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## Maritime Strategy in Disputed Waters

A game-theoretic analysis of Chinese maritime strategy in the Senkaku/Diaoyu Islands dispute in the period 2010 to 2013

Bachelor's project in Political Science

Supervisor: Jo Jakobsen

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Faculty of Social and Educational Sciences  
Department of Sociology and Political Science





## ABSTRACT

The purpose of this thesis is to identify China's maritime strategy in the Senkaku/Diaoyu Islands dispute from 2010 to 2013, while challenging the notion that this dispute is best understood as a Chicken game in game theory. The research includes a review of the Senkaku/Diaoyu Islands dispute with a focus on the fishing trawler incident of 2010, and the island purchase of 2012; an explanation of sub-threshold strategies such as *salami tactics* and the *use of intermediaries*; and the context of sub-threshold strategies in China's reaction to the incidents of 2010 and 2012, and the significance of the Chinese board game *Go* in Chinese strategy. Through a game-theoretic analysis using Prisoners' Dilemma, Bluff, and Easy Win games, the findings suggest that China's maritime strategy is characterized by exploiting their economic and military power compared to Japan, as well as the structure of the dispute, by applying sub-threshold strategies to gain territory without fighting while maintaining their "face" in the East Asian region. Chinese strategies appear influenced by the mindset of the Chinese board game *Go*, as well as Sun Tzu's *Art of War*. Regarding the notion that the dispute is best understood as a Chicken game, the findings suggest that due to the difference in power between China and Japan, among other things, that the dispute is better understood as a Prisoners' Dilemma game or a game where the players have asymmetrical preferences, such as a Bluff or Easy Win game.

## ACKNOWLEDGMENTS

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# 1. INTRODUCTION

The sovereignty question concerning the Senkaku/Diaoyu Islands dates back to the 1960s after an optimistic report on the hydrocarbon wealth of the East Asian seabed emerged. Since then, the islands have been an arena for many small-scale political crises and has been at the center of Sino-Japanese maritime relations (Manicom, 2014:42). The dispute has since the 1970s gone through several phases of both sovereignty disputes and joint resource development. However, the dramatic confrontations over the islands from 2010 to 2013 and a growing interest in the islands economic value, marked the end of the mutual recognition that cooperation should be emphasized, and sovereignty claims shelved (Manicom, 2014:42). The increased importance of maritime territory and potential for resource exploitation, in addition to China's remarkable rise in economic and political power since the 2000s, has potentially launched the Senkaku/Diaoyu Islands dispute into a new phase; in which China displays a greater presence and indirect control over the disputed maritime area than before.

## 1.1. RESEARCH DESIGN

Through the application of game theory, the overall aim of this research is to identify China's maritime strategy in the Senkaku/Diaoyu Islands dispute from 2010 to 2013, while challenging the notion that this dispute is best understood as a Chicken game in game theory. Throughout the thesis, I will consistently refer to the islands using both the Chinese and Japanese names to remain impartial to the countries' claims. I also recognize that Taiwan has made a claim to the islands. However, this thesis will focus on the dispute between China and Japan. Furthermore, this thesis will be limited to China's maritime strategy and will not discuss Japanese strategy or other dimensions of the dispute such as airspace.

To gain an insight into the Senkaku/Diaoyu Islands dispute and Chinese strategy, this thesis will first provide a theoretical framework, which will serve as the foundation of the game-theoretic analysis and discussion. This entails describing the two incidents that took place near the islands in 2010 and 2012, and explaining the theory of sub-threshold strategies, specifically salami tactics and the use of intermediaries. Sub-threshold strategies will be emphasized in the theory-section as they will be central when discussing Chinese strategy later. Next, the sub-threshold strategies will be put in context with China's actions during the incidents of 2010 and 2012, using the ancient Chinese board game *Go* as an analogy. The extent of the dispute is in this thesis limited to the period 2010 to 2013, with a short explanation of the background



of the dispute. This is due to China's economic leap in 2010, as well as it being an eventful period in the dispute's recent history. Then, the thesis' method and the choices made when structuring the games are accounted for, as well as the methodological limitations. The analysis will consist of describing each of the three games, explaining the possible outcomes and the player's ranked preferences; identifying the games Nash equilibrium and confirm whether these are Pareto optimal, and to which extent these can be considered solutions.

Finally, the discussion will put the findings from the analysis in context with the theoretical framework to discuss: (1) Why the Senkaku/Diaoyu Islands dispute can be better understood as a Prisoners' Dilemma game. (2) Which of the three games more accurately describes the situation. (3) And finally, what has been China's maritime strategy in the Senkaku/Diaoyu Islands dispute from 2010 to 2013. The findings will then be summed up in the conclusion, and a quick evaluation of the thesis quality and future research will be conducted.

## 2. THEORETICAL FRAMEWORK

This section will lay down the theoretical framework which will later be discussed in the context of game theory. First, I will explain the situation at the Senkaku/Diaoyu Islands with a focus on two specific incidents that took place in 2010 and 2012. Then, I shall clarify the concept of sub-threshold strategies, as well as two specific strategies: salami tactics and the use of intermediaries. Finally, I will put the concept of sub-threshold strategies in context with Chinese strategy in the Senkaku/Diaoyu Islands dispute, while using the Chinese board game *Go* as an analogy.

In the last decade, East Asia has gone through a major power shift; from being dominated by the presence of the US and Japan, to experiencing increased Chinese political and economic power in the region (Goswami, 2013:3). This shift in power has drastically changed structures and bargaining mechanisms in East Asia, leading to unresolved disputes such as the Senkaku/Diaoyu Island dispute between China and Japan; creating security dilemmas in the region (Goswami, 2013). With growing tension between China and Japan in the East China Sea, the demand for a more visible security guarantee by the US increases. The situation in East Asia forces the US to balance between not allowing China unlimited power expansion, while also not wanting to get into long-term disputes and struggles with China (Togo, 2014:248). One can claim that China's economic growth and the shift of power in the region, has given rise to a new dimension of the Senkaku/Diaoyu Island dispute.

## 2.1. TROUBLE IN THE EAST CHINA SEA

The Senkaku Islands in Japanese or the Diaoyu Islands in Chinese, is a group of small islands in the East China Sea approximately 7 km<sup>2</sup> in size (Pan, 2007:71). The islands consist of eight small formations which themselves have remained uninhabited in the past and have little of valuable resources to offer (Métraux, 2013:218). However, a legitimate claim to the islands involves a claim to the territorial waters surrounding it, according to the United Nations Convention on the Law of the Sea (UNCLOS); a treaty which attempts to create a consistent international maritime standard, and limits for territorial sea and resource exploitation (Nemeth, Mitchell, Nyman & Hensel, 2014). UNCLOS establishes an exclusive economic zone (EEZ) of territorial waters up to 200 nautical miles from a state's coast and the exclusive right to the exploitation of the resources within their EEZ (Nemeth et al, 2014:714). The claim to this EEZ is one of the key elements of the Senkaku/Diaoyu Islands dispute. The territorial waters around the Senkaku/Diaoyu Islands have rich fishing grounds as well as the potential for large scale oil and gas exploitation, resources that would provide both China and Japan with an economic gain, which they would benefit immensely from in a region with rapidly changing power balance such as East Asia (Métraux, 2013).

In addition to these resources, the right to the EEZ around the Senkaku/Diaoyu Islands would also provide China with the opportunity to expand their maritime territory, which would present them with a geostrategic advantage in the East Asian region. Although resources, territory, and other physical gains are central elements of the dispute, there is also a historical aspect of the situation. In the early 1970s, the administrative rights of the islands were transferred from the US to Japan (Smith, 2013: 28). This incident, in addition to the centuries of hostility and warfare between China and Japan, has made the Senkaku/Diaoyu Islands dispute a persistent annoyance in Sino-Japanese relations. However, in later years the dispute has gained greater importance as both China and Japan have experienced a gradual power shift; China with an immense rise in economic and political power, and Japan with a lengthy economic and demographic decline (Smith, 2013; Chanda, 2014; Goswami, 2013). These shifts have changed the situation in the East China Sea.

### *2.1.1. Fishing trawler incident of 2010*

The fishing trawler incident of 2010 was a major turning point in the Senkaku/Diaoyu Islands dispute and caused a diplomatic rupture in already unstable Sino-Japanese relations. On September 7<sup>th</sup>, 2010 a Chinese fishing trawler collided with two Japanese Coast Guard

vessels near the Senkaku/Diaoyu Islands group, which resulted in the detention of the Chinese captain. This detention marked the first foreign national arrest connected to the islands dispute that involved criminal action (Hafeez, 2015:77; Manicom, 2014:1). The 2010 incident led to multiple canceled negotiations, the suspension of high-level talks, and a series of related issues that were interpreted as retaliatory measures by the Chinese in protest of the arrest (Hafeez, 2015:77; Manicom, 2014:1). One of the first alleged retaliatory measures were the movement of drilling equipment to a developing offshore facility in a disputed gas field in the East China Sea. Up until this point both nations had refrained from unilateral exploration of the gas field, and China had been in talks with Japan on joint development. However, China had postponed the latest rounds of discussion a week before the drilling equipment was first sighted. The timing suggests that the decision to postpone talks and move equipment was meant as a retaliatory measure for the arrest of the captain (Hafeez, 2015:81).

Another one of these issues came to light when the *New York Times* reported on September 22<sup>nd</sup> that China had halted the export of rare earth minerals to Japan, a vital resource in the production of Japanese high-technology products (Hafeez, 2015:81). However, China denied the report and claimed that they already had intentions of reducing export quotas in July. Although the Chinese explanation of the halt being planned for a long time is credible; it first taking effect after the incident and at the height of diplomatic tension makes it seem like an intended retaliatory measure. (Hafeez, 2015:81). In addition to the alleged retaliatory measures, the 2010 incident also brought about massive protests among the Chinese which quickly escalated to acts of anti-Japanese violence. These acts of anti-Japanese nature among the Chinese, displayed a definite mistrust and discontent with how the Japanese government handled the incident (Hafeez, 2015, 77).

### *2.1.2. Island purchase of 2012*

A similar dissatisfaction and tension between the states rose again two years later in 2012 when the Japanese government signed a contract to purchase three of the five main islands that make up the Senkaku/Diaoyu Island group, which essentially nationalized the islands (Smith, 2013:29). The purchase was intended to stop nationalist Tokyo governor Shintaro Ishihara and the Tokyo metropolitan government from purchasing the islands for their gain, as Ishihara was bent on damaging Sino-Japanese relations (Smith, 2013; Hafeez, 2015; Manicom, 2014:1). Regardless of the intention or motivation, the purchase was recognized as a severe provocation by the Chinese, which resulted in the eruption of a new wave of anti-Japanese protests. There

was an outburst of violence committed against Japanese people and property, and thousands of Chinese were engaged in demonstrations and marches (Smith, 2013:29). The Chinese government also responded to the situation by dispatching Maritime Surveillance Agency ships, as well as forces of the People's Liberation Army Navy, in the surrounding waters regularly, which put Chinese law enforcement in close proximity to the disputed area. Furthermore, they also declared territorial baselines around the islands (Hafeez, 2015:85).

The hostility, lack of communication and reluctance to cooperate displayed by both states involved in these incidents, have left the East China Sea and the Senkaku/Diaoyu Islands in a dangerous, uncertain state where neither Japanese nor Chinese forces show incentive to negotiate a resolution in the near foreseeable future (Hafeez, 2015).

## 2.2. SUB-THRESHOLD STRATEGY

Sub-threshold strategies or gray zone strategies are described as strategies to challenge the status quo without provoking the eruption of war; and are used to describe actions and means of non-war yet conflictual nature (Jackson, 2017:39; Wirtz, 2017:107). Sub-threshold conflicts and strategies differ from other types of “warfare”, as engagement in such a strategy involves several political preconditions. Some key preconditions involve weak international legal framework and permeable borders (Belo, 2020; Wirtz, 2017). A state utilizing a sub-threshold strategy attempts to stay beneath the threshold of conflict and war, while often inciting an opponent state to break the threshold and become the aggressor. A conflict or war is never the goal of a sub-threshold strategy, however, as long as the aggressor and initiator is the opponent state, it is not considered the worst outcome. There are several types of sub-threshold strategies that differ depending on what an actor wants to achieve and how. Actors might also combine the tactics in a complementary way to efficiently achieve their objectives (Wirtz, 2017). Two of the most common sub-threshold strategies are (1) salami tactics, where the aggressor slowly imposes on an opponent's commitment to “red lines” (Wirtz, 2017:108), and (2) the use of intermediaries, which involves the employment of third-party agents, effectively avoiding passing the threshold of a military conflict (Jackson, 2017:43).

### 2.2.1. *Salami tactics*

The term *Salami tactics* first appeared in Thomas Schelling's *Arms and Influence*, originally published in 1966, wherein he explains the phenomena by comparing it to the logic of a child. “Tell a child not to go in the water and he'll sit on the bank and submerge his bare

feet; he is not yet “in” the water” (Schelling, 2008:66-7). Schelling goes on to explain how most commitments are ambiguous in nature and therefore easy to exploit; soon the child would submerge more of his body in the water, and soon the new rule would be to not swim too far out. Likewise, Salami tactics describe efforts to exploit the ambiguity of commitments in deterrence situations. The actors wanting to alter the status quo (challengers) limits their actions against the opponent actor (defenders) to stay below the threshold of possible “red lines” that could trigger a deterrent response (Wirtz, 2017; Schelling, 2008). The challenger tests the seriousness of the commitment by probing it to see if they meet resistance; if there is no challenge they continue or intensify the probing, still staying below the threshold of the “red lines” (Schelling, 2008). Over time the status quo and “red lines” erode, especially if the defenders lack the justification to respond to individual incidents and aggressions from the challenger. This eventually results in the defenders’ attempts of deterrence being made irrelevant, and the challenger successfully raising the threshold (Wirtz, 2017, Schelling, 2008).

### 2.2.2. *Use of intermediaries and fait accompli*

Another way to avoid a defender’s “red lines” is by applying intermediaries and utilizing a challenger’s third-party agents or non-conventional military forces. The intermediaries in the context of sub-threshold strategies are agents of the state that do not typically play a significant role in playing out the “high politics” of international security; actors such as terrorists, members of social movements, computer hackers, or even fishermen (Jackson, 2017:43). While using military instruments produces certain expectations and risks of conflict, using intermediaries distorts responsibility by obscuring the identification of a challenger’s authority or intent; a situation that is particularly difficult to deal with as it often presents defenders with a *fait accompli* (Jackson, 2017:44).

A *fait accompli* presents the defender with a choice of either backing down and not taking direct action or initiating a coerced countermeasure. By applying a *fait accompli*, the challenger can potentially alter the situation to make the defender appear as an aggressor (Jackson, 2017:44). Therefore, the use of intermediaries in a sub-threshold conflict are neither passive nor inconsequential, but rather an active and intended means to coerce the defender into a position where neither alternative of countermeasures is ideal (Jackson, 2017:44).

### 2.3. CHINESE GAME OF “GO”

*Go* is a Chinese board game where two players take turns placing stones on the board to encircle and win space and territory, intending to gain more than their enemy. *Go* can be interpreted as a metaphor for war and human conflict; it is a struggle for territory and the placing of the stones on the board can be compared to the engagement of troops and other instruments of foreign policy (Lai, 2014:12). The game is an appropriate representation of the way China acts in international affairs and conflicts, and separates the Chinese way of war from that of other cultures. *Go* lays the Chinese philosophical and military mindset as its foundation and puts Chinese strategic military thinking into play. Many interpret *Go* as an embodiment of Sun Tzu's *The Art of War*, written roughly around the 5<sup>th</sup> century BC as one of the first written attempts to understand strategy and conflict. It is considered one of the oldest and most respected treatises on military strategy (Niou & Ordeshook, 1994:161; Zhang, Gao, Wheeler & Kwon, 2016:11). Sun Tzu's strategy of conquering the enemy without fighting is the guiding principle of *Go*, as well as several other observations from *The Art of War* (Lai, 2014:13). This principle is also the primary principle of sub-threshold strategies. Some scholars have used the game to analyze Chinese strategy, such as Henry Kissinger in his book *On China* (2012) where he used *Go* To illustrate China's "realpolitik" tradition (Lai, 2014:13).

The mindset of *Go* and Sun Tzu of conquering your enemies without fighting can be observed in Chinese sub-threshold strategies in the East China Sea. Since China overtook Japan to become the world's second-largest economy in 2010 (Lee, 2019), they have claimed their position as a major power in international politics. China has since changed their strategy to a more aggressive and expansionistic approach, using sub-threshold strategies to stay beneath the threshold of conflict, while still claiming territories and their surrounding waters such as the Senkaku/Diaoyu Islands (Chanda, 2014).

The boat collision in 2010 is an example of China's maritime strategy of combined sub-threshold strategies where they use intermediaries and salami tactics to provoke while still keeping beneath the threshold of conflict. Whether the Chinese fishing trawler crashing into the Japanese navy ships was an intentional use of intermediaries or it was purely a coincidental accident, they were still present in an area that, according to the Japanese government, is "inherent territory of Japan" (Hafeez, 2015:80). Beijing's reaction to the arrest of the captain, by placing drilling equipment in the disputed area, can be interpreted as China using salami

tactics by slowly placing themselves in the disputed area where they are not wanted; testing Japan's limits and attempting to change the rules, similar to the child mentioned in Schelling's *Arms and influence* (Hafeez, 2015; Schelling, 2008).

After the island purchase by the Japanese government in 2012, China was quick to respond by dispatching both naval and non-military instruments in the surrounding waters while declaring territorial baselines around the islands (Hafeez, 2015:85). This attempt to change the status quo before Japan could respond, presented Japan with a *fait accompli* and the choice to either back down or become the aggressor. This way of strategy is accurately described in James R. Holmes and Toshi Yoshihara's article concerning Chinese sub-threshold strategy: "China's way of gray-zone strategy appears founded on creating the semblance of sovereignty over disputed islands, seas and skies. (...) Beijing imposes a monopoly of military and civilian forces and dares others to reverse it." (Holmes & Yoshihara, 2017:323). This quick act by China was also an effort to avoid losing face towards Japan. "Saving" face is deeply rooted in Chinese and Asian culture and is an attempt to preserve collective self-esteem and avoid embarrassment (Gries, 2004: 22). If China were to not react to the Japanese nationalization of the islands, they would risk losing face towards Japan and other countries in the East Asian region.

### 3. METHODOLOGY

Nations are often said to "play games" in international affairs, as strategies and interactions between states are often studied and viewed in these terms (Lai, 2014:12). The Senkaku/Diaoyu Islands dispute are characterized by many as a game of Chicken between China and Japan, where the two players provoke each other to their limits, and conflict is considered the worst possible outcome (Hafeez, 2015; Lai, 2014; Jash, 2017). To build on and challenge this notion, this thesis applies game theory as a method to analyze China's maritime strategy in the Senkaku/Diaoyu Islands dispute from 2010 to 2013. To illustrate how the players make their decisions through preferences for different outcomes, the incidents of 2010 and 2012 will be used as examples of situations in the dispute where the players' strategies became apparent.

Although many scholars view the situation between China and Japan over the Senkaku/Diaoyu Islands as a game of Chicken, there are several factors and circumstances that could indicate that the apparent game of Chicken is more complex. A Chicken game is

characterized by the conflict outcome always being the worst outcome for both players (Jakobsen, 2002). The Cuban Missile Crisis of 1962 is an example of a typical Chicken game where the worst outcome is critical for both players, as it had the potential to lead the world into nuclear war (Jakobsen, 2002). While the Senkaku/Diaoyu Islands dispute overall can be understood as a simple game of Chicken, the individual incidents and actions that have taken place on and around the islands the last decade can suggest that there are several types of “games” involved in the bilateral affair. Looking past the Chicken game theory and attempting to look at the situation through other game-theoretic approaches could provide us with a better understanding of the dispute and particularly China’s maritime strategy from 2010 to 2013.

First, this thesis applies a simple Prisoners’ Dilemma game to analyze the fishing trawler incident of 2010 and which choices and preferences the players have. This is to give a simple overview of the situation at the Senkaku/Diaoyu Islands, how it can be understood through game theory, and how Prisoners’ Dilemma rather than Chicken game can be applied to understand the situation. The first game is designed as a static two-player game where the players have the same options and make their decision simultaneously. Game-theoretic model development and analysis consist of several steps, where one has to identify the players, each players strategy, a set of possible outcomes, and each players’ preferences (Hovi, 2020:28). First, the players (China and Japan) and the possible actions they can take (advance or retreat) are placed in a 2x2 table. Then, the players preferred outcomes are ranked from 1-4 (with 4 being the best and 1 being the worst) and placed into the table. The players’ preferences are decided based on previous strategies in similar situations, the players’ preconditions, and overall understanding of the players’ position at the international political stage. Then, one has to identify the game’s equilibrium(s), which in the case of the first game, a static game with complete information, is a Nash equilibrium. An outcome is a Nash equilibrium if neither of the players have a reason to regret their choice when the other players’ strategy is revealed. If the game only has one equilibrium, one can assume that rational players would choose this outcome, and it is then considered the game’s solution (Hovi, 2020:35). Finally, one has to identify whether the solution is Pareto-optimal, meaning that there is no other outcome that is better for at least one player without it being worse for the other (Hovi, 2020:35).

As the first game focus on explaining the situation at the Senkaku/Diaoyu Islands with a simple static game with only one round where neither player can observe and react to the other player’s actions; a second and third game were applied to illustrate the complexity of the



situation and provide a more realistic and detailed analysis of the players' actions and strategies. The second and third games are designed as dynamic games of the island purchase of 2012. A dynamic game means that at least one of the players can observe and react to another player's actions (Hovi, 2020:30). Further, the second and third games have complete information. This means that all the players' strategies and preferences are known to all players, and the players themselves are aware of this (Hovi, 2020:32). The games are also designed with asymmetrical preferences, which means the players rank their preferences differently, unlike in a Prisoners' Dilemma or Chicken game where their preferences are ranked in the same order (Jakobsen, 2002). When the two players have asymmetrical preferences, they will often have different strategies, which causes the games to be interpreted as a combination of games rather than a simple Prisoners' Dilemma or Chicken game.

In the second game, the US is modeled to be perceived as a stable player and an element that influences the two main players and their preferences. The term "stable player" is here used to describe an element that is perceived by the players as rational, and that will follow the rules and obligations they have made, such as the defense alliance between the US and Japan. An unstable player on the other hand is perceived as not necessarily loyal to their alliances and could decide to ignore their obligations if it is beneficial to do so, depending on the situation and the players involved. In 2010, the Obama administration declared that their defense alliance to Japan also involved protection of the Senkaku/Diaoyu Islands (Resnick, 2014:103). This statement would make China perceive the US as a stable player, which would influence their preferences in the games. Because of this influence, the games are designed with the US being perceived as both a stable and unstable player. The US position as the world's most powerful nation (U.S. News, 2020), in addition to their tense relationship with China and their defense alliance with Japan, makes it necessary for the players to consider the US' position when deciding the preference of outcome. In the third game, the US is modeled as an unstable player and element, and the preferred outcomes of the two players are ranked thereafter.

The second and third games are developed in the same order as the first. However, these games also include an extensive model of the game in addition to the table. The games are modeled with three rounds of action where China acts first, then Japan and then China again. The order of moves is modeled to recreate the island purchase of 2012, where China's reaction to the Japanese government's actions are regarded as the first round. Each round the player has two choices depending on what the other player chose. Then, the possible outcomes for the

entire game, as well as the players' preferences for each outcome, are modeled into a 2x3 table and the extensive model. Finally, the second and the third game's equilibriums have to be identified. These are dynamic games with complete information, which operate with a subgame perfect equilibrium, which can be described as a Nash equilibrium for every subgame (Hovi, 2020:72).

By using game theory as a method, one can get a helpful overview of a specific situation or conflict, while also gaining an understanding of a state's strategy, as well as their interactions with other states. However, international disputes are often affected by multiple factors and circumstances and are rarely one-dimensional. Therefore, game theory will never be able to explain a conflict in its entirety. However, the method can give a simple and valuable understanding and shed light on a situation and make further analysis easier. Game theory is therefore a useful first step in analyzing and understanding a state's strategy.

## 4. ANALYSIS

This section will describe each of the three games and explain the possible outcomes and the player's ranked preferences. Next, the games Nash equilibriums will be identified, as well as whether these are Pareto optimal and to which extent these can be considered the games' solutions.

### 4.1. GAME 1: STATIC PRISONERS' DILEMMA

After the fishing trawler incident of 2010, the players China and Japan have two options where they act simultaneously and therefore cannot choose their strategy based on the other player's choice. The two options are *advance* and *retreat*. In this static game of Prisoners' Dilemma, the players' preferences ranked from 4-1 is as follows.

**Table 4.1.1. Static Prisoners' Dilemma in normal form.**

China	Japan		
	Advance	Advance	Retreat
		2, 2*	4, 1
Retreat	1, 4	3, 3	

*China:*

4. China advances, Japan retreats
3. China retreats, Japan retreats
2. China advances, Japan advances
1. China retreats, Japan advances

*Japan:*

4. Japan advances, China retreats
3. Japan retreats, China retreats
2. Japan advances, China advances
1. Japan retreats, China advances

In this Prisoners' Dilemma game, the best outcome for both China and Japan, is the option where they advance while the other one retreats. This outcome indirectly indicates that one player backs down from the islands, unofficially giving up the territory, which gives the other player the possibility to advance and claim the islands. This is the outcome that both China and Japan would benefit the most from. Next, the preference where both players retreat is ranked higher than the outcome where they both advance. This is because it is rational to assume that both countries would want to avoid confrontation and a full-scale conflict, if they had the opportunity. Finally, the countries' worst outcome is the one where they retreat while the other player advances, as neither country willingly wants to back down from the islands and risk losing both territory and "face".

The Nash equilibrium (\*) in this game will be the outcome where both players advance (2,2). Since this is the game's only equilibrium, this is to be considered the game's solution.

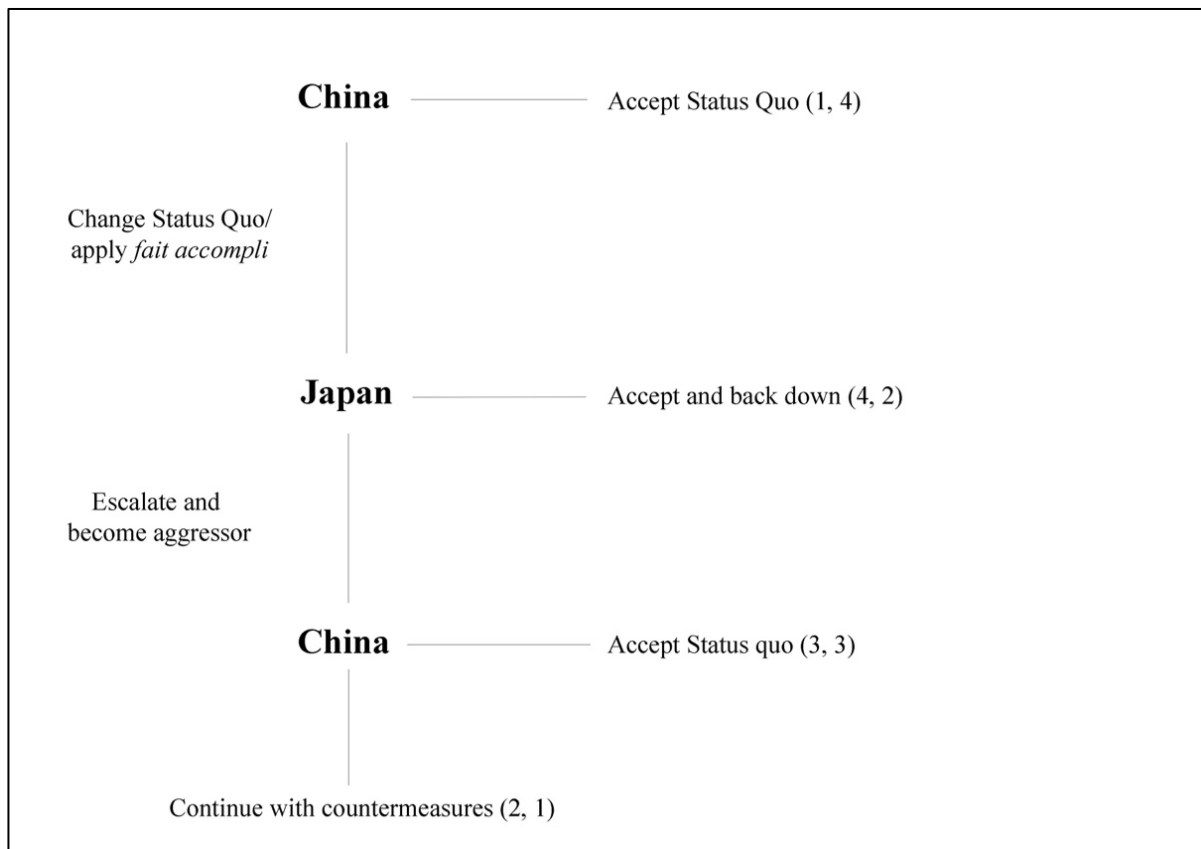
However, since the players could change their strategies and achieve an outcome of higher preference without it affecting the other player, this Nash equilibrium is not Pareto-optimal. The reason the advance outcome (2,2) is the Nash equilibrium and solution, and not the retreat outcome (3,3), which is Pareto-optimal, is because when the player's strategies are revealed, both players would change their decision if it is revealed that the other player decided to retreat, therefore it cannot be a Nash equilibrium. If one player retreats and the other advances, one player gets their best outcome while the other gets their worst. In an attempt to not regret their decision, it is rational to believe the players would not want to risk getting their worst outcome. Therefore, the advance, advance (2,2) outcome is the safest outcome for both players, making it the game's solution.

#### 4.2. GAME 2: DYNAMIC BLUFF GAME

In the second game, the two players have asymmetrical strategies and game preferences. In this game, China has preferences like Prisoners' Dilemma and would in an ordinary Prisoners' Dilemma game have defection as a strategy. Due to China's earlier actions in the dispute, it is reasonable to assume that the worst possible outcome for China would be for them to accept the situation and Japan's claim to the islands. One can assume that for China, the idea of losing "face" and status in the region is worse than a full-scale conflict. Meanwhile, Japan has preferences like Chicken with conflict as the worst possible outcome. This is due to Japan's lack of military and economic power compared to China, in addition to their deep-rooted skepticism towards their military and military leaders since their devastating loss in World War 2 (Izumikawa, 2010:126). These preferences make this a dynamic Bluff game.

In this game, China acts first as a reaction to the island purchase made by Japan in 2012. China has two options, either accept the Status Quo and not react, or attempt to change the Status Quo (by applying a *fait accompli*). In this game, the US is modeled as a stable player, this means that if the situation escalates to a full-scale conflict, the US will be there to support Japan and defend their territory. With this in mind, after China has made their choice, Japan has two choices, either accept China changing the Status Quo and back down, or escalate the situation and become a seeming aggressor. Then, China has the final choice of either accepting the Status Quo and backing down, or countermeasure Japan's escalation, which is to be considered the conflict outcome, as this is the only outcome in the game in which a full-scale conflict could follow as a result.

**Figure 4.2.1. Dynamic Bluff game in extensive form.**



In this dynamic Bluff game, both players' best outcome will be the one where the other player accepts and backs down. Next, since the US is modeled as a stable element, and would support Japan in a full-scale conflict, the outcome where China backs down after Japan becomes the aggressor is the second-best outcome for both players. As mentioned above, Japan has Chicken-preferences and consider the conflict outcome to be the worst, while China's worst outcome is the one where they accept the situation and lose "face".

*China:*

4. China attempts to change Status Quo, Japan accepts and backs down.
3. China attempts to change Status Quo, Japan escalates, and China backs down.
2. China attempts to change Status Quo, Japan escalates and China countermeasure.
1. China accepts Status Quo and does not react.

*Japan:*

4. China accepts Status Quo and does not react.
3. China attempts to change Status Quo, Japan escalates, China backs down.
2. China attempts to change Status Quo, Japan accepts and backs down.
1. China attempts to change Status Quo, Japan escalates and China countermeasure.

**Table 4.2.2. Dynamic Bluff game in normal form.**

		Japan	
		Accept if China change	Escalate if China change
China	Accept Status Quo	1, 4	1, 4
	Change Status Quo, Then accept	4, 2*	3, 3
	Change Status Quo, Then continue	4, 2*	2, 1

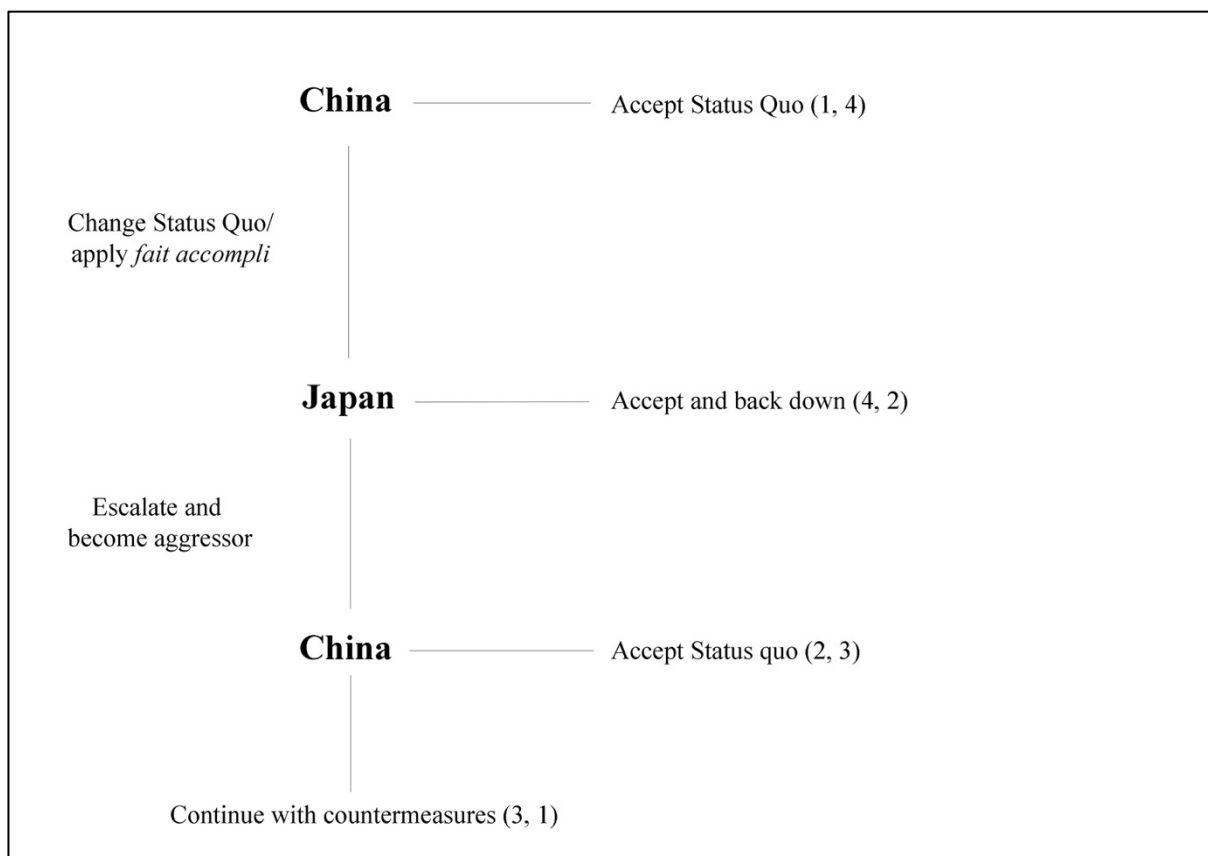
In this game, the subgame perfect equilibrium (\*) will be the outcome where China attempts to change Status Quo, and Japan accepts it and backs down. A subgame perfect equilibrium is a Nash equilibrium for every subgame, this game has three subgames, two of which are China's final decision, while the third consists of the whole game. Subgame perfect equilibrium can be found through backward induction, where one starts with the final decision and work their way up (Hovi, 2020:75). In this game, China has two options if Japan escalates, and the best of these options is to back down. However, since China has defection as a strategy and they have the choice between the retreat outcome (3,3), where both players get their second-best outcome, or the conflict outcome (2,1) where Japan loses more than China, they would most likely choose the latter. With that in mind, it is the better choice for Japan to back down rather than escalate, as they know China's strategy and would risk getting their worst outcome. Therefore, the game's solution will be for China to attempt to change Status Quo, and for Japan to accept, knowing China will most likely countermeasure and Japan would lose.

This solution and subgame perfect equilibrium is considered Pareto optimal as there is no other option that is better for one player without it being worse for the other.

### 4.3. GAME 3: DYNAMIC EASY WIN GAME

In the third game, the players also have asymmetrical preferences. However, in this game the US is modeled as an unstable player. If one were to use Schelling’s understanding of commitments as ambiguous, which was mentioned earlier, one can assume that the US is likely to be an unstable player, as there is no direct guarantee that they will assist Japan. This results in more uncertainty for Japan, a disadvantage China is aware of. Therefore, in this game, China has the preferences of a Deadlock game, while Japan keeps their Chicken game preferences from game number two. Deadlock game preferences have defection as a dominant strategy, like Prisoners’ Dilemma preferences. However, in a typical Deadlock game the conflict outcome is ranked higher than in a Prisoners’ Dilemma game, which would make the conflict outcome a Pareto-optimal Nash equilibrium. These preferences make this game a dynamic Easy Win game. The game follows the same pattern of turns and choices as in the second game. However, China’s preferences are slightly different.

**Figure 4.3.1. Dynamic Easy Win game in extensive form.**



In this dynamic Easy Win game, the players' preferences are almost the same as in the second game. However, in this game the conflict outcome is the second-best outcome for China, as the US is an unstable player and won't necessarily aid Japan in a possible conflict, which would make it easy for China to outdo Japan in what would be a bilateral full-scale conflict.

*China:*

4. China attempts to change Status Quo, Japan accepts and backs down
3. China attempts to change Status Quo, Japan escalates, China countermeasure
2. China attempts to change Status Quo, Japan escalates, China backs down
1. China accepts Status Quo and does not react.

*Japan:*

4. China accepts Status Quo and does not react.
3. China attempts to change Status Quo, Japan escalates, China backs down
2. China attempts to change Status Quo, Japan accepts and backs down
1. China attempts to change Status Quo, Japan escalates, China countermeasure

**Table 4.3.2. Dynamic Easy Win game in normal form.**

	Japan		
	Accept if China change	Escalate if China change	
China	Accept Status Quo	1, 4	1, 4
	Change Status Quo, Then accept	4, 2*	2, 3
	Change Status Quo, Then continue	4, 2*	3, 1



In this game, the subgame perfect equilibrium will be the outcome where China attempts to change Status Quo and Japan accepts and backs down (4,2). The reason for this is because the best option for China if Japan escalates is to countermeasure, which is the worst outcome for Japan. Therefore, it is rational for Japan to not escalate the situation assuming China will countermeasure and achieve their next-best preference. The game's solution is therefore, like in the second game, for China to attempt to change Status Quo, and for Japan to accept it and back down. This subgame perfect equilibrium is also considered Pareto optimal as there is no other option that is better for one player without it being worse for the other.

## 5. DISCUSSION

This section will discuss the three games and their plausibility and relevance to Chinese strategy, in an attempt to illustrate how the dispute can be understood as a Prisoners' Dilemma game, and to answer the research question: What was China's maritime strategy at the Senkaku/Diaoyu Islands from 2010 to 2013?

Although there is a general understanding of the Senkaku/Diaoyu Islands dispute between China and Japan as a Chicken game, the first game shows how the dispute, and more precisely the fishing trawler incident of 2010, can be better understood as a Prisoners' Dilemma game. In a typical Chicken game, the players are considered of equal size concerning power and will both lose and win the same. On one hand, this does not reflect China's massive economic and military power compared to Japan, which is an important circumstance the two players have to consider. Therefore, one can argue that it is more realistic to regard the situation and dispute as a Prisoners' Dilemma game, or a mix of games, rather than a pure Chicken game. On the other hand, Japan's defense alliance with the US would make up for their lack of power, if the US is perceived as a stable player. This alliance could presumably make this a Chicken game where both players have equal power. Furthermore, this would also raise the severity of the situation and make the conflict outcome the worst for both players, as it could potentially lead to a full-scale armed conflict between China, and the US and Japan. However, in the first game the US is not modeled as a player and a means for Japan, and the extent of Japanese power is strictly their own. This would make the conflict outcome less severe as it is realistic to assume that, should it only involve China and Japan, it would likely result in the continuation of sub-threshold actions and strategies rather than a full-scale conflict.

As neither country has any interest in seeking conflict, it is deemed more important for the two countries to not lose face against each other by retreating from the islands. As the conflict outcome can be considered less realistic in this Prisoners' Dilemma game, the outcome where one player retreats while the other advances is considered the worst outcome for both players, as this would lead to the biggest loss. The conflict outcome in this Prisoners' Dilemma game is not critical to the players in the same sense as in a typical Chicken game, like the Cuban crisis. Thus, the dispute is more realistically a Prisoners' Dilemma game or a mix. Although the dispute as a whole has the potential to escalate into an armed conflict, it is not realistic to assume that the fishing trawler incident of 2010 in itself would end with both players' demise, as a conflict outcome in a typical Chicken game suggests. Due to the difference in size and power between the players it is also rational to assume that they don't necessarily have the same preferences at all. Although the first game shows both players having Prisoners' Dilemma preferences, it would be more realistic for Japan to have different preferences than China. If the countries were to escalate the tension and actively challenge one another for the rights to the islands, it is reasonable to assume that Japan would risk losing more than they would have gained if they were to be victorious in a full-scale armed conflict. Therefore, it is more likely that Japan would consider conflict the worst outcome, consequently having Chicken preferences, which makes the second and third games more plausible in this analysis.

The presence of the US in East Asia, specifically in Sino-Japanese relations, is an important deciding factor in Chinese maritime strategy. It is more likely that China will perceive Japan as a legitimate threat in the East China Sea, if the US is clear in their alliance to Japan and is perceived as a stable player. Whether the US can be perceived as a stable or unstable player depends on the governing president and their administration. During the events at the Senkaku/Diaoyu Islands from 2010 to 2013, the Obama administration was clear in their alliance to Japan. In contrast to the current US presidency and their isolationistic approach, the Obama administration declared in 2010 that their defense alliance to Japan also applies to the Senkaku/Diaoyu Islands, establishing themselves as a stable player. The US's alliance to Japan would, as the second and third games suggest, affect China's maritime strategy and their preferences in the games, making China's Prisoners' Dilemma preferences from the Bluff game the best reflection of reality. Therefore, it is reasonable to assume that the Bluff game in the analysis is the most plausible due to the US' role and influence in the Senkaku/Diaoyu Islands dispute at the time.

The Bluff game where China has Prisoners' Dilemma preferences and Japan has Chicken preferences, indicate that the solution to the island purchase of 2012 is for China to attempt to change Status quo by applying sub-threshold tactics such as a *fait accompli*, and for Japan to back down knowing China's strategy. This game shows how China can use such a situation to their advantage by employing a sub-threshold strategy. In this dispute, one can say that China follows the mindset of *Go* and attempts to conquer territory without fighting, through their sub-threshold strategy. This mindset, in addition to China's massive power compared to Japan, gives China the opportunity to have a more offensive approach; an advantage in the Bluff and Easy Win games when it comes to preferences, which both China and Japan are fully aware of when making their choices. In both the Bluff and Easy Win games, the Nash equilibriums and solutions to the games is for China to attempt to change Status Quo, and for Japan to back down. This displays how, independent of whether the US is perceived as a stable player, China has the ability to exploit the structure of the games and their limited leeway, turning it to their advantage. One can argue that in the dispute of the island purchase of 2012, and the Senkaku/Diaoyu Islands dispute as a whole, China's maritime strategy is to use these advantages they gain from their sub-threshold and *Go* mindset, to attempt to claim the islands without armed conflict.

One of the weaknesses with this analysis and using game theory to understand the Senkaku/Diaoyu Islands dispute, is that the possible outcomes in the games are meant to serve as a conclusion to the dispute. Meanwhile, a dispute of this nature does not necessarily have a conclusion. The three games' solutions are therefore not necessarily where the dispute in the East China Sea ends, but rather crossroads where decisions have to be made. Both the fishing trawler incident of 2010, and the island purchase of 2012 shows how the dispute does not necessarily have an ending, but that it rather escalates and dies down in periods without a climax or conclusion. One of the reasons the dispute has a fluctuating nature where the situation always seems to end at a deadlock, is due to China's sub-threshold strategy of not wanting to become the initiator of war and conflict. Applying strategies such as salami tactics or the use of intermediaries, makes it difficult for the opponent player to react and respond without escalating the situation, forcing both players into a deadlock as neither wants the dispute to escalate into a conflict. If we interpret the games' outcomes as crossroads rather than endings, the solution of all three games drives the players into a deadlock where neither player wants to be the aggressor, which is part of China's strategy to incite Japan until the brink of conflict.

One can argue that although China has a definite interest and wish to claim the islands and the maritime territory surrounding it, their strategy indicates that it is just as important for China to save face vis-à-vis Japan and the rest of the East Asian region, as well as the US. China's preferences in the Bluff and Easy Win games, and their retaliatory actions after the island purchase of 2012 shows this. The worst outcome for China in that situation, which is illustrated in the dynamic games, would be for them to have no reaction to the island purchase and accept Status Quo. This could be due to China's claim to the islands, but might also be because they were put in a position where they could lose "face" in the region if they did not react. China's sub-threshold strategy has yet to gain China a legitimized claim to the Senkaku/Diaoyu Islands. However, the strategy has contributed to China "saving face" in the region and towards Japan. Their retaliatory measures of applying sub-threshold strategies such as salami tactics and the use of intermediaries to the fishing trawler incident of 2010 and the island purchase of 2012, showed Japan that China has no intention of surrendering their claim to the islands easily, and will react if their collective self-esteem is threatened. China has in a masterly manner exploited their maritime sub-threshold strategy and the nature of the dispute to present Japan with a *fait accompli* concerning the Senkaku/Diaoyu islands. Like the Bluff and Easy Win games show, Japan can either become the initiator of a conflict they will most likely lose, or slowly surrender their claims to the islands; both outcomes where China will benefit the most in the long term.

## 6. CONCLUSION

This research has aimed to identify China's maritime strategy in the Senkaku/Diaoyu Islands dispute from 2010 to 2013 through the application of game theory; and provide an understanding of the dispute as a Prisoners' Dilemma game rather than a Chicken game. To sum up, this research found that China's maritime strategy is characterized by taking advantage of their greater economic and military power compared to Japan. China exploits the structure of the three games and the 2010 and 2012 incidents by using sub-threshold strategies such as salami tactics or the use of intermediaries to challenge the Status Quo and present Japan with a *fait accompli*. Furthermore, China follows the mindset of *Go* through their sub-threshold strategy; to incite their enemy to the brink of conflict, in an attempt to gain more territory without fighting, and maintain their "face" in the region. This is illustrated through China's preferences in the second and third games, where the second game is deemed more plausible and a more accurate depiction of the situation in the East China sea, due to the US's alliance to Japan and their position in the region. This ambiguous alliance and difference in power

makes it reasonable to analyze the dispute as a mix of games with asymmetrical preferences rather than a pure Chicken game where both players share the same preferences.

Throughout this thesis, several choices were made to limit the extent of the research. The focus in this research has been the dispute-dimension of the Senkaku/Diaoyu Islands and Sino-Japanese relations and has been limited to maritime strategy. In future research it would be beneficial to account for several dimensions of the dispute such as airspace, or explore the possibilities for future maritime cooperation between China and Japan, through joint development and bilateral resource exploitation in the disputed area. The method of game theory has proven to be an adequate way of gaining an overview of the dispute and China's maritime strategy. In future research, game theory could be used as a first step in a more thorough analysis where several methods are utilized, to sufficiently provide an in-depth analysis of a complex matter such as Chinese strategy and the Senkaku/Diaoyu Islands dispute. Whether the dispute will continue to be at the center of Sino-Japanese maritime relations is uncertain. What is certain however, is that Sino-Japanese maritime relations are intricate and are gaining importance in a region of uncertainty and shifting power balance.

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