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China's New Silk-Road Initiative and the South China Sea Disputes: Toward a New Mutual Deterrence Equilibrium

Rongxing Guo and Kaizhong Yang

Regional Science Association, Peking University, 101402, Beijing, China

Abstract. As a measure for China to countervail the U.S. strategy of military and diplomatic 'pivot' or 'rebalance' toward Asia and to take a bigger role in global affairs, China's New Silk-Road Initiative is bound to evolve into, and to be decided by, a number of geopolitical games in the South China Sea. In this paper a three-player, non-cooperative game is constructed for policy-makers to handle the South China Sea disputes. Theoretically and analytically, conditions under which the strategy combination – specifying that China stays out, state x (which is defined as any country that has territorial disputes with China at the South China Sea) fights if China goes in, and the United States allies with state x if China goes in and state x fights but, if state x stays out, colludes with China and does not otherwise ally with state x – is a mutual deterrence (subgame perfect) equilibrium are examined. In the second part of this paper, four typical cases – including (i) the Scarborough Shoal standoff (April – June 2012), (ii) the HYSY 981 drilling rig crisis (May – July 2014), (iii) the US navigation incident (2015), and (iv) the long existing, though informal, scheme on shelving territorial disputes – are briefly narrated and, if necessary, quantitatively tested. My major analytical interest focuses the political and economic incentives for all the players involved in each case of the South China Sea disputes to reach a new mutual deterrence (subgame perfect) equilibrium.

Keywords: South China Sea, territorial disputes, game theory, China, United States

1. Introduction

The 2010s is bound to be an uneasy decade for countries surrounding and in relation to the South China Sea. In 2010, China surpassed Japan as world's No. 2 economy; and there were reports that at its current rate of growth, China would have replaced the U.S. as the world's top economy in about a decade. Indeed, this was good news for China but bad news for the United States.

The U.S. military and diplomatic 'pivot,' or 'rebalance' toward Asia became a popular buzzword after Hillary Clinton, then U.S. Secretary of State, authored "America's Pacific Century," in the *Foreign Policy* magazine in November 2011. Clinton's article emphasizes the importance of the Asia-Pacific, noting that nearly half of the world's population resides there, making its development vital to American economic and strategic interests. She believed that a U.S. renewed political and military involvement in Asia is vital to the region's future:

“The region is eager for our leadership and our business – perhaps more than at any time in modern history. We are the only power with a network of strong alliances in the region, no territorial ambitions and a long record of providing for the common good... Our challenge now is to build a web of relationships across

the Pacific that is as durable and as consistent with American interests and values as the web we have built across the Atlantic.”¹

Since 2013, China has made the “New Silk Road” policy, which connects China with Europe, a key part of China’s international relations. On September 7, 2013, Chinese President Xi Jinping proposed to build a “Silk Road Economic Belt” during his speech at Kazakhstan. On October 3, of the same year, he proposed to build a “Twenty-first Century Maritime Silk Road” during his speech at Indonesia. China and Europe stand at either end of the New Silk Road. In each of his speeches, President Xi drew attention to the long connections between China and Europe from ancient times along both the land and the sea routes. By stressing the contribution that commercial relations make to cultural interaction and peaceful development, he pointed out:

“[C]ivilizations are equal, and such equality has made exchanges and mutual learning among civilizations possible. All human civilizations are equal in terms of value. They all have their respective strengths and shortcomings. There is no perfect civilization in the world. Nor is there a civilization that is devoid of any merit. No one civilization can be judged superior to another.”²

Since the end of World War II, many of the Asian economies have been the political or military allies of the United States. On the other hand, thanks to its open-door policy from the late 1970s onwards, China, in economic terms, has been increasingly integrated with the rest of the world (and with Asia in particular). Then, since the U.S. ‘pivot’ or ‘rebalance’ to Asia started in 2011 and China’s “Twenty-first Century Maritime Silk Road” Initiative was proposed in 2013, what have happened in the field of the U.S.-China relations, especially concerning the issues relating to Asia?

In this paper, the territorial disputes and other issues relating to the South China Sea will be taken into account. Specifically, our analytical interests focus on the following:

- A. Why is China so determined to initiate a project that may induce confrontations with the United States and/or other claimant state(s)?
- B. What will induce a claimant state to give in or fight against China if China goes in?
- C. How will the United States choose between staying out, allying with the claimant state, and colluding with China?

In order to deal with the above issues, I will use an analytic narrative approach. Narrative matters because it is inherently concerned with causality recognizing that from the historical perspective specific events can yield a multiplicity of equilibria. But narrative alone is insufficient since many questions relate to events that did not take place (or have not yet taken place) or are concerned with the motivations behind why certain behavior or events have not occurred. This is arguably especially true when the accuracy or adequacy of the data and information on which the narrative are based is in question. Addressing these issues requires an appropriate model for linking what is observed (or observable) with what is not observed. More often than not, the combination of ‘analytics’ and ‘narrative’ can capture the conviction that data linked to theory is

¹ Cited from Clinton (2011).

² Cited from Xi (2014).

more powerful than either data or theory alone. A priori, the most relevant advantage of the analytic narrative method is that it allows us to model historical “one-off” processes and events that have unique characteristics. Likewise, the method renders some problems of empirical testing of hypotheses manageable (Bates et al., 1998, p. 10). Some political and cultural events pose insurmountable difficulties to traditional panel data or time series methods.

This paper is organized as follows. Section 2 presents a brief narrative of four typical cases – including the Scarborough Shoal standoff (April – June 2012), the HYSY 981 drilling rig crisis (May – July 2014), the US navigation incident (2015), and the long existing, though informal, scheme on shelving territorial disputes – all relating to the territorial disputes in the South China Sea. Our interests focus on their geopolitical implications to all the stakeholders concerned. In Section 3 a three-player, non-cooperative game is constructed for policy-makers to handle the South China Sea disputes. Theoretically and analytically, conditions under which the strategy combination is a mutual deterrence (subgame perfect) equilibrium are examined. In Section 4, using the three-player, non-cooperative game that has been developed in Section 3, we try to evaluate – qualitatively and, if necessary, quantitatively – the four cases mentioned in Section 2. Our analytical interest focuses on the political and economic incentives for all the players involved in the South China Sea disputes to reach (or move away from) a mutual deterrence (subgame perfect) equilibrium. Finally, we conclude, with a few of suggestions to policymakers.

2. Narrative

On April 8, 2012, a Philippine Navy surveillance plane spotted eight Chinese fishing vessels docked at the waters around the Scarborough Shoal. Located at the southeast part of the South China Sea (also called the West Philippine Sea in the Philippines), the Scarborough Shoal (called “Huangyan Dao” in Chinese) is claimed by both China and the Philippines. The dispute arose when the Philippines sent its navy to search the Chinese fishing vessels operating in the disputed area. Chinese Maritime Surveillance Forces vessels subsequently arrived. A standoff has ensued, with the Philippines requesting a diplomatic resolution to the crisis but refusing to retreat. Bilateral relations have quickly deteriorated, with China introducing restrictions on imports of Philippine bananas and calling on tour groups to leave, dealing a severe blow to the Philippine economy. On May 11, Filipinos organized a protest near the Chinese Consulate in Manila against China's policies on the Scarborough Shoal. Though the protest in Beijing ended peacefully, the Hong Kong activists organized stronger protests on May 11, to reiterate China's claim over the Scarborough Shoal near the Philippine Consulate in Hong Kong.

After a months-long confrontation with each other, the Philippines withdrew their forces from the Shoal on June 5, hoping that a deal over its ownership could be reached. China, however, did not retreat and kept on maintaining its presence at the Shoal. By July 2012, China had erected a barrier to the entrance of the Shoal. Since the standoff, vessels belonging to the China Marine Surveillance and Fisheries Law Enforcement Command have been observed in the nearby disputed shoal and they have been turning away Filipino vessels sailing to the area. In response, the Philippines stated that it would be preparing to resend vessels to the Shoal, in what has been described as a “cold standoff”. In the following years, China has continued to maintain a presence within the Shoal, among heightened tensions regarded a new law which requires non-

Chinese fishing boats to seek permission from China when in the South China Sea; however, Philippine fishing boats sometimes were still able to fish around the Shoal without Chinese interaction.

The Haiyang Shiyou (HYSY) 981 oil rig crisis refers to as the tensions between China and Vietnam arising from a Chinese state-owned company moving its oil platform to waters near the disputed Paracel Islands in the South China Sea, and the resulting Vietnamese efforts to prevent the platform from establishing a fixed position. The crisis is regarded as the most serious development in the territorial disputes between the two countries ever since the Johnson South Reef Skirmish in 1988. On May 2, 2014, China National Offshore Oil Corporation (CNOOC) moved its HYSY 981 oil rig to a location 120 nautical miles east of Vietnam's Ly Son island and 180 nautical miles south of China's Hainan island, in which the last two nearest undisputed features generate a continental shelf. The location is also at the edge of hydrocarbon blocks 142 and 143 which were already created by Vietnam but had not been offered for exploitation to foreign oil companies, nor had been acknowledged by China.

Soon after the CNOOC moved its oil rig to south of Paracel Islands and established an exclusion zone around it, Vietnam vociferously protested the move as an infringement of its sovereignty. It sent 29 ships to attempt to disrupt the rig's placement and operations. The ships met resistance from Chinese ships escorting the rig, and Vietnam stated that its ships were repeatedly rammed and sprayed with water resulting in 6 people being injured, while China stated that its ships were also rammed and it sprayed water in self-defense. Domestically, the tensions with China resulted in people protesting against Chinese actions. Starting from May 11, 2014, a series of unprecedented anti-China protests flared up across Vietnam. On May 13 and 14, these anti-Chinese protests in Vietnam escalated into unrests and riots in which many foreign businesses and Chinese workers were targeted, with four deaths and more 130 injuries. In addition, about 1000 businesses and factories, owned by foreign investors from China, Taiwan, Singapore, Japan and South Korea, were subject to vandalism and looting due to the confusion by protesters who believed the establishments to be Chinese. Previously, on May 8, the VN-Index – Vietnam's benchmark stock index – had plunged by about 6% amid escalating tensions with China over disputed waters, marking the biggest drop since 2001.³ On July 15, 2014, China announced that the platform had completed its work and withdrew it fully one month earlier than originally announced.

On October 27, 2015, the USS Lassen, a guided-missile destroyer of the US Navy, sailed within 12 nautical miles of Subi and Mischief reefs in the Spratly archipelago. The region is widely considered as international waters but Beijing claims islands, reefs and other features in large part of the South China Sea. Many nations including Vietnam, the Philippines, Taiwan and Malaysia are entangled in the messy territorial claims in the region. The U.S. and China have been locked in a battle of words over the U.S. challenge of China's territorial claims in the South China Sea by entering within 12 nautical miles of the Chinese islands built on top of reefs in the Spratly Islands. The dispute has gotten so heated that it's forced the United States into a difficult position: balancing the interests of allies in the region, such as the Philippines, with respect for China's legitimate claims and to avoid fraying ties to the fast-growing regional power.

³ Data source: author based on miscellaneous news clippings.

Since 2014, China has extensively reclaimed several islets and atolls in the Spratlys, prompting the US and other nations to intensify counter-measures. This has even led to confrontation between US forces and the Chinese navy. China's outposts in the middle of the ocean may not be as vulnerable as some thought. If war breaks out, China can declare that it makes no difference between an attack on these islands and an attack on its mainland. The artificial islands can serve as strong points of control, robust hubs of logistics, and effective bases of power projection in peacetime and in gray zones between war and peace. The runways and other facilities China built on the Subi and Mischief reefs have alarmed the United States and its partners in the region. Washington has repeatedly stated it does not recognize any Chinese claim of territorial waters around the reclamations built on previously submerged reefs.

The South China Sea encompasses a portion of the Pacific Ocean stretching roughly from Singapore and the Strait of Malacca in the southwest, to the Strait of Taiwan (between Taiwan and mainland China) in the northeast. The area includes hundreds of small islands, rocks, and reefs, the majority of which are located within the Paracel and Spratly Island chains. Many of these islands are partially submerged islets, rocks, and reefs that are little more than shipping hazards not suitable for habitation. Even though most of these islets are not arable, do not support permanent crops, and have no meadows, pastures or forests, the surrounding water areas are abundant in oil, natural gas, minerals, and seafood.⁴ What is more important, more than half of the world's annual merchant fleet tonnage passes through the Straits of Malacca, Sunda, and Lombok, with the majority continuing on into the South China Sea.

At present, most of the islands and reefs in the South China Sea have been occupied by China, the Philippines, Vietnam, Taiwan, and Malaysia (see Table 1 for more details). China's rising energy demands, decreasing ability to meet demand growth with domestic energy sources, and continued reliance on oil have propelled China to look to alternative energy sources. Despite these territorial disputes and the uncertainty over the South China Sea, the above claimants have involved energy companies in exploration and exploitation in their respective claims. However, past cooperation arrangements, in the absence of a settlement of the maritime boundaries, have been based on a fragile equilibrium of powers.

Table 1 Competing over the waters and islets at the South China Sea, by claimant

Claimant	South China Sea	Spratly islets	Paracel islets
Brunei	UNCLOS	1 (0)	None
China	All*	All (9)	All (all)
Indonesia	UNCLOS	None	None
Malaysia	UNCLOS	3 (3)	None
Philippines	UNCLOS	Significant number (8)	None
Taiwan (ROC)	All*	All (1)	All (0)
Thailand	Not available	None	None
Vietnam	Significant portion	Significant number (29)	All (0)

Notes: (1) UNCLOS denotes "claims to areas of the ocean to be made using a 200 nm exclusive economic zone (EEZ) and/ or the continental shelf principle; (2) "*" excludes buffer zone along littoral states (calculations for buffer unknown); and (3) figures within parentheses are the numbers of islands that are actually occupied.

Sources: EIA (2008) and author's estimates.

⁴ For example, oil and natural gas reserves in the Spratly region are estimated at 17.7 billion tons (Guo, 2005, p. 113). The Spratly reserves place it as the fourth largest reserve bed worldwide.

3. A 3-Player Game: Simplifying the Analytics

The “Silk Road Economic Belt” and the “21st-century Maritime Silk Road” (also known as the “One Belt One Road” or “Yidai Yilu” in Chinese) Initiative is a development strategy and framework that was proposed by the President of the People's Republic of China in 2013. This Initiative focuses on connectivity and cooperation among China and the selected countries in Eurasia and at the seas. As a measure for China to countervail the U.S. strategy of military and diplomatic 'pivot' or 'rebalance' toward Asia that was proposed by the Obama administration in late 2011 and to take a bigger role in global affairs, the Chinese Initiative is bound to evolve into, and to be decided by, a number of geopolitical games.

In this paper, we assume that a mutual deterrence (subgame perfect) equilibrium, in which claimant states don't challenge each other, exists if and only if the following conditions are satisfied: (1) that, if no state challenges, the amount of each state's expected economic benefit is larger than its investment in military strength; and (2) that the amount of each state's investment in military strength is larger than what is required to deter the other state from challenging for any investment in military strength that that state can make. In order to present more rigorous analytical results, we try to simplify each case of the South China Sea disputes as a three-player game. Each of the players – China, another South China Sea claimant state, and the United States – could freely choose its decisions or strategies in relation to the territorial and maritime disputes at the South China Sea. Specifically, China could choose either “Go in” or “Stay out”. In response to China's “Go in” strategy, state x could choose either “Fight” or “Give in” while the United States could “Fight” side by side with state x against China, “Collude” with China or even “Stay out”. The model presented in this section includes seven outcomes, each yielding different payoffs for the three players (see Figure 1 and Table 2).

Among all the outcomes shown in Table 2, G is the best outcome for the United States and state x ; however, it is the worst outcome for China. Here, we assume that, stemming from the U.S. “rebalance” policy, on the one hand, and China's “21st-century Maritime Silk Road” initiative, on the other hand, Outcome G will not occur in reality. For China, the best outcome is F; however, it is the worst outcome for both the United States and state x , it is almost certain that outcome F will not occur in reality. In this game, the strategy combination – specifying that China stays out, state x fights if China goes in, and the United States allies with state x if China goes in and state x fights but, if state x stays out, colludes with China if $V_2^* \geq I_2$ and does not otherwise ally with state x – is a mutual deterrence (subgame perfect) equilibrium if the following conditions hold:

- I. Motivating China to initiate a project that may induce confrontations with state x : $v_1(m_1/m_x)V_1 - c \geq 0$.
- II. Motivating state x to fight against China if China goes in: $(1 - v_1(m_1/(m_x + m_2)))V_x - c \geq I_x$.
- III. Motivating China to collude with the United States if state x fights against China: $v_1(m_1/(m_x + m_2))V_1 - c \leq V_1 - V_2^*$.
- IV. Deterring the United States from allying with state x if the latter fights against China: $(1 - v_1(m_1/(m_x + m_2)))V_2 - c \leq V_2^*$.

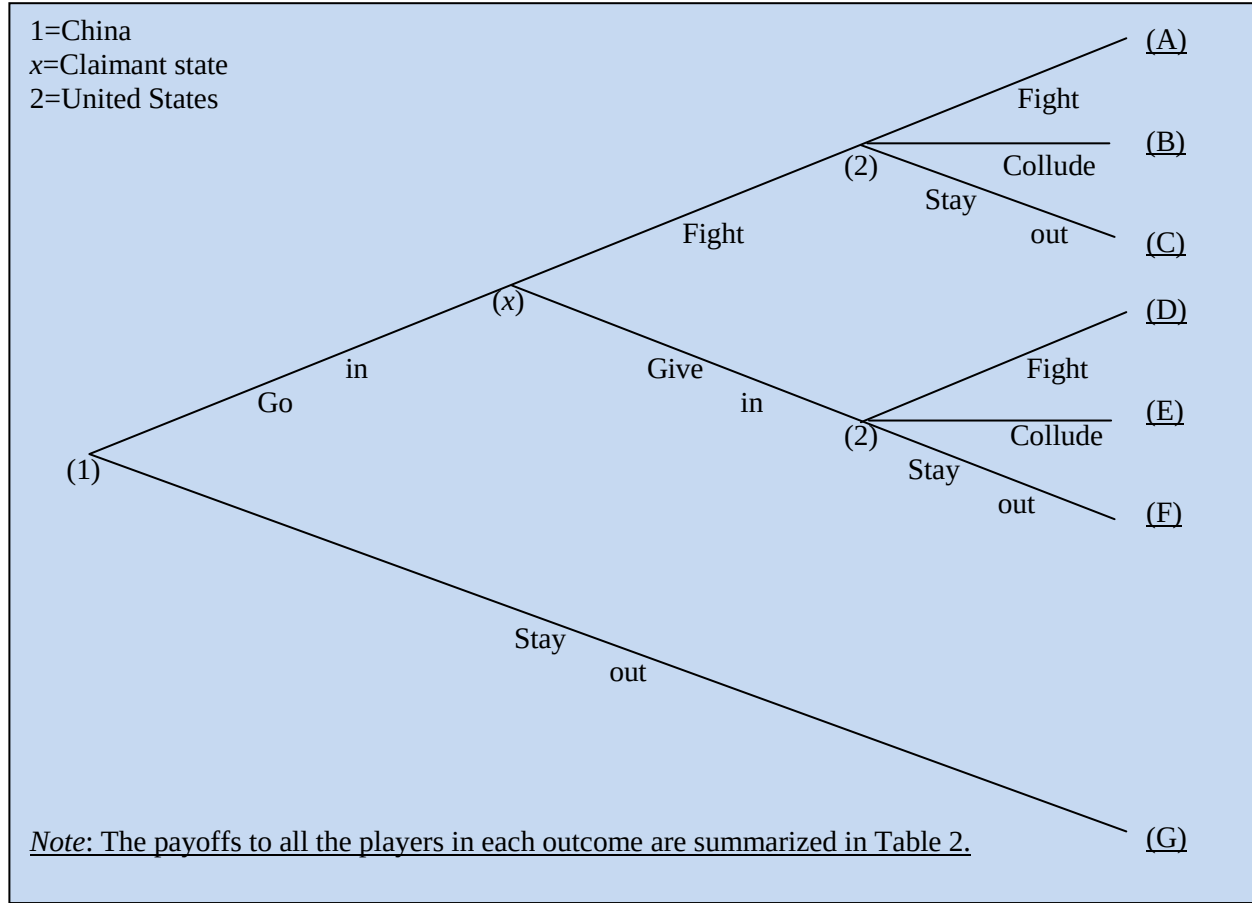


Figure 1. A 3-player, non-cooperative game: Structure and outcomes

Table 2. Evaluating the 3-player game: Outcomes and the players' payoffs

Outcome	China (1)	Claimant state (x)	United States (2)	Reference
A	$v_1(m_1/(m_x+m_2))V_1-c$	$(1-v_1(m_1/(m_x+m_2)))V_x-c$	$(1-v_1(m_1/(m_x+m_2)))V_2-c$	
B	$V_1-V_2^*$	0	V_2^*	
C	$v_1(m_1/m_x)V_1-c$	$(1-v_1(m_1/m_x))V_x-c$	0	Case (ii)
D	$v_1(m_1/m_2)V_1-c$	0	$(1-v_1(m_1/m_2))V_2-c$	Case (iii)
E	$V_1-V_2^*$	0	V_2^*	
F	V_1	0	0	Case (i)
G	0	I_x	I_2	Case (iv)

Notes: (1) Subscripts "1", "x" and "2" denote China, claimant state x and the United States, respectively. m_1 , m_x and m_2 represent the military strengths of China, claimant state x and the United States, respectively. v_1 , v_x and v_2 are the probabilities that China, claimant state x and the United States will win a war (or any other confrontation), respectively. c denotes the cost that a player has to bear if it participates in a military confrontation. V_1 , V_x and V_2 are the gross values that China, claimant state x and the United States gain by winning a war (or confrontation), respectively. I_x and I_2 are the payoffs that claimant state x and the United States gain when China stays out, respectively. (2) It is assumed that $V_1 \geq V_2$, and $v_2(m_2/m_1)V_2-c \leq V_2^* \leq v_2(m_2/m_1)V_1+c$. (See appendix for a more detailed description of the math formulas in this table.) (3) Cases (i), (ii), (iii), and (iv) are defined in Section 4.

Intuitively, Conditions I and III imply that China, though expecting various disturbances or confrontations from both state x and the United States, still finds it optimal to initiate the project. Condition II guarantees that state x would fight against China. Since the United States would not fight against China unless state x fight, and since Condition II implies that state x prefers to fight rather than to stay out if the United States fights against China, it is state x 's best response to fight if China goes in. Condition IV implies that the United States is better off colluding with China if state x fights, although it would ally with state x otherwise.

The United States is a world-class player in terms of military technology. However, restricted by its geographical disadvantages in the South China Sea, the U.S. military ability is assumed here to be weaker than that of China, i.e., $m_2 < m_1$. Of course, even if state x 's military ability (m_x) is the weakest among all the three players', China's military ability may not exceed those of the United States and state x combined, i.e., $m_1 \leq m_2 + m_x$.⁵ This is the foundation for why China is willing to reward (or to make some kind of compromise with) the United States if the latter could collude with it. At the same time, Condition IV implies that this kind of collusion is still profitable to the United States if $V_2^* \geq I_2$.

4. Back to the Narrative

Using the analytical framework defined in Section 3, let us first return back to Section 2 to see if and how the narrative conforms to the outcomes shown in Table 2. Specifically, we divide the events that have occurred in the South China Sea from 2010 to 2015 into four cases, as the following:

- Case (i): The Scarborough Shoal standoff (April – June 2012)
- Case (ii): The HYSY 981 drilling rig crisis (May – July 2014)
- Case (iii): The US navigation incident (2015)
- Case (iv): The long existing, though informal, scheme on shelving territorial disputes

The Scarborough Shoal standoff, which is labeled as Case (i), came to an end in June 2012, with the Philippines choosing to “give in” and the United States – a close strategic major ally of the Philippines – choosing to “stay out.” As a result, China is thought to be the winner. The payoffs to all the three players are shown in Outcome F in Table 2.

By way of contrast, it is difficult to define the winner(s) and loser(s) in Case (ii), i.e., the HYSY 981 drilling rig crisis. And it is still more difficult to measure the payoffs to all the players involved in the crisis. In general, the case may be described as the one in which China “goes in,” Vietnam “fights,” and the United States “stays out” (see Outcome C in Table 2) but it has more complicated effects than Case (i). Specifically, the following viewpoints are worth of noting: First, China won since it had erected its drilling rig for more than two months in the disputed waters and had effectively removed all the provocative actions taken by the Vietnamese side.⁶

⁵ This is also decided by the fact that, after the United States and state x join together, China's geographical advantages would have been substantially reduced, if not disappeared, in the South China Sea.

⁶ Accordingly, the payoffs to China and Vietnam (represented by state x), as shown in Table 2, are $v_1(m_1/m_x)V_1 - c > 0$ and $(1 - v_1(m_1/m_x))V_x - c < 0$, respectively.

Secondly, Vietnam won since it had not only won sympathy and moral support from most, if not all, of the U.S.-led allies but it had also forced China to move the 981 drilling rig one month earlier than originally announced.⁷ Thirdly, while both China and Vietnam were losers, Vietnam lost more than China did.

However, there is another explanation of China's motivation for activating its territorial disputes with Vietnam. With a good mastery of Sun Tzu's (c. 500 BC) theory of *The Art of War*, the Chinese policymakers might have used the 981 drilling rig crisis as a diversion tactic to shifting the outside's attention from their expansive land reclamation program in the South China Sea (Xue, 2015). This can explain why, for most of the time from 2014 to 2015, China's land reclamation and other related construction work in the disputed islands and land features had gone smoothly. (We will discuss this issue later on.)

Table 3. Quantifying the impacts of the South China Sea disputes: Cases (i) and (ii)

Indicator		(i) Philippines, 2012	(ii) Vietnam, 2014
Annual GDP growth rate (%) change		3.10	0.60
Annual bilateral tourism growth rate (%) change ^a	From China	-25.60	-87.64
	To China	-0.40	5.13
	From USA	10.00	-5.30
	To USA	30.00	...
Annual bilateral import/ export growth rate (%) change	From China	-18.1	-6.15
	To China	9.30	-1.75
	From USA	4.92	-0.11
	To USA	2.43	-9.81
Annual bilateral FDI growth rate (%) change	From China	-72.88	-608.75
	To China	37.19	...
	From USA	9.26	-5.78
	To USA	117.05	-145.00 ^b

Notes: (1) FDI= foreign direct investment, GDP= gross domestic product. (2) All figures are in percentage points. (3) Cases (i) and (ii) – specifically, the Scarborough Shoal standoff (April – June 2012) and the HYSY 981 drilling rig crisis (May – July 2014) – are supposed to have impacts on the Philippines' economic performances in 2012 and Vietnam's economic performances in 2014, respectively. (4) Each indicator's growth rate change, of the Philippines in 2012 and of Vietnam in 2014, is measured by its current year's annual growth rate (in %) minus its previous year's (in %). "..." denotes that data are not available. (a) Except for the U.S.-Philippine figures, which are calculated based on the receipts and payments (in million US dollars), all the other figures are based on the number of visitors (in persons). (b) Since the FDI figures in 2013 and 2014 are negative, the FDI growth rate in 2014 is calculated as: $-(|FDI \text{ in } 2014| - |FDI \text{ in } 2013|) \div |FDI \text{ in } 2013|$, where " $|\dots|$ " denotes "absolute value of ...".

Source: Calculated by author based on World Bank (2015), National Bureau of Statistics (2011; 2012; 2013; 2014), U.S. Census Bureau (2015), ITC (2015), BEA (2015a), GSO (2012; 2013; 2014), NTTD (2015), TCG (2015), VNAT (2015) and PSA (2015).

Note that the payoffs to all the players concerned in Cases (i) and (ii), as shown in Table 2, only include the static ("one-off") impacts but exclude all indirect and time-lag consequences that could also have resulted from the events. In reality, however, all these impacts and consequences

⁷ Accordingly, the payoffs to China and Vietnam (represented by state x), as shown in Table 2, are $v_1(m_1/m_x)V_{1-c}<0$ and $(1-v_1(m_1/m_x))V_{x-c}>0$, respectively.

are too complicated to be precisely measured in simple mathematical formulas. Table 3 presents data and information that may help us to understand how Cases (i) and (ii) have impacts on the socioeconomic performances of the Philippines and Vietnam, respectively.⁸ Here, China and the United States are supposed to be the major economic partners of both the Philippines and Vietnam. Since China and the United States were playing completely different roles, it is logic to believe that their economic relations with the Philippines and Vietnam should also be differently influenced in 2012 and 2014, respectively. Specifically, for the Philippines, each indicator's growth rate change in 2012, in which the Scarborough Shoal Standoff occurred from April to June 2012, is measured by 2012's annual growth rate (in %) minus 2011's (in %); and for Vietnam, each indicator's growth rate change in 2014, in which the HYSY 981 drilling rig crisis occurred from May to July, is measured by 2014's annual growth rate (in %) minus 2013's (in %). It is reasonable to assume that, as for the year 2012, the effects of the Scarborough Shoal standoff on the Philippines' economic cooperation with China should be quantitatively negative and that, *ceteris paribus*, those on the United States should be quantitatively positive; and that, as for the year 2014, the effects of the HYSY 981 drilling rig crisis on Vietnam's economic cooperation with China should be quantitatively negative and that, *ceteris paribus*, those on the United States should be quantitatively positive.

Obviously, the HYSY 981 drilling rig crisis (in which China “goes in,” Vietnam “fights,” and the United States “stays out”) is more physically violent than the Scarborough Shoal standoff (in which China “goes in,” the Philippines “gives in” and the United States “stays out”). As a result, we can arrange the following hypotheses: that the former's negative impacts on the China-Vietnam economic relations are greater than latter's on the China-Philippine economic relations; and that, accordingly, the former's positive impacts on the U.S.-Vietnam economic relations are greater than the latter's on the U.S.-Philippine economic relations. Even though most of the figures shown in Table 3 may be used to approve the above hypotheses, some impact coefficients on the Philippines (in 2012) and Vietnam (in 2014) include those that are endogenously determined and thus do not conform to our hypotheses. For example, with the reductions of Vietnam's foreign direct investment (FDI) from China (with the impact coefficient of -608.75%) and of its import from and export to China (with the impact coefficients of -6.15% and -1.75%, respectively), the HYSY 981 drilling rig crisis also had negative impacts on the Vietnamese trade with and the FDI from and to the U.S. This phenomenon is quite unusual; but it does show that, compared with Case (i) in which China and the Philippines didn't resort any physical violence to each other, Case (ii) had, in most, if not all circumstances, more serious economic impacts on *all* the players and stakeholders concerned (see Table 3).

Frankly speaking, it is a difficult task for us to explain why China and the United States have had so significantly different economic relations with their East Asian partners (including the Philippines and Vietnam) (shown in Table 4). Nevertheless, these differences have stemmed from, in addition to various domestic policies and international events, many other – geographical and cultural – factors. Specifically, the U.S. geographical disadvantages, which are thought to have affected America's military supremacy in Asia, have also reduced the efficiency of the long-

⁸ It should be noted that there had been many other factors and events – both domestically and internationally – that could have influenced the Philippines' and Vietnam's foreign economic performances. The best way to estimating the influence of a specific factor or event is to develop a multivariable, econometric model by which to control for the remaining explanatory variables (domestic and international factors and events).

distance, trans-Pacific trade and economic cooperation. In 2004, using a gravity model of trade and the U.S. and Chinese panel data, I found that, while geographical distance had become less important in foreign trade than cultural links since the end of the Cold War, it did reduce the U.S. trade (especially export) with the rest of the world.⁹ In addition, I also found that, although religious retardation on foreign trade was more significant in China than in the U.S, religious dissimilarity would retard the U.S. export more than that of China; and, by contrast, it would retard the Chinese import more than that of the U.S. (Guo, 2004).

Table 4. Changes of trade dependence on China and the U.S. (2010-2014), by trade partner, %

Trade partner	China ^a			USA ^a		
	2010	2014	Change	2010	2014	Change
Australia	18.55	27.40	8.85	8.86	7.80	-1.06
Brunei	9.02	13.73	4.71	1.19	4.12	2.93
Cambodia	12.07	15.46	3.39	20.57	13.06	-7.50
China	--	--	--	15.36	13.73	-1.64
Hong Kong ^b	18.78	23.01	4.24	2.51	2.86	0.35
Indonesia	14.57	17.93	3.36	7.98	7.80	-0.18
Japan	20.34	20.73	0.39	12.37	13.33	0.97
Macau	34.84	29.99	-4.85	5.64	4.02	-1.62
Malaysia	20.44	23.03	2.59	11.01	9.82	-1.19
Philippines	25.25	34.29	9.04	13.97	14.34	0.38
Singapore ^b	10.10	12.36	2.25	5.58	4.81	-0.77
South Korea	23.23	26.45	3.22	9.84	10.38	0.54
Taiwan	27.65	33.74	6.08	11.77	11.44	-0.33
Thailand	14.07	15.94	1.87	8.42	8.55	0.13
USA	11.87	13.81	1.94	--	--	--
Vietnam	19.15	27.90	8.75	11.82	12.12	0.29

Notes: (^a) The bilateral trade of China includes re-exports and re-imports, while that of the U.S. does not. (^b) For Hong Kong and Singapore, the total trade includes re-exports and re-imports.

Source: Calculated by author based on (1) WTO (2015) for data on each economy's total trade (merchandise exports and imports); (2) National Bureau of Statistics (2011) and ITC (2015) for data on China's bilateral trade in 2010 and 2014, respectively; (3) and U.S. Census Bureau (2015) for data on the U.S. bilateral trade.

The US navigation incident in October 2015, i.e., Case (iii), largely stemmed from China's extensive reclamation in the Spratlys, prompting the US and other nations to intensify counter-measures. The land reclamation activities have been conducted in eight areas, namely Mischief (Meiji in Chinese) reef, Johnson South (Chigua in Chinese) reef, Fiery Cross (Yongshu in Chinese) reef, Cuarteron (Huayang in Chinese) reef, Hughes (Dongmen in Chinese) reef, Gaven (Nanxun in Chinese) reef, Subi (Zhubi in Chinese) reef, and Eldad (Anda in Chinese) reef. In the artificial islands that are based in the Meiji, Chigua, and Yongshu reefs, airports, seaports and various civil and military facilities have also been constructed. At present, it is unlikely for any other claimant states to substantially join in the U.S. challenges to China's claims in the South China Sea. Why that?

⁹ For example, the estimated coefficient on the natural log of distance is -1.256, which is statistically significant at greater than the 1% confidence level, suggesting that, with a one percent increase of distance between the U.S. and its trade partners, there would be a 1.256% reduction of the U.S. export (Guo, 2004).

China is now pursuing an ambiguous, or the so-called double-track mechanism by which to deal with the territorial issues relating to the South China Sea. On the one hand, China claims the major portion of the South China Sea and all the islands, reefs, shoals and rocks thereof. On the other hand, China is implementing a “shelving disputes” strategy and, in most, if not all circumstances, has not been showing any substantial harm to the states that China believes have “illegally” occupied its territories in the South China Sea. Given that the claimant states will not challenge China if China doesn’t challenge them, it is unlikely that the three-player, non-cooperative game, as described in Section 2, will evolve into Outcome A (see Table 2) in which, given that m_1 is less than $m_x + m_2$ (that is, $v_1(m_1/(m_x + m_2)) < 0.5$), the payoffs are

$$\begin{aligned} &v_1(m_1/(m_x + m_2))V_1 - c < 0.5V_1 - c, \text{ to China;} \\ &(1 - v_1(m_1/(m_x + m_2)))V_x - c > 0.5V_x - c, \text{ to the Philippines or Vietnam; and} \\ &(1 - v_1(m_1/(m_x + m_2)))V_2 - c > 0.5V_2 - c, \text{ to the United States.} \end{aligned}$$

It must be noted that, no matter whatever happens in the remaining cases (outcomes), any other claimant state (represented by state x in Table 2), except China and the United States, will not obtain any positive payoffs for itself. For example, as shown in Outcome D in Table 2, in which China and the United States fight against each other, the payoffs to China and the United States are $v_1(m_1/m_2)V_1 - c$ and $(1 - v_1(m_1/m_2))V_2 - c$, respectively. The most likely result is that China would use its geographical advantages to win a medium-sized war against the United States (that is, $v_1(m_1/m_2) > 0.5$), as long as the war is conducted near the Chinese mainland and far away from the U.S. mainland. Accordingly, the payoffs to China and the United States now become

$$\begin{aligned} &\text{Payoff (China)} > 0.5V_1 - c \text{ and} \\ &\text{Payoff (US)} < 0.5V_2 - c. \end{aligned}$$

All this is also endorsed by the fact that China has been wielding more formidable conventional militaries brandishing weapons such as highly accurate antiship ballistic and cruise missiles, increasingly powerful antisatellite missiles and jammers, and quieter and more lethal submarines, all handled by better trained and professionalized military personnel. However, the payoffs to both China and the United States will be further worse off, till both of which become negative in a long-lasting war.¹⁰ Of course, if either side -- China and the United States -- recognizes the pros and cons of the Sino-U.S. confrontation, a large-scale war would not likely occur in the South China Sea. As a result, Outcome E (shown in Table 2) will be the optimum choice. In addition, even though most, if not all Southeast Asian economies would not welcome China as a dominative power over the South China Sea, they may not be the eventual beneficiaries in the large-scale Sino-U.S. confrontation.

To put it clearer, even if China is defeated in its war against the United States, other claimant

¹⁰ In general, three scenarios of the Sino-US war may exist: (a) A short-lasting, small-scale war, which would end in favor of the United States (since the latter may be decades ahead of China in terms of military technology), but which would likely evolve into a longer, larger-sized war thereafter. (b) A medium-scale war, which would end in favor of China (since the latter has distinct geographical advantages over the United States), but which would likely evolve into an even longer, more costly, and larger-sized war thereafter. (c) A large-scale war, which would eventually end with the mutual destruction of both China and the United States (since both of them have the military capacities to destroy each other). (Source: based on the judgment of an anonymous PLA general.)

states – the Philippines and Vietnam – would still not benefit from what the United States has promised, or, at the very least, they would not benefit as much as they would otherwise (see Table 4 for more empirical evidence that supports that the Philippines and Vietnam have had increasing economic interests in trading with China vis-à-vis the U.S.). Here, we suppose that, as the result of the disappearance of the China threat, the United States would no longer provide any *unnecessary* military aid to its allies near the South China Sea, or at least as much as what has been needed for the implementation of its “rebalancing” policy toward Asia. In fact, neither would the United States be too stupid to be involved in a long-lasting war that is neither of any certainty to win nor helpful for all the stakeholders concerned. Thanks to its “rebalancing” policy, the United States has now ranked as the leading supplier of defense aircraft for Asia-Pacific partners and allies.¹¹ As a result, it is almost certain that “game is going on” can always make the United States better-off than “game is over” can in Asia.

While the U.S. political and military relations with most, if not all of the Southeast Asian nations have been enhanced, China's economic and trade relations with Southeast Asia have grown more rapidly than the U.S.' have (see Table 4). For example, from 2010 to 2014, East Asia's dependence on trade with the U.S., though having a much lower starting level than that with China, had still decreased (with a few exceptions in Brunei, Hong Kong, Japan, the Philippines, South Korea, and Vietnam). On the other hand, during the same period, East Asia's dependence on trade with China, though having a much higher starting level than that with the U.S., had still increased steadily (with the only exception in Macau). Particularly noteworthy is that, from 2010 to 2014, Australia, the Philippines, South Korea, and Taiwan – all of which are the close allies of the United States – had significantly raised their shares of trade with China from 18.55%, 25.25%, 23.23%, and 27.65% in 2010 to 27.40%, 34.29%, 26.45%, and 33.74% in 2014, respectively. However, during the same period of time, their dependence on trade with the United States had only been slightly improved (in the cases of the Philippines and South Korea) or even worsened (in the cases of Australia and Taiwan).

It is interesting to note that the years from 2010 to 2014 had seen both the U.S. “pivot” (or 'rebalance') toward Asia and the Chinese “New Silk Road” initiative. However, during this period of time, when the trade dependence of many East Asian economies, including that of China, on the U.S. had *decreased*, the U.S. dependence on the trade with China had *increased* from 11.87% in 2010 to 13.81% in 2014 (see Table 4).¹² Indeed, the U.S.-China economic relations from 2010 to 2014 are too complicated to be explained by the current geopolitical situation in East Asia and Pacific, neither can they be fully decided by the U.S. “pivot” (or 'rebalance') toward Asia or the Chinese “New Silk Road” initiative. And the multilateral relations between the U.S., China, and their Asian partners – political, military or economic – can never be understood by the so-called “all-or-none” thinking pattern. And, any worsening geopolitical situation in the South China Sea could evolve into a lose-lose game for all the players and stakeholders concerned. (The HYSY 981 drilling rig crisis, shown in Table 3, is one example.)

¹¹ According to an Aviation Week Intelligence Network (AWIN) analysis, between 2009 and 2023, the U.S. would have sold about US\$79.2 billion worth of defense aircraft and related equipment, including both development and production costs, to Australia, India, Indonesia, Japan, Malaysia, Pakistan, Singapore, South Korea, Taiwan, and Thailand (Fabey, 26 November 2013).

¹² In 2014, U.S. exports to China accounted for 7.1% of total U.S. exports, and U.S. imports from China accounted for 16.9% of total U.S. imports (BEA, 2015b).

China's military build-up and indications of how Beijing intends to employ its increasing power are driving a number of regional states to increase their own defense spending. The Philippines, Vietnam, Malaysia, Singapore and Brunei are each pursuing enhanced maritime capabilities, spurring a nascent regional arms race. While these countries are unable to compete with China's forces on a one-to-one basis, new acquisitions in submarines, anti-submarine helicopters, fighters, and advanced patrol vessels can raise the potential risk and costs of Chinese action. Nevertheless, after the China threat disappears, most, if not all of these nations will not invest as much as they did in purchasing American arms. Even worse, they may even not welcome any American presence at the South China Sea. Think that would not happen? Think again.¹³ Therefore, the U.S.-China game should not be treated as a zero-sum game, which could easily evolve into a lose-lose game. Instead, the most feasible solution to the U.S.-China equation should be the one in which all players can find a new mutual deterrence equilibrium.

5. Concluding Remarks

Over the course of human history, boundary and territorial disputes have often stemmed from historical and cultural claims; they may have also resulted from fundamental geopolitical changes. In certain circumstances, boundary and territorial disputes may even evolve into a vicious circle of rivalry and competitions. Therefore, it seems unlikely that some, if not all, boundary and territorial disputes can be easily resolved. However, provocative actions, which are aimed at the seizing of part or all of the disputed territories or any benefits thereof, sometimes are very costly. When the costs of a provocative action exceed its benefits, the disputant parties may find that "shelving disputes strategy" is the most logical solution to cross-border conflicts.

Till present, U.S. strategy toward China has coupled engagement with balancing. The engagement half of this strategy has been geared toward enmeshing China in global trade and international institutions, discouraging it from challenging the status quo, and giving it incentives to become a 'responsible stakeholder' in the existing international system. The other half attempts to maintain the balance of power, deter aggression, and mitigate any attempts of coercion (Friedberg, 2012). Obama's 'pivot' or rebalancing toward Asia may be appropriate for its Asian allies. Without such a move, there would have been a danger that China, with its hard-line, realist view of international relations, would conclude that an economically exhausted United States was losing its staying power in the Pacific (Rudd, 2013). With the United States now fully investing in Asia, Washington and Beijing must create long-term cooperative strategies that accommodate each other's interests. Doing this would significantly reduce miscalculation and the likelihood of conflict.

At a moment when China is launching initiatives like the New Maritime Silk Road to foster regional development, its South China Sea policy creates new sources of friction in Southeast Asia. Yet, despite promulgating tensions throughout the region, China could unilaterally define the region's trajectory, as, on the one hand, the ASEAN remains divided and uncertain of the

¹³ This can be witnessed by the fact that, in December 1992, shortly after the end of the Cold War, then Philippine President Corazon Aquino issued a formal notice for the United States to withdraw from the Subic Bay naval base by the end of 1992.

way forward on the South China Sea and, on the other hand, the Chinese economy is decreasingly determined by external factors.¹⁴ Ultimately, it is incumbent on international and regional partners, like the United States, to provide Southeast Asian states with strategic diversity in their diplomatic, economic, and security engagements, so that they have the confidence to resist coercive actions and help advance a rules-based order in the Asia-Pacific region.

Strategically, China's activities in the South China Sea are raising profound questions across the region. During an earlier regional charm offensive, China entered in a landmark agreement with ASEAN to diffuse tensions and prevent a land grab for the disputed islands. Signed in 2002, the Declaration on the Conduct of Parties in the South China Sea forbids the types of land reclamation and military build-up China is now undertaking. To be clear, each country in Asia seeks a positive and stable relationship with China. China's economy and rising middle class offers tremendous opportunities, China's US\$40 billion financing programs, through the "21st-century Maritime Silk Road" Initiative, can help to drive regional infrastructure development and integration, and there are strong cultural and people-to-people connections. However, these elements are not enough to form the sorts of enduring relationships and alliances that a great power requires for international success – including a friendly periphery coupled with burden-sharing partners. Given the trust deficit with China, regional states are limiting areas of sensitive cooperation and seeking a strategic diversity in their engagement to serve as a potential hedge against unilateral Chinese actions.

History has revealed that smaller and relatively weaker states usually were marginalized or even became losers in various bilaterally- or multilaterally-based political games. In addition, the current situation in the South China Sea is not necessarily bound to evolve into a zero-sum game between the United States and China – the No. 1 and 2 economies of the world. Technically, the fuzziness of international laws concerning the territorial sea of artificial islands that are based on rocks, reefs and other features in the South China Sea may enable China and the United States to negotiate for a win-win outcome for themselves.¹⁵ At the very least, given that an active dispute cannot be resolved within a short period of time, delaying (i.e., shelving the dispute and doing nothing to compromise or escalate) is in many circumstances the least costly strategy for all policymakers to adopt. This policy has followed Mr Deng Xiaoping's (1904–1997) famous remark when the Sino-Japanese Treaty of Peace and Friendship was signed in 1978:

“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.”¹⁶

¹⁴ For example, China's foreign trade as percentage of GDP has decreased from as high as 66% in 2007 to 42% in 2014 (World Bank, 2015). Obviously, if the above trend continues in the years to come, the Chinese leaders will become more self-determined in dealing with international affairs.

¹⁵ According to the United Nations Convention on the Law of Sea, “[a] low-tide elevation is a naturally formed area of land which is surrounded by and above water at low tide but submerged at high tide... Where a low-tide elevation is wholly situated at a distance exceeding the breadth of the territorial sea from the mainland or an island, it has no territorial sea of its own” (UNCLOS, 1982, Article 13).

¹⁶ Cited from Lo (1989, pp. 171-2).

The rationale for “shelving disputes” is based on an understanding that some or all participants will have to pay more additional costs than what they can benefit from finding an immediate solution to a territorial dispute. Claiming a piece of territory controlled or claimed by other state(s) always carries some price. By challenging another state’s sovereignty, territorial claims foster uncertainty about the security of the most vital of national interests, territorial integrity, and mistrust about the intentions of the opposing state more broadly. Uncertainty and mistrust, in turn, “sustain poor and tense diplomatic relations that limit the willingness of states to engage in or deepen cooperation with each other, creating security, diplomatic, or economic opportunity costs for contesting land” (Fravel, 2008, p. 16).

The main purpose of the dispute-shelving strategy is to shift attention from sovereignty dispute to more essential concerns which countries involved could try to tackle together, and which do not necessarily depend on a resolution of the sovereignty dispute. Regular meetings or workshops can be held, with participation of the officials and expert groups from the countries involved in the dispute. The idea is to build confidence, initiate cooperative projects, lay the foundation for joint management of shared resources, and ensure cross-border environmental protection. Sovereignty issues have been banned from the agenda at all meetings. Even though the term “shelving disputes” is defined here as a dispute-settlement strategy, it is only considered an approach to conflict *prevention* instead of conflict *resolution* (Guo, 2012, p. 152). Nevertheless, in most circumstances it can be applied by policymakers and practitioners to reduce or delay existing tensions in disputed areas.

As this paper was near to be finalized, a piece of news appeared at the headlines in both China and the United States:

On December 10, 2015, two U.S. B-52 bomber planes flew near the artificial islands built by China in the disputed South China Sea. China's Defense Ministry demanded that Washington immediately take measures to prevent such incidents and damage to relations between the two nations' militaries. “The actions by the U.S. side constitute a serious military provocation and are rendering more complex and even militarizing conditions in the South China Sea,” the ministry said in a statement. “The U.S. should cease sending ships and planes to China’s South China Sea islands, stop showing off its military might and respect China’s core interests,” Foreign Minister Wang Yi told Secretary of State John Kerry. Pentagon spokesman Mark Wright said that the December 10 mission was not a “freedom of navigation” operation and that the U.S. military planes have “no intention of flying within 12 nautical miles of any feature...”¹⁷

At this time, the U.S. side did indicate that the mission might have strayed off course. Or probably the U.S. had needed China’s cooperation on other, more important issues elsewhere. Nevertheless, in the years to come, and thanks to the U.S. “pivot” toward Asia and the Chinese “New Silk Road” initiative, there will be more geopolitical equations and games that need the U.S. and China to solve. How will the Chinese and the U.S. policymakers negotiate, bargain, collude, or cooperate with each other? Let’s open our eyes and watch. Nevertheless, when a

¹⁷ Source: miscellaneous news clippings.

common enemy appears, both the U.S. and China would find that:

Two are better than one, because they have a good reward for their toil. For if they fall, one will lift up his fellow. But woe to him who is alone when he falls and has not another to lift him up! Again, if two lie together, they keep warm, but how can one keep warm alone? And though a man might prevail against one who is alone, two will withstand him—a threefold cord is not quickly broken. (Ecclesiastes 4:9-12.)

Appendix

To analyze the 3-player game, it is useful to begin by examining a “collusion game” between China and the United States. The question to be addressed in this game is the extent to which China can ex ante commit to reward (or to make some kind of compromise with) the United States which could collude with it if any challenges occur at the South China Sea. The notations used in this game are as follows:

m_1 and m_2 represent the military strengths of China (denoted by subscript “1”) and of the United States (denoted by subscript “2”), respectively. $v_1(m_1/m_2)$ and $v_2(m_2/m_1)$ are the probabilities that China and the United States will win a war (or any other confrontation) against each other, respectively. Obviously, the probabilities that China and the United States will win a war against each other increase with respect to the relative military strengths of the United States (represented by “ m_2/m_1 ”) and of China (represented by “ m_1/m_2 ”), respectively.¹⁸ c denotes the cost that a player has to bear if it participates in a military confrontation. V_1 and V_2 are the gross values that China and the United States gain by winning a war (or confrontation), respectively. It is assumed that $V_1 \geq V_2$, viz, that China gains more from winning the war (or confrontation) than the United States does. (This assumption, as well as the one that the cost of war is the same to all players, is made for ease of expression and is not essential to the results to be presented.)

Using these notations, we can analyze how China and the United States will collude with each other. The starting point of the analysis is the situation in which China, in order to ensure the smooth implementation of its New Silk-Road Initiative at the South China Sea, is willing to decide what reward, R_2 , to provide the United States. Once the reward is announced, the United States can either accept it and not fight or can reject it and fight. If it accepts the offer, the payoffs are:

$V_1 - R_2$, to China; and
 R_2 , to the United States.

If the United States rejects China’s offer and fights, the payoff to each is the probability of winning times the gross value of winning the war (or confrontation) minus the cost stemming from the war, namely

¹⁸ For ease of simplicity, the influences of the other countries’ military strengths are omitted and we obtain $v_1(m_2/m_1) + v_2(m_1/m_2) = 1$.

$(1-v_2(m_2/m_1))V_1-c$, to China; and
 $v_2(m_2/m_1)V_2-c$, to the United States.

The United States will not fight if it gets at least the net expected value of fighting against China, namely

$$R_2 \geq v_2(m_2/m_1)V_2-c.$$

Similarly, China will not find it profitable to offer an R_2 higher than the one required to make it indifferent between fighting or not fighting, that is $V_1-R_2 \geq (1-v_2(m_2/m_1))V_1-c$ or, written in the following form:

$$R_2 \leq v_2(m_2/m_1)V_1+c.$$

Hence, the payoffs associated with this subgame perfect equilibrium are:

$V_2^* \in \{v_2(m_2/m_1)V_2-c, v_2(m_2/m_1)V_1+c\}$, to the United States; and
 $V_1-V_2^*$, to China.

Thus, the analysis implies that after collusion occurs, the amount by which China would reward the United States depends on the latter's military ability to confront China militarily. Specifically, the United States would not get, in any equilibrium, more than its net value for militarily confronting China, i.e., $v_2(m_2/m_1)V_2-c$. This implies that ex ante – before collusion has occurred – China cannot credibly commit to reward the United States ex post by more than this amount. When $v_2(m_2/m_1)V_2-c$, for example, China cannot make its promise to reward the United States credible at all. More generally, the higher the ratio of the United States' military ability to China's (i.e., m_2/m_1), the higher is the extent to which China is willing to make its promise to reward the United States.

Next, let us extend this game by introducing one more player. Suppose that China plans to develop a controversial project in or related to a claimant state x – potentially an ally of or influenced by the United States. m_x represents the military strength of the claimant state x (denoted by subscript “ x ”); and V_x is the gross value that state x gains by winning a war (or confrontation) with China. The game is presented in Figure 1.¹⁹

The game begins, without loss of generality, with China having to decide whether or not to go in and to implement the project. If China decides to go in, claimant state x can either fight or give in. In either case, the United States can respond either by attempting to prevent China from taking control (by allying with claimant state x) or by staying out, or by colluding with China. If it colludes, it is assumed that, for ease of exposition, that the claimant state x has to surrender everything to China and that China and the United States are playing the collusion game (as shown at the beginning of this appendix).

¹⁹ The analytical framework to be presented below borrows that of Greif (2006, pp. 407-20), even though their math formulas and the implications thereof are completely different from each other.

It is assumed that China stays out, claimant state x and the United States can get the payoffs of I_x and I_2 , respectively. However, if China goes in, all these payoffs will become more complicated when a war (or confrontation) occurs. Specifically, if China goes in and state x fights, then the associated payoffs to the three players are as follows.

(A): If the United States fights against China, then China will either gain control and get V_1 or fails to do so. The payoffs are thus $v_1(m_1/(m_x+m_2))V_1-c$, $(1-v_1(m_1/(m_x+m_2)))V_x-c$, and $(1-v_1(m_1/(m_x+m_2)))V_2-c$ to China, claimant state x , and the United States, respectively.

(B): If the United States colludes with China, then China assume control and the payoffs are $V_1-V_2^*$, 0, and V_2^* to China, claimant state x , and the United States, respectively.

(C): If the United States stays out, then China and claimant state x each will obtain its payoff equaling the net expected value of controlling the project while the United States gets I_2 , that is, $v_1(m_1/m_x)V_1-c$, $(1-v_1(m_1/m_x))V_x-c$, and I_2 to China, claimant state x , and the United States, respectively.

If China goes in and claimant state x does not fight, then the associated payoffs are as follows.

(D): If the United States fights against China, its payoff equals the net expected value of its attempting to gain control, and hence the associated payoffs are $v_1(m_1/m_2)V_1-c$, 0, and $(1-v_1(m_1/m_2))V_2-c$ to China, claimant state x , and the United States, respectively.

(E): If the United States colludes with China, then China will reward it by V_x^* (namely, the United States' payoff in the equilibrium of the collusion game), and hence the associated payoffs are $V_1-V_2^*$, 0, and V_2^* to China, claimant state x , and the United States, respectively.

(F): If the United States stays out, the associated payoffs are V_1 , 0, and 0 to China, claimant state x , and the United States, respectively.

(G): If China stays out, the payoffs are 0, I_x and I_2 to China, claimant state x , and the United States.

A summary of these payoffs are shown in Table 2.

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