a ban on ships entering an area around the Pinghu field near Japan's unilaterally claimed boundaries while it lays pipeline and cables; Japan protests the ban immediately. On May 18, the 5th round of talks start in Tokyo. On July 8, the 6th round of talks start in Beijing. On August 28, Japan strongly protests China's plans to develop a new gas field, Bajiaoting.
- 2007: On March 29, the 7th round of talks start in Tokyo. On May 25, the 8th round of talks start in Beijing. On June 26, the 9th round of talks start in Tokyo. On October 11, the 10th round of talk start in Beijing. On November 14, the 11th round of talks start in Tokyo.

- 2008: On May 7, China's largest oil company (PetroChina) and Japan's largest oil and gas processing enterprise, Japan National Oil Corporation (JNOC), sign a MOU on the joint venture of oil refining. On June 18, at the end of the 12th round of talks held in Beijing, China and Japan sign an agreement on the joint development of the Longjing/Asunaro oil/gas field and its surrounding area including the following points: A (29°31′N; 125°53′30″E), B (29°49′N; 125°53′30″E); C (30°04′N; 126°03′45″E), D (30°00′N; 126°10′23″E), E (30°00′N; 126°20′00″E), F (29°55′N; 126°26′00″E) and G (29°31′N; 126°26′00″E). In this agreement, China also welcomes, in principle, Japan's participation in the development of the Chunxiao/Shirakaba gas field.
- 2009-2010: No progress has been achieved towards the substantial cooperation between China and Japan, and incidents continue to exacerbating the territorial dispute in the East China Sea.

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