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THE SINO-TAIWANESE CRISIS:  
A GAME THEORETIC ANALYSIS

Nelson Chung

Abstract
International relations specialists have produced abundant literature on the China-Taiwan crisis, which is among the most volatile issues facing the United States. But thus far, few have predicted the outcome of the crisis, which I intend to do. I use game theory to model the expected behavior of the three countries while considering each of the other's actions. I organize the outcomes based on the four major regime-type relationship options available to China and Taiwan: reunification, confederation, commonwealth, and independence. By building on previous research, I define the incentive structures the three countries face. Within that framework I examine every possible course of action accessible to each country and how each course of action affects their payoffs. Then I find the Nash-Equilibrium course of action. I predict that China and Taiwan will peacefully form a commonwealth, because neither side can find a more profitable unilateral deviation.

Introduction
In his reelection bid President George W. Bush said the following in defense of invading Iraq:

"We're pursuing a strategy of freedom around the world, because I understand free nations will reject terror. Free nations will answer the hopes and aspirations of their people. Free nations will help us achieve the peace we all want." (New York Times, 1 October 2004)

President Bush's remarks reflect his neoconservative belief in promoting peace through spreading democracy, a conviction which stems
from the theory that democratic nations will avoid going to war with each other.

Bush exhibited this ideology early in his tenure when he vowed to commit whatever resources necessary to defend democratic Taiwan in the case that China decided to attack. His promise is perhaps the strongest commitment by a U.S. president to Taiwan since the U.S. de-recognized Taiwan's status as a sovereign state. The commitment constitutes a radical break from previous administrations' intentional ambiguity toward the China-Taiwan problem. Critics condemned Bush's act as excessively provocative, contending that China's staunch determination to regain the island could produce a major conflict if the U.S. intervened. Supporters lauded the President's commitment to defending democracy.

The China-Taiwan problem originated when China ceded Taiwan to the Japanese in 1895. After World War II, the Japanese were forced to relinquish Taiwan to the United States, who transferred the island to the Chinese Nationalists as a place of refuge against the Communists in the Chinese Civil War. The Nationalists lost the war and retreated to Taiwan. Ever since, Taiwan has functioned as a de facto independent country. The Civil War has been declared over, but China is insistent on regaining Taiwan and has threatened the use of force in doing so.

Any military conflict in the Taiwan Strait would cost the U.S., China, and Taiwan in lives and treasure. Each country is considering the relevant costs, which thus far have prevented them from taking any action. Using a game-theoretic model of Taiwan, China, and the United States, I predict that China and Taiwan will peacefully form a Chinese commonwealth, the U.S. will not have to intervene, and China will not impose economic sanctions. This outcome follows from several conclusions. If Taiwan attempts to gain more sovereignty than that granted by a commonwealth by declaring independence, it would incur a costly Chinese invasion without American help. For China, if Taiwan offers to form a commonwealth, invading would be too costly; Beijing is better off simply accepting that political relationship. If Beijing threatens to isolate Taiwan economically, it would see damage to its own economy; therefore such threats are not credible.

Past Work on the Sino-Taiwanese Conflict

Many international relations scholars have written about the probability and impact of a Taiwanese declaration of independence and a
Chinese invasion. Steven Tsang has examined the incentive structures the two states face in their actions (Tsang 2004b). I will use these structures to gauge the payoffs of different strategy options.

Scholars differ on whether China would follow through on any threat to attack Taiwan. Michael O'Hanlon advances notions that China would not invade because (1) it has too much to lose economically and (2) it lacks the military capacity (O'Hanlon 2000). Andrew Scobell and Larry Wortzell challenge those notions, arguing that China would retake Taiwan even at high economic costs. And though China lacks the navy to launch an amphibious attack, it possesses missiles and weapons of mass destruction sufficient to obliterate the island (Scobell and Wortzell 2001). This aids in determining the payoffs of the game; China would lose more from not invading than from invading if Taiwan chooses to declare independence.

Concerning the Taiwanese side, John Tkacik argues that Taiwan has too much invested in China to declare independence (Tkacik 2001). Even if China does not attack, it can threaten to sever economic relations with Taiwan at high costs to the latter.

Regarding the outcome of a possible armed conflict, Ellis Joffe shows that three major options of attacking Taiwan are available to China: a blockade, missile strikes, and an amphibious invasion (Joffe 2001, 126–27). Assuming U.S. support of Taiwan, only missile strikes have a reasonable probability of succeeding. Sustaining a blockade against Taiwan is difficult against the Taiwanese military, let alone the U.S. military. An amphibious invasion is beyond the capacity of the Chinese military in the near future. From this premise it is clear that U.S. intervention would probably determine whether China can take back Taiwan.

Scholars recognize that cross-strait dynamics also bear significance to the United States. Ralph Clough has noted a trend of Taiwanese information technology (IT) production facilities being relocated to the Chinese mainland. Many of these final products are sold in the U.S. (Clough 2001, 33). Any military conflict would potentially affect the supply of these technologies to U.S. markets. This technology factor increases the costs of non-intervention for the United States.

On the theoretical level, Enze Han, Emerson Niou, and Brett Benson have each used game theory to model the Sino–Taiwanese crisis. Han provides a very basic model as a starting point (Han 2004). The model includes two games with two players each, China and Taiwan: one game
without American intervention, one with American intervention. The second game has a higher probability of conflict. Han proposes increasing the incentives for cooperation in order to avoid that conflict. In these games, players are given two options: cooperate, which means maintaining the status quo, and deviate, which to Taiwan means independence and to China attacking. Han's model shows that a U.S. commitment to defending Taiwan would actually heighten the probability of war (Han 2004, 8–9). He recommends increasing incentives for cooperation as the way to maintain peace.

Niou's more sophisticated model of the crisis includes the U.S. as a third player and uses sequential moves, dividing China's military action into two steps: missile exercises and actual attacks. It also includes the uncertainty of who is in charge of each country. His conclusions include, among others, that Taiwan is more likely to declare independence if the probability of U.S. help is high and that China is more likely to use military coercion if the American government is weak (Niou 1998, 12, 18).

Benson and Niou construct another game-theoretic model that accounts for the different types and levels of commitments the U.S. can make to Taiwan (Benson and Niou 2001; 2004). In their game, the U.S. chooses among ambiguous, weak, and strong commitments. Niou and Benson conclude that the U.S. can maximize its payoff by maintaining ambiguity in its commitment to defend Taiwan.

The aforementioned models allow us to see the significance of U.S. involvement, the importance of each country's leadership strength, and the implications of different degrees of clarity in U.S. commitments. But each model has dichotomous strategies: Taiwan can choose either between reunification, on one hand, and independence or the status quo, on the other. These models ignore the possibility of different regime types that can serve as compromises between the two outcomes. They also disregard the impossibility of Taiwan's maintaining the status quo. Joffe notes that China has sternly warned Taiwan that it does not have the option of maintaining the status quo forever (2001, 111). Scholars have proposed different regime types that do allow for compromises in the political relationship between China and Taiwan. A confederacy and a commonwealth are two of the most common of these models. Tai-chun Kuo and Ramon H. Myers have defined a commonwealth (Kuo and Myers 2004, 192–94); Tsang, a confederacy (Tsang 2004a, 202–06).
Under a commonwealth, two equal and sovereign countries join in a political union. They control standing territories and pledge not to intervene in each other’s domestic affairs. Neither is considered a province. A commonwealth between China and Taiwan would allow Taiwan to become a neutral country in security terms and require the two countries to gradually demilitarize. Additionally, a commonwealth allows each country to engage in its own diplomatic relations and join international organizations. According to Kuo and Myers, this arrangement, a commonwealth, would help China “expunge the past humiliations suffered by the PRC from foreign ‘imperialism’ and allow the people of Taiwan recognition as a sovereign, independent nation” (Kuo and Myers 2004, 192).

A confederacy constitutes a slightly closer integration. Tsang describes a confederacy (what he dubs as a “Chinese Union”) as two governments across the Taiwan Strait upholding the principle that there is but one China though both can have diplomatic representations overseas and conduct relations with the rest of the world without violating this principle. In looking at the sovereignty issue this can be seen in comparison to that in a marriage. While a married couple (or the Chinese Union) together will share ‘sovereignty’ as a unit, the husband and the wife (or the two constituent Chinese states of the PRC and Taiwan) can by mutual agreement and understanding still function as ‘sovereign’ individuals to the outside world without infringing on the ‘sovereignty’ of the marriage (or the Chinese Union) even though one partner in the marriage (or the PRC) may, because of its size, play a more dominant role. (Tsang 2004a, 203)

In comparison to a commonwealth, which grants Taiwan full sovereignty, a confederacy allows Taiwan shared sovereignty with China while functioning as a sovereign only in diplomatic relations. In a confederacy, unlike in a commonwealth, Taiwan must conduct its diplomatic relations under a title that designates itself as part of the Chinese confederacy, such as “Taiwan of the Chinese Union” or “Chinese Taiwan” (Tsang 2004a, 204). In addition, Taiwan can never vote against or undermine China in international bodies. As in a commonwealth, a confederacy prohibits interference in each other’s domestic affairs, but adds that the two entities cannot criticize each other’s policies. Also like a commonwealth, a confederacy allows both sides to maintain their own armed forces with separate
command structures and the right to purchase arms from any source in the world. But the two militaries would organize under the designation “Defence Forces of the Chinese Union,” with a coordinating body (Tsang 2004a, 205). As is apparent, a confederacy implies a tighter union in name and in function vis-à-vis a commonwealth.

I use those definitions to construct a sequential-move, game-theoretic model that assumes Taiwan has reached the point where it must choose from reunification, confederacy, commonwealth, and independence. Past game-theoretic models have included the status quo as an option because the aims of those models were normative: to determine what the U.S. should do to avoid armed conflict in the Taiwan Strait. These models did not predict the final outcome of the crisis. In contrast, this study does. The status quo cannot be the final outcome because China has said it will not allow Taiwan to drag its feet indefinitely. This model assumes that Taiwan has reached a point where it must choose, that China reacts to Taiwan’s decision, and that the U.S. decides whether to intervene.

This study adds further light to the crisis by allowing us to see what regime type will define the Sino–Taiwanese political relationship.

**Unit of Analysis**

I will treat Taiwan, China, and the United States as unitary actors for simplification. Rational choice theory allows the aggregation of each policymaker’s decision calculus into a whole, assuming that each politician within a country faces roughly the same incentive structure.

**The Taiwanese Interest**

With the players defined, I now identify the interests of each player that constitute the payoffs in the game. The government of Taiwan seeks to perpetuate its power, and to do so the government must answer to its electorate. Su identified democratization as the greatest force behind Taiwan’s mainland policy (Su 2004, 50–51). But the realities of the international system restrain Taiwan from acting out of pure political motives at the expense of the country’s security. In face of these limitations, Taiwan can respond to the demands of its people by pursuing three major goals: raising Taiwan’s international standing, maintaining the democratic way of life, and promoting economic prosperity.
Raising Taiwan’s International Standing. The Taiwanese generally desire raising Taiwan’s international profile. Disagreement over the island’s identity and future polarizes its inhabitants. But a majority rejects the “one China” principle and recognizes Taiwan’s sovereignty (Zhao 2001, 103). Taiwan actively seeks to promote its sovereignty through dispensing foreign aid in exchange for diplomatic relations, campaigning to join international organizations, and demanding equality in talks with the PRC. Attaining de jure independence would consummate Taiwan’s quest for a heightened international standing.

Maintaining the Democratic Way of Life. Democratization has raised Taiwan’s international profile, but the Taiwanese also hold liberal democracy to be an end unto itself, not just a means to attain stronger international status. Tsang has noted that the Taiwanese see themselves as sharing more in terms of political values with Western Europe and North America than with communist China (Tsang 2004b, 6). Taiwan has experienced the freedoms of liberal democracy and would not revert to authoritarianism. De jure independence would ensure that the Taiwanese continue to enjoy their freedoms. Reunification would not necessarily mean that those freedoms would be revoked; China has promised not to interfere with local affairs after reunification (Lasater 2000a, 48). But the Taiwanese are suspicious of those promises. They scrutinize China’s treatment of Hong Kong in order to predict the treatment China would give them under unification.

Promoting Economic Prosperity. Even more so than democratization, rapid economic growth in Taiwan has enhanced Taiwan’s prestige and improved the quality of life for the Taiwanese. To take advantage of China’s economic ascent will require Taiwan to have closer economic integration with China.

In pursuing increased international standing, perpetuation of democracy, and further economic growth, Taiwan is subject to constraints imposed by the PRC. Taiwan’s increasing economic dependence on the mainland make it vulnerable to blackmail. Pursuing international recognition angers the PRC and has often elicited threats of attack.

China has the world’s fastest-growing economy, and Taiwan must concede to closer integration if she is to cash in on that growth. China supplies a huge export market and low-cost labor. Consequently, Taiwanese companies have relocated much of their manufacturing to the
mainland. In order to capture further gains from this growth, Taiwanese businesses have lobbied the Chen administration to proceed with *san tong*, or “three links” of direct air, shipping, and mail across the strait. Industrialists like Wang Yung-Ching of Formosa Plastics and Kao Chin-yen of Uni-Enterprises (owner of the 7-Eleven franchise in Taiwan) have joined in lobbying, suggesting that Taiwan's government set aside politics for fifty years and focus on economic issues (*Taiwan Economic News*, 22 May 2002). Jiang Zemin expresses similar wishes. His eight-point proposal asserts that “political disagreement should not impede economic cooperation” between China and Taiwan; Jiang aims to protect the “rights and interests of industrialists and business people from Taiwan” (Jiang 1995). Detaching politics from economics is impossible (Rourke 1995, 472). Wang, Kao, and Jiang are naïve in thinking that it is.

While the growing trade and investment relationship between China and Taiwan is mutually beneficial, Taiwan, as the smaller economy, stands to lose more if the relationship is ended. China can threaten to sever economic ties if Taiwan refuses to reunite. Chalmers Johnson has noted that the Taiwanese government is aware of this, and in response it has tried to divert outward foreign investment flows from China towards Southeast Asia to lessen dependence on China's market, so that an attack on Taiwan equates to an attack on the entire region (Johnson 2000, 160). Nonetheless, if links are not established, Taiwan may lose out to Japanese, Korean, and Western corporations in cashing in on China's boom. Thus the “China factor” imposes a major constraint on Taiwan in promoting economic prosperity.

Taiwanese pursuit of international recognition provokes China. Chinese economic and military threats constrain Taiwan's ambitions to improve its international profile. Examples of responses to Taiwan's efforts at acquiring international recognition include the firing of missiles into the Strait after Taiwanese President Lee Teng-hui's visit to Cornell University in 1996 and the Chinese furor over arms purchases from the United States.

The Chinese Interest

Just as Taiwan must answer to its electorate in order to perpetuate its power, China is beholden to the nationalism that legitimizes the regime. With Communism's collapse the CCP resorted to nationalism as the ideology bolstering the party. The CCP's legitimacy is a function of its
performance in boosting the state's international stature and meeting the basic needs of its people. China can do so in three major ways: maintaining territorial integrity to meet the irredentist demands of its people, improving its strategic position to increase its power and thereby enhance international stature and prestige, and developing China's economy to improve the lives of its people. All three are answers to nationalism; the last can also be seen as meeting the basic needs of its people. The following is a detailed explanation of the three.

1. Closing the chapter of national humiliation. The CCP is determined to retake Taiwan in order to close the chapter of national humiliation caused by Western and Japanese imperialists, as that would end what China sees as foreign meddling in China's domestic affairs. Allowing Taiwan to break away would dissatisfy its people's nationalistic sentiments because Taiwan has not been fully returned to China since China surrendered the island to Japan in 1895. If Taiwan were allowed to become independent, the CCP would be seen as incapable of answering to the nationalism that legitimizes it in the first place. Social disorder might result from CCP indifference to Taiwanese moves toward independence. Such is the main incentive for the PRC to block independence movements. Thus, having Taiwan under its reins would positively impact China's legitimacy, as did the return of Hong Kong.

2. Enhancing national power. In addition to closing the chapter of humiliation, China can answer to the nationalism of its people by attaining superpower status. Retaking Taiwan would boost the PRC's strategic position and hard power. Martin L. Lasater has noted that control of Taiwan would give China the following: its only strategic gateway into the ocean; adjacency to critical sea lines of communication; the ability to block Japan's economic lifeline; a communications hub in the Western Pacific; disruption of the U.S. strategic chain spanning Japan, Korea, and the Philippines; and the coastal defense currently unavailable (Lasater 2000a, 7–8).

But the costs of war would cripple China's military, especially if the U.S. chose to intervene. As will be discussed later, war could mean economic instability leading to social unrest that would force the PLA to protect the CCP and render the PLA incapable of attending to its security functions. The geopolitical enhancement from having Taiwan would be of little use if the PLA has to quell domestic discontent. Thus I expect war to have a negative impact on China's national power.
3. Developing economy. China's rapid post-liberalization growth has contributed immensely in legitimizing the CCP. Integrating newly industrialized Taiwan into China's economic sphere would further the work by enabling a synergistic relationship between China's low-cost labor and Taiwan's advanced high-tech sector. However, as was seen with the European Union in its earlier stages, complete economic integration does not require political integration. Tariff-free borders, free flow of investment, and labor mobility can occur between two independent political entities. On the other hand, attacking Taiwan comes at a high economic costs; Scobell and Wortzell have shown that an invasion of Taiwan would lead to a sharp drop in foreign direct investment inflows from Taiwan to the mainland and thereby would cause massive unemployment and ultimately social unrest (Scobell and Wortzell 2001, 1). Retaking Taiwan by force would hurt China's economy and the CCP's legitimacy, so it constitutes a major disincentive for forced reunification.

**International constraints on China.** In pursuing legitimacy through those three means, China faces the constraints of the international system. China has entered the international community and consequently is subject to global norms and institutions. Two major events constrain China in its attempts to maximize legitimacy: the probability of international intervention and the disapproval of the international community.

*Expected international intervention.* The international community is likely to frown upon an invasion and may take action to deter China. China saw NATO intervene in Kosovo without a UN mandate and in spite of NATO's recognition of Serbia's sovereignty. This action has major implications for the Taiwan issue because China's UN Security Council veto and Taiwan's lack of sovereignty may not be enough to safeguard China from international intervention.

*International norms.* In addition, forcibly reintegrating Taiwan would adversely affect China's "soft power." As Joseph Nye has demonstrated, the ability to get others to do things through enticement rivals hard power as the "currency" of international relations today (Nye 2004). Much talk of the recent diminution of the U.S.'s soft power resulted from Bush's allowing the neoconservatives to run amok in foreign policy decision-making (Buchanan 2004; Prestowitz 2003). Neoconservatives in the upper reaches of the Bush administration have been blamed for violating international norms when attacking Iraq unprovoked and for considering
doing the same to Iran. The same would hold true for China. Attacking a prosperous, democratic entity would similarly give China a black eye in the international community. Furthermore, such a choice could even lead to a Cold War with the United States (Scobell and Wortzell 2001, 20–21). Thus, invading Taiwan clearly harms China’s international status.

U.S. Interest

U.S. interests in the cross-strait crisis are mainly strategic and economic. Lasater identified nine reasons why Taiwan is of importance to the United States and five why China is (Lasater 2000b, 51–56). I summarize the major issues below.

U.S. strategic interests in Taiwan. Taiwan is of strategic importance to the United States for three major reasons. First, if the U.S. fails to defend Taiwan it will hurt U.S. credibility regarding its other commitments. Second, a de facto divided China may be vital in containing China’s growing power. Third, Taiwan is part of an American ally chain that spans Japan, South Korea, and the Philippines. If a war were to break out, escalate, and spread, the U.S. would be drawn in, if only to fulfill its commitment to protect its allies.

U.S. economic interests in Taiwan. Taiwan is the U.S.’s seventh-largest trade partner and, as mentioned before, a large supplier of the U.S.’s IT consumption. A war would cause both an IT shortage in the U.S. and a recession that would spread throughout the Asia-Pacific region, the destination for the bulk of U.S. exports, limiting the region’s ability to absorb them.

U.S. strategic interests in China. The U.S. has strategic interests in China as well. With China’s growing power the U.S. needs to accommodate China in the new world order. China has the potential to join the U.S. in the global war on terror and in nonproliferation. Coming to Taiwan’s defense may complicate China’s willingness to help on those fronts. Furthermore, the war will likely escalate into a regional security conflict between the U.S. and China.

U.S. economic interests in China. The U.S. has a large stake in China’s economic development. Cheap imports from China have helped save American consumers $100 billion since 1997. China is also an eager consumer of American goods. As America’s fastest-growing export market, China absorbs $20 billion worth of American exports each year.
also helps keep U.S. interest rates low by financing U.S. debt (Tyson 2003, 30). It is in the U.S.'s interest to maintain its economic relationship with China without disruption from war.

Model Specification

Within the above framework, I use game theory to predict the outcome of the China–Taiwan problem. Taiwan, China, and the U.S. will be the players in the game. They will move in that order. Taiwan's strategy set ($S^T$) contains four strategies: reunification ($r$), confederacy ($cf$), commonwealth ($cw$), and independence ($idp$). China's strategy set ($S^C$) contains three strategies: invade ($nv$), not-invade but impose sanctions ($-nv/sc$), not-invade and not impose sanctions ($-nv/-sc$). The U.S.'s strategy set ($S^A$) contains three strategies: intervene to help Taiwan ($h$) and not intervene ($-h$). I summarize the strategy sets of all three players:

(1)  

\[ S^T = \{r, cf, cw, idp\} \]
\[ S^C = \{nv, -nv/sc, -nv/-sc\} \]
\[ S^A = \{h, -h\} \]

Taiwan, as the first mover, chooses between $r$, $cf$, $cw$, and $idp$. I assume that if it chooses $r$, it does so on Chinese terms, in accordance with Jiang Zemin's eight-point proposal, which allows Taiwan to retain its armed forces and independently administer its governmental affairs (Jiang 1995). China will have attained its goal of peaceful unification and the game will be over. If Taiwan chooses $cf$, $cw$, or $idp$, then China chooses among $nv$, $-nv/sc$, and $-nv/-sc$. If China chooses $nv$, then the U.S. enters the game and chooses between $h$ and $-h$.

The following is a list of all possible outcomes. The first letter of each outcome denotes Taiwan's strategy: $R$ for reunification, $F$ for confederacy, $W$ for commonwealth, and $I$ for independence. For the number that follows the letter, $-1$ denotes a Chinese invasion and U.S. aid to Taiwan, $-2$ a Chinese invasion without U.S. aid to Taiwan, $-3$ Chinese sanctions, and $-4$ Chinese acceptance of Taiwan’s offer. If Taiwan chooses reunification, the game automatically ends without participation by the other players. Therefore I set the digit for reunification to zero because $1–4$ are irrelevant.

(2)  

\[ RO: (r) \]
\[ FI: (cf, nv, h) \]
\[ F2: (cf, nv, -h) \]
\[ F3: (cf, -nv/sc) \]
I also assume that for every U.S. *non-help* outcome, China will eventually win the war, and Taiwan will be forced into reunification. For every *h* outcome, Taiwan will survive the war and strained relations after the war will prevent any union between China and Taiwan, regardless of what Taiwan originally offered, and Taiwan will be independent. The same applies if China imposes economic sanctions: strained relations will render compromises impossible, and Taiwan will become independent. I summarize the assumptions of the model below:

1. Taiwan has reached the point where it must choose between reunification, confederacy, commonwealth, and independence. Although Taiwan is currently able to keep its policy options open rather than being forced to choose one (Nathan and Ross 1997, 213–14), China has warned that Taiwan cannot maintain the status quo indefinitely (Joffe 2001, 111).

2. If Taiwan reunites, China, though authoritarian, will treat Taiwan in accordance with Jiang Zemin's eight points for peaceful reunification.

3. If the U.S. does not intervene, China will win the war and force Taiwan into reunification.

4. If the U.S. intervenes, Taiwan will survive the war and become independent.

5. If China decides to impose economic sanctions on Taiwan, compromise would be impossible and Taiwan would move to independence regardless of what it initially offered.
Analysis of Preferences

Taiwan’s Preferences

I now examine every outcome and the utility each player derives from those outcomes. To begin, I group similar outcomes and compare. Because for every non-help outcome Taiwan will be forced into reunification and thereby lose all international standing in addition to suffering economic damage, all non-help outcomes will yield the lowest payoffs. From this I conclude that

\[ F_2 = W_2 = I_2. \]  

And because with all help outcomes, Taiwan will become independent and thereby maximize its international standing, its democratic way of life, and suffer economic damages to a smaller degree than with non-help outcomes, all help outcomes will yield payoffs all equal to each other and higher than those in (3). This is represented by

\[ F_1 = W_1 = I_1 > F_2 = W_2 = I_2. \]  

If Taiwan were to choose reunification then it would lose all international standing, puts its democratic way of life at risk, but could continue to enjoy economic prosperity. It would yield a payoff lower than outcomes with help but higher than non-help. With reunification, international standing approaches zero, while with all help economic prosperity does not close in on zero. Hence,

\[ I_1 > R_0 > F_2. \]  

For all non-invade/sanction, Taiwan would suffer economic isolation from the mainland, although it could find alternative sources of economic prosperity. Economic isolation does not compare to economic destruction from war. So all payoff values for non-invade/sanction scenarios are higher than those for all invade scenarios. And because the sixth assumption holds that if sanctions are imposed, Taiwan move towards independence, regardless of what it originally offered, all non-invade/sanction outcomes yield the same payoff values. Thus non-invade/sanction payoffs are all equal and greater than invade payoffs: Thus,

\[ F_3 = W_3 = I_3 > F_1 = W_1 = I_1. \]  

For all cases of non-invade/non-sanction, Taiwan could enjoy greater international standing and continued economic prosperity than with non-invade/sanction cases. The level of international standing differs according to regime type. Hence,
If we aggregate (4) through (7), we have

\[ I_4 > W_4 > F_4 > F_3 = W_3 = 13. \]

(8)

\[ I_4 > W_4 > F_4 > F_3 = W_3 = 13 > F_1 = W_1 = 11 > R_0 > F_2 = W_2 = I_2. \]

**China's Preferences**

Again, I begin by grouping similar outcomes. For all non-help outcomes, China would have Taiwan under its control after a long war, but would suffer economic losses from war and suffer backlash from the international community for attacking a free-market democracy. The damage to its military would offset any geostrategic enhancement from gaining the island. The backlash would be the only variable that differs depending on what Taiwan chooses and would be inversely related to the level of autonomy Taiwan is seeking. If Taiwan were to choose independence, for example, the backlash over attacking Taiwan would not be as great as if Taiwan offered commonwealth, because offering commonwealth would make Taiwan seem more conciliatory, since it is partially relinquishing some sovereignty, so China would seem more at fault if it declined the offer and attacked. Offering confederacy would make Taiwan seem even more conciliatory and China even more at fault if China declined. So we have the following:

\[ I_2 > W_2 > F_2. \]

For all help outcomes, China would not be able to regain Taiwan and close the chapter of national humiliation. U.S. intervention would allow Taiwan to become an independent country regardless of what Taiwan chose in the first place. The payoffs are thus lower than in all those in (10) and also depend on whether Taiwan were to choose confederacy, commonwealth, or independence. So again, as with non-help outcomes, all variables would be the same irrespective of Taiwan's original strategy, except the international backlash, which would differ depending on in how conciliatory a manner Taiwan negotiates:

\[ I_2 > W_2 > F_2 > I_1 > W_1 > F_1. \]

If Taiwan were to choose confederacy, or commonwealth, and China were to enact economic sanctions, then China would suffer the same economic damages from severing economic ties with Taiwan. Its closing of the chapter of national humiliation would be the same under both outcomes because in both cases Taiwan would move towards independence, regardless of whether it offered confederacy or commonwealth (Assumption 5). Still, the payoffs would be higher than from any war scenario:
If Taiwan were to choose *independence* and China were to choose *non-invade/sanction*, that is, do nothing, the CCP would lose its legitimacy, creating the worst-case scenario. If Taiwan were to choose *independence* and China *non-invade/sanction*, i.e., merely sanction, such action would amount to virtual inaction. China would lose almost as much legitimacy, creating the next-to-worst-case scenario, which would be worse than losing a war to the United States.

Some may question this preference. Assumption 4 holds that if the U.S. were to choose help then China loses the war and not regain Taiwan anyway. China would apparently suffer severe geopolitical and economic damage in vain. The reason, as Chu Shulong of the China Institute of Contemporary International Relations explains, owes to cultural perceptions of victory. Chu says that even if China were to lose to the United States, standing up against an encroaching superpower like the U.S. would be considered victorious to the Chinese (Chu1997). Thus the people prefer China fight and lose the war than do nothing at all.

If Taiwan were to choose *commonwealth* or *confederacy*, and China were to choose *non-invade/non-sanction*, then China would somewhat close the chapter of national humiliation, without suffering losses in economic development from severing economic ties with Taiwan. The more autonomy Taiwan gains, the more embarrassment China suffers. All *non-invade/non-sanction* scenarios yield greater payoff values than all *non-invade/sanction* scenarios because the only difference is that *non-invade/sanction* allows China to maintain trade and investment relations with Taiwan.

Finally, if Taiwan were to choose reunification, the chapter of national humiliation would be completely closed, there would be no international backlash, and China's national power would be strengthened. This would be the best-case scenario:

Combining (10) through (14) gives us the following preferences for China:
United States' Preferences

We now examine preferences for the third mover, the United States. As stated earlier, if the U.S. were to fail to come to Taiwan's aid it would lose credibility on its defense commitments elsewhere. The U.S. has pledged its support for all scenarios excepting a unilateral Taiwanese declaration of independence. As mentioned earlier, the current Bush administration opposes any unilateral acts towards independence. If the U.S. intervenes when Taiwan chooses independence it loses lives and treasure and suffers strained relations with China; good relations are needed in the war on terror. So by choosing non-help the U.S. would lose credibility only if Taiwan chooses confederacy or commonwealth, not if Taiwan chooses independence. With $F_l$ and $W_l$ the benefits of maintaining credibility and of maintaining China's and Taiwan's separation from each other would exceed the cost of strained relations with China. Between its non-help options, the U.S. prefers Taiwan choosing confederacy over commonwealth. The U.S. loses more credibility from non-help if Taiwan offered confederacy, because with confederacy Taiwan sacrifices more sovereignty, making it seem more conciliatory. Thus the U.S. would be more obligated to defend Taiwan. Conversely, help when Taiwan chooses confederacy would be better than non-help if Taiwan chooses commonwealth for the same reason. When Taiwan is more conciliatory, the obligation to defend is greater, and thus the higher the costs of not defending.

To summarize, if Taiwan chooses confederacy or commonwealth, then the U.S. would be better off choosing help. And the U.S. is better off helping when Taiwan chooses confederacy than helping if it chooses commonwealth:

\[ F_l > W_l > W_2 > F_2. \]  

But if Taiwan chooses independence, then the U.S. is better off choosing non-help. But $I_2$ is preferred to $W_2$ and $F_2$ because again, the U.S. has a greater obligation to intervene the more conciliatory Taiwan is. However, $F_l$ and $W_l$ are preferred to $I_2$ because it is in the U.S.'s security interest to keep the two entities separate, and if Taiwan is seen as conciliatory the U.S. has justification. Finally, $I_1$ is preferred to $W_2$ and $F_2$ because though the United States has no obligation to intervene if Taiwan declares independence, intervening when not obligated and keeping Taiwan separate would be better than not intervening when obligated and seeing a rise in Chinese power.
Beyond this point, payoff values are irrelevant for the United States because for reunification and all non-invade scenarios the U.S. does not play in the game. But I will complete the assignment of payoff values so we can see the U.S.'s final utility. If Taiwan were to choose reunification, then the U.S. would be better off than in any war scenario. Although the U.S. would rather the two nations remain separate to contain the rise of Chinese hegemony, the U.S. has demonstrated its preference for a peaceful resolution in its longstanding policy of allowing the two sides to work things out themselves. Thus,

\[ R_0 > F_1. \]

The U.S. would also rather China and Taiwan bilaterally reunite than China impose economic sanctions on Taiwan. Sanctions would cause a regional economic disruption and cause U.S. exports to fall sharply. In other words, though the U.S. would be better off geopolitically with non-invade/sanction outcomes than with reunification, economically reunification would be more beneficial. Neither geopolitics nor economics are independent from each other, but in this case I expect economic concerns to dominate for two reasons.

First, a sharp export decline would cause the already massive U.S. trade deficit to swell to unacceptable proportions, considerably harming the U.S.'s financial position. Second, the U.S. is currently devising other solutions to containing China's hegemonic rise. The most notable one is maintaining the balance of power in the region through strengthening Japan by seeking a permanent seat in U.N. Security Council for the island-nation. So though China would be strengthened by reunification, its power can be offset by a more powerful Japan. For this reason the economic advantages of reunification would outweigh its political disadvantages. Thus reunification would yield higher payoff values for the United States than non-invade/sanction scenarios.

Among the non-invade/sanction outcomes, all yield the same payoff values because Assumption 5 holds that in the case of sanctions Taiwan will move towards independence regardless of what it originally offered.

The non-invade/sanction scenarios would also be preferable to any war scenarios, because the United States prefers any peaceful solution over armed conflict. With war the regional economic disruption is even greater than with sanctions. To summarize,
Finally, non-invade/non-sanction scenarios are optimal for the United States. They are peaceful solutions that keep the two entities separate to certain degrees. Among those solutions, greater separation between Taiwan and China results in a lower threat of Chinese hegemony and thus greater payoffs for the U.S. So we have

\[(19) \quad R_0 > F_3 = W_3 = I_3 > F_1.\]

Combining (15) through (20) yields:

\[(20) \quad I_4 > W_4 > F_4 > R_0.\]

\[(21) \quad I_4 > W_4 > F_4 > R_0 > F_3 = W_3 = I_3 > F_1 > W_1 > I_2 > I_1 > W_2 > F_2.\]

In Table 1, I assign ordinal payoff values to outcomes for each player.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Taiwan</th>
<th>China</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(R_0)</td>
<td>2</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>(F_1)</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>(F_2)</td>
<td>1</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>(F_3)</td>
<td>4</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>(F_4)</td>
<td>5</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>(W_1)</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>(W_2)</td>
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<td>2</td>
</tr>
<tr>
<td>(W_3)</td>
<td>4</td>
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<td>7</td>
</tr>
<tr>
<td>(W_4)</td>
<td>6</td>
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<td>10</td>
</tr>
<tr>
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<td>5</td>
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</tr>
<tr>
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<td>4</td>
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<tr>
<td>(I_3)</td>
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<td>7</td>
</tr>
<tr>
<td>(I_4)</td>
<td>7</td>
<td>1</td>
<td>11</td>
</tr>
</tbody>
</table>

Table 1: Payoff Values for Each Player
Towards a Nash-Equilibrium Solution

With the ordinal values in place I now proceed to construct the extensive form game, shown in Figure 1. I will solve the Nash-equilibrium by backwards induction.

Figure 1: Extensive Form Game

**Third-Mover: U.S.**

If the U.S. is given \((cf, nv)\), it chooses \(b\). If given \((cw, nv)\), it chooses \(b\). If given \((idp, nv)\), it chooses \(-b\). So we eliminate \(F2, W2, and I1\) from the game.

**Second Mover: China**

If given \((cf)\), China chooses \(-nv/sc\). If given \((cw)\), China chooses \(-nv/sc\). If given \((idp)\), China chooses \(nv\). This allows us to eliminate \(F1, F3, W1, W3, I2, I3 and I4\) from the game.
First Mover: Taiwan

Taiwan, as the first mover, chooses from the entire $S^T$ and chooses $cw$, which yields $(cw, -nv)$, or $W^4$, which has the highest remaining payoff value of 6. China would receive a payoff of 10 and the U.S. 10. Hence $W^4$ is the only Nash-equilibrium outcome.

Analysis of Results

The Nash-equilibrium, $W^4$, is when Taiwan offers to unite with China in a commonwealth and China decides not to invade or sanction. The U.S. would not be drawn in. Invasion is an empty threat because the U.S. will credibly defend Taiwan so long as Taiwan does not declare independence. This analysis reveals that economic blackmail will also be, in all cases discussed, an empty threat. While Han's model shows that the prospect of American intervention will heighten the likelihood of conflict, this model demonstrates that if compromise solutions are offered, war can be averted. The compromises available to Taiwan and China are a commonwealth and a confederacy. With sovereignty being Taiwan's main quest, and territorial integrity China's, these compromise regimes allow both entities to make gains from the status quo in their pursuits. Comparing the two regimes, a commonwealth gives Taiwan more sovereignty and China less integrity. But a commonwealth is the more likely outcome because when China is offered either regime, the costs of invasion outweigh the benefits. The absence of an invasion permits Taiwan to choose between the commonwealth and confederacy. It will choose a commonwealth because this regime type allows for greater sovereignty. The threat of economic sanctions is also empty; China itself would lose economically when it does not have to, and Taiwan would rather lose economically than lose sovereignty. In this model, China would prefer to impose sanctions rather than not if Taiwan declares independence. But in that case China would be better off attacking Taiwan anyway. From this I conclude that in this crisis, economic blackmail would be an empty threat.

Conclusion

Previous game-theoretic works on the cross-strait crisis give Taiwan and China two strategies in each game. Taiwan can either declare independence or maintain the status quo, and China can either attack or allow the status quo. These dichotomies ignore concrete compromises between independence and unification that scholars have proposed. This model
accounts for those compromises: it predicts that Taiwan will offer to form a commonwealth with China, China will peacefully accept, and the United States will not have to intervene. This model also reveals that Chinese threats of economic sanctions are not credible.

This finding has useful implications for further research. One possibility would be to merge this model with Benson and Niou's models to form a more robust prediction, that is, construct a model that both includes uncertainty like that of Benson and Niou and accounts for the possibilities of the regime types examined in this model. Such a model would show the impact of the crisis outcome for both American strategic commitments and regime-type possibilities.

Endnotes

1. Of course, reality is more complex. Eric Hyer has demonstrated that the popular notion “China speaks with one voice on foreign policy” is false (2005).
2. Daniel Damron has noted that rational choice is primarily concerned with the aggregation of individual choices, not the individual choice itself (2003).
3. Some argue that having excessive commitments worldwide is the U.S.’s problem; Buchanan notes that the U.S. has treaty guarantees to fifty countries and troops in one hundred countries (2004, 5–6).
4. The convention for extensive form games is to list a separate strategy for every contingency (Cardon 2004; Mackay 2005). For example, China would have \( m_v, -m_v/sc, -m_v/-sc \) for each strategy Taiwan chooses except \( r \), giving China a total of nine strategies. For simplicity and on the advice of Jay Goodliffe I do not follow convention here (2005).
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