

## RESEARCH ARTICLE

# The Taiwan Game. Navigating U.S.-China Tensions from Game Theory Perspective

Agata Ziętek<sup>1</sup>, Elizabeth Freund Larus<sup>2</sup>, Anna Tatarczak<sup>3</sup>

<sup>1</sup>Institute of International Relations, Maria Curie Skłodowska University, Lublin, 20-612, Poland

<sup>2</sup>University of Mary Washington, Fredericksburg, Virginia, USA

<sup>3</sup>Faculty of Economics, Maria Curie Skłodowska University, Lublin, 20-031, Poland

## Abstract

Taiwan is a potential flashpoint for conflict between the U.S. and China. Although it has been de facto independent of China for more than seventy years, China's leaders regard Taiwan as an inseparable part of the PRC. While China claims to strive for peaceful "reunification," it has never renounced the use of force against Taiwan. Despite a 45-year policy of "strategic ambiguity" regarding Taiwan's defense, the U.S. has declared its support for the use of military force to defend Taiwan. China's threats and U.S. support have created a security dilemma, in which adversaries build up their respective offensive or defensive capabilities in response to each other's actions. This article employs game theory to assess whether the United States and China are more likely to use force or seek accommodation in determining Taiwan's future. The paper seeks to answer the following questions: What risks would China's leaders be willing to take to secure the benefits of seizing Taiwan? What costs would they be willing to bear? Is the United States prepared to use military force to defend Taiwan? To demonstrate the usefulness of game theory, the paper begins with an explanation of the history of classical game theory. It then provides an overview of cross-strait relations and the role of the United States as Taiwan's security guarantor. The payoff structure of this analysis reflects the dynamics of a Chicken Game with asymmetric stakes: China's pursuit of peaceful unification represents a strategic imperative tied to national identity, while the United States prioritizes regional stability and ally credibility. These differing levels of urgency and risk tolerance shape their strategic decisions.

## Keywords

Game Theory, China, United States, Taiwan, Taiwan Strait, Security Dilemma

**Corresponding author:** Agata Ziętek (wiktoriazietek@gmail.com)

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## Introduction

In May 2021, *The Economist* featured Taiwan on its cover, labeling it “the most dangerous place on Earth”—a claim that initially drew criticism for perceived exaggeration. However, subsequent developments have validated such concerns, as cross-Strait tensions have reached their highest levels in nearly three decades. Taiwan is now widely regarded as a volatile geopolitical flashpoint with far-reaching regional and global implications. The World Economic Forum’s 2022 *Global Risk Report* designated Taiwan as a high-risk area, citing the intensification of the People’s Republic of China’s activities near its borders. In 2023, Taiwan and China were jointly identified as one of the top five global hotspots for potential interstate conflict, particularly in the East and Southeast Asian context. The 2024 edition of the *Global Risk Report* further underscored this trajectory by listing Taiwan—alongside the conflicts in Ukraine and Gaza—as one of the world’s most pressing geopolitical flashpoints. As a result, Taiwan has come to symbolize broader concerns over regional security and the potential for great-power confrontation.<sup>1</sup>

For over seventy years, Taiwan has experienced dynamic social, economic, and political change while striving to maintain an uneven balance with its western neighbour, the People’s Republic of China (PRC, hereafter “China”). Today, China regards this thriving democracy of approximately 24 million people as a breakaway province that must be reunified with the mainland as soon as possible.

Taiwan is a potential flashpoint for conflict between the U.S. and China. Although it has been de facto independent of China for more than seventy years, China’s leaders regard Taiwan as an inseparable part of the People’s Republic of China. Like his predecessors, Xi has pledged to seek peaceful reunification but has not renounced the use of force to unite Taiwan with China. More recently, China’s leader Xi Jinping pledged to take “all measures necessary” to unite Taiwan with the PRC. The official U.S. stance is that Taiwan’s future should be determined peacefully by the people on both sides of the Taiwan Strait. The Biden administration has expressed support for using U.S. military force to defend Taiwan if necessary. These positions were often nuanced or later “reformulated” by administration officials. The United States has long pursued a policy of strategic ambiguity. Statements by Donald Trump and the recent shift in tone raise further questions. As recently as 2021, Donald Trump enjoyed significant popularity in Taiwan, partly because he was credited with bringing the U.S. and Taiwan closer. As the 47th President of the U.S., after a series of comments, it is no longer clear whether Taiwan can count on continued support during his potential second term. His stance on strategic ambiguity seems to

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<sup>1</sup> “The Global Risks Report 2022,” 17th ed. accessed May 17, 2024, [https://www3.weforum.org/docs/WEF\\_The\\_Global\\_Risks\\_Report\\_2022.pdf](https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2022.pdf); “The Global Risk Report 2023,” 18th ed. accessed May 17, 2024, [https://www3.weforum.org/docs/WEF\\_Global\\_Risks\\_Report\\_2023.pdf](https://www3.weforum.org/docs/WEF_Global_Risks_Report_2023.pdf); “The Global Risk Report 2024,” 19th ed. accessed September 2, 2024, [https://www3.weforum.org/docs/WEF\\_The\\_Global\\_Risks\\_Report\\_2024.pdf](https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2024.pdf).

reflect an application of the “madman theory”,<sup>2</sup> especially in the context of U.S.-China relations. However, Xi maintains that Taiwan’s reunification with China is an internal matter that should be resolved without external interference. China’s threats to forcibly unite Taiwan and possible U.S. support for Taiwan distinctive of China are contradictory. Their opposing positions have created a security dilemma, in which adversaries build up their respective offensive or defensive capabilities in response to actions taken by the other. This spiraling can compel Beijing and Washington to either seek accommodation in their differences or use military force in pursuit of their aspirations.<sup>3</sup>

This article applies game theory to assess whether the United States and China are more inclined to pursue military confrontation or diplomatic accommodation in determining the future of Taiwan. By offering a structured analytical framework, game theory enables a deeper understanding of the strategic interactions and decision-making processes that define high-stakes geopolitical conflicts. In particular, it provides insights into how such conflicts—like the one potentially unfolding in the Taiwan Strait—might be managed or averted. The paper addresses several key questions: What level of risk are Chinese leaders prepared to assume to achieve the strategic gains associated with the seizure of Taiwan? What costs—political, economic, and military—are they likely willing to incur? Finally, to what extent is the United States prepared to employ military force in defense of Taiwan?

To demonstrate the usefulness of game theory, the paper begins with an explanation of the history of classical game theory. It then familiarizes the reader with an overview of relations across the Taiwan Strait and role of the United States as Taiwan’s security guarantor. The next section of the paper applies game theory, assessing likely scenarios and outcomes, to determine whether the United States and China are more likely to accommodate each other’s position on the status of Taiwan or to use force to resolve their differences.

Game theory is a research method, a theory of effective action and a theory of effective conflict resolution. Game theory is a branch of mathematics that analyzes the structure and resolution of conflicts.<sup>4</sup> A defining characteristic of decision-making in game theory is that a player’s outcome depends not only on their own choices and random factors but also on the decisions of one or more other players. Players’ interests can be completely aligned, entirely opposed, or, more commonly, a mix of both.

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<sup>2</sup> The “Madman Theory” is a foreign policy strategy where a leader deliberately cultivates an image of irrationality and unpredictability to deter adversaries by making them believe the leader is capable of anything, even actions that would normally be considered irrational. This theory suggests that by appearing unstable and willing to take extreme risks, a leader can gain a negotiating advantage.

<sup>3</sup> The current situation in the Taiwan Strait was recently analyzed in the article: A.W. Ziętek and E.F. Larus, “Taiwan: One of the Most Dangerous Places in the World,” in *Contemporary Security Problems of Poland and the Czech Republic*, ed. E. Kancik-Kořtun (Lublin: Maria Curie-Skłodowska University Press, 2024).

<sup>4</sup> J.P. Kahan and A. Rapoport, *Theories of Coalitions Formation* (New York, London: Routledge, 1984), 3.

While each player's possible outcomes are well-defined, they remain uncertain due to the unpredictability of others' choices and external factors.

Although game theory can address scenarios where players' interests align, its most intriguing applications lie in situations involving conflict.<sup>5</sup> Originally introduced by J. von Neumann and O. Morgenstern, game theory was founded on several key assumptions about the logical reasoning of players, both individually and collectively. No one individual is able to control the results. This theory involves making recommendations for rational and effective action, assuming that the other participant is also rational.<sup>6</sup> Game theory provides a formal language to describe a conflict or decision challenge, and a set of tools to analyze or resolve it. The states under study are called players, their actions are strategies, and their payoffs are outcomes depending on the chosen strategies.

Game theory, according to Polish researcher Z.J. Pietras should be understood as a set of mathematical models for solving situations in which the conflicting interests of decision-making centers intertwine. It assumes that the goal is not to eliminate the other party, which has its own hierarchies of preferences. Knowing the hierarchies of the other party's preferences allows participants to anticipate the results and thereby act rationally, i.e., seek to maximize the expected payoff. In other words, players seek to maximize the realization of their goals.<sup>7</sup> Participants are assumed to have a choice between two basic strategies: cooperative (peaceful, altruistic) and confrontational (warlike, competitive, non-cooperative, egoistic, and betrayal). To formalize a conflict as a game, one needs to identify the players, their respective strategies, and the payoffs to each player for each outcome. The payoff for a player is expressed using utility function, which represents the preferences of a player over possible outcomes. Formally, the utility function can be written as  $U_i(s_1, s_2, \dots, s_n)$ , where  $U_i$  denotes the utility (or payoff) for player  $i$ , and  $s_1, s_2, \dots, s_n$  are the strategies chosen by all  $n$  players in the game. The utility function encapsulates how much value a player derives from a specific combination of strategies. In this context, the payoff for a specific player, such as the United States or China in the Taiwan Strait conflict, is denoted as  $U_{USA}(i, j)$  or  $U_{China}(i, j)$ , where  $i$  and  $j$  correspond to the strategies chosen by the United States and China, respectively.

We find that game theory is particularly useful in addressing existing and emerging challenges in the Indo-Pacific region. One of the most pressing current challenges are tensions between Taiwan and China and those between China and the United States. Our primary goal in this article was to model the bilateral strategic tensions between the United States and the People's Republic of China, as perceived

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<sup>5</sup> Kahan and Rapoport, *Theories of Coalitions* (New York, London: Routledge, 1984), 3.

<sup>6</sup> J. von Neuman and O. Morgenstern, *Theory of Games and Economic Behavior* (Princeton: Princeton University Press, 1944), 9–13.

<sup>7</sup> Z.J. Pietraś, *Decydowanie polityczne* (Warszawa, Karków: Wydawnictwo Naukowe PWN, 1998), 182.

through the lens of game theory. In this context, Taiwan is treated as the central stake over which both actors compete—rather than as a third player within the game-theoretic structure. Before turning to game theory in relation to the analysis of US-China relations in the context of the Taiwan Strait, we will outline the background and sources of recent tensions.

## Relations across the Taiwan Strait

Strained relations between the People's Republic of China (PRC) and the Republic of China (ROC) on Taiwan have been a potential source of conflict for decades. Cross-Strait tensions developed in the late 1940s when the Kuomintang (KMT), having been defeated by the Chinese Communist Party (CCP), retreated to Taiwan near the end of the Chinese Civil War. Two distinct political entities evolved following the ROC's retreat to Taiwan. For many years, both the PRC and the ROC claimed a single state on the Chinese mainland (大陸) but disagreed if jurisdiction of the mainland belonged to the ROC founded in 1912 or the PRC founded in 1949. During a process of Reform and Opening in the PRC as well as democratization in the ROC, semi-official representatives of the KMT and CCP met in 1992, concluding with a consensus that both Taiwan and the Chinese mainland belonged to “one China” but with each side maintaining “respective interpretations” (一中各表) of one China. In the succeeding decades of democratization (minzhuhua 民主化) and nativization (本土化 *bentuhua*), Taiwan has increasingly sought to define its own national identity and international status distinctive from that of China's. Although the goal for the KMT has long been eventual unification with mainland China under a democratic policy, democratization in Taiwan but not in China has made unification less attractive. Cross-Strait relations deteriorated in 1999 when Lee Teng-hui articulated his “Two States Theory”, which defined relations between Taiwan and China as “between two countries”.<sup>8</sup> Cross-Strait relations further deteriorated after the 2000 election of Chen Shui-bian (2000–2008), who touted “Two Different Countries separated by the Taiwan Strait”. ROC President Ma Ying-jeou (2008–2016), returned to the spirit of the so-called 1992 Consensus (九二共識), believing that cooperation with China was the best route to Taiwan's security.<sup>9</sup> Official dialogue between China and Taiwan was suspended, however, after Tsai Ing-wen's 2016 election as ROC president. Tsai refused to support the 1992 Consensus, which she associated with the “one country, two systems” formula applied to Hong Kong after 1997, and insisted that Beijing treat Taiwan as an equal as a precondition for talks. In her 2016 inaugural address, Tsai Ing-wen, the first female president of Taiwan, emphasized her commitment to upholding Taiwan's sovereignty and territorial

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<sup>8</sup> Ł. Gacek and E. Trojnar, *Pokojowe negocjacje czy twarda gra? Rozwój stosunków ponad Cieśniną Tajwańską* (Kraków: Księgarnia Akademicka, 2013), 16; E. Larus and A.W. Ziętek, “Taiwan's Military Posture Toward China's Confrontational Stance,” in *Taiwan Environmental, Political and Social Issues*, eds. C.M. Clark, K. Ho and A.C. Tan (New York: Nova Science Publisher, 2021).

<sup>9</sup> Gacek and Trojnar, *Pokojowe negocjacje*, 23.

integrity. By referencing the Constitution of the Republic of China (ROC), she reaffirmed Taiwan's political identity and legal framework, signaling her intention to defend its status against external pressures. This was especially significant because Tsai's inauguration came at a time of heightened tension between Taiwan and China. Beijing regards Taiwan as part of its territory and has repeatedly sought to pressure Taiwan to accept reunification under Chinese rule. Tsai, as a member of the Democratic Progressive Party (DPP), has been critical of China's approach, advocating for Taiwan's distinct political and cultural identity. In this context, Tsai's words served as a reaffirmation of Taiwan's self-governance and her position on safeguarding its sovereignty, signaling to both domestic and international audiences that her administration would resist any attempts at coercive reunification.<sup>10</sup> Beijing rejected this formulation. For the CCP, Taiwan is a 'core interest' and unification is essential to China's survival and development. In response, Beijing cut off contacts with Taiwan and escalated its use of 'gray zone' tactics, including cyber-attacks, selective trade embargos, military incursions into Taiwan airspace, naval exercises in the water around the island, to intimidate Taiwan.

In his 2024 presidential election victory speech, Taiwan's newly elected president, Lai Ching-te, emphasized his commitment to maintaining the cross-strait status quo and called for reopening dialogue with China to replace confrontation. While Lai reaffirmed his intention to preserve Taiwan's current political situation, he did not explicitly pledge to conduct cross-strait relations according to the Constitution of the Republic of China (ROC), which upholds the one-China framework. This omission suggests that Lai aims to approach Taiwan's relationship with China without directly endorsing Beijing's claim over the island. In addition, Lai thanked the United States and Taiwan's international allies for their support, particularly appreciating the 2024 Indo-Pacific Security Supplemental Appropriations Act passed by the U.S. This legislation will provide increased security and assistance to the Indo-Pacific region, contributing to the stability of the Taiwan Strait. Lai's acknowledgment highlights Taiwan's close ties with the U.S. and its role in ensuring the region's peace amidst ongoing tensions with China.<sup>11</sup> In his May 20, 2024 inauguration speech, Lai Ching-te emphasized Taiwan's sovereignty, stating clearly that the Republic of China (ROC) and the People's Republic of China (PRC) are not subordinate to one another. He pointed to the first chapter of Taiwan's Constitution, which asserts that "The sovereignty of the Republic of China shall reside in the whole body of citizens", and that "Persons possessing the nationality of the Republic of China shall be citizens of the Republic of China". These constitutional provisions, Lai argued, underscore Taiwan's independent sovereignty and identity.

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<sup>10</sup> Office of the President Republic of China (Taiwan), "Inaugural address of ROC 14th-term President Tsai Ing-wen," May 20, 2016, accessed May 17, 2024, <https://english.president.gov.tw/News/4893>.

<sup>11</sup> S. Lau, "China skeptic wins Taiwan presidency in snub to Beijing," January 13, 2024, accessed May 20, 2024, <https://www.politico.eu/article/william-lai-takes-early-lead-in-taiwan-presidential-race-in-snub-to-beijing/>.

Furthermore, Lai called for unity among the people of Taiwan, urging them to come together to safeguard the Taiwanese nation. He emphasized that all political parties should oppose annexation and protect Taiwan's sovereignty, stressing that no one should consider sacrificing the nation's sovereignty for political gain or power. His speech reinforced Taiwan's determination to maintain its independence and to reject any attempts at reunification under Chinese rule.<sup>12</sup> President Lai also called for dialogue with Beijing and demonstrated an openness to resuming cross-strait tourism and student exchanges. President Lai has emphasized a distinct Taiwanese identity and advanced policies that lean toward independence, positions that Beijing considers ideologically provocative. In response, China's state-run media accused Lai of delivering a speech containing "deceitful political lies", claiming that he was "promoting the separatist ideology of 'Taiwan independence', inciting cross-strait antagonism, and advocating independence through reliance on foreign support and military means".<sup>13</sup>

## The US as security guarantor

The United States plays a crucial role as Taiwan's most significant security guarantor, with U.S.-China relations being a key factor in maintaining Taiwan's security. While China's "One China Principle" asserts that Taiwan is part of the People's Republic of China (PRC), the U.S. "One China Policy" does not take a definitive stance on whether "China" refers to the PRC or the Republic of China (ROC). The U.S. acknowledges that there is only one China but refrains from specifying which entity it recognizes as the representative government. Although the U.S. switched its formal diplomatic recognition from the ROC to the PRC in 1979, it continues to maintain unofficial relations with Taiwan through the Taiwan Relations Act (TRA). This act, enacted in the same year, legally commits the United States to provide military arms to Taiwan for self-defense purposes, ensuring Taiwan's security in the face of potential threats. In 1982, the U.S. further bolstered its support for Taiwan with the "Six Assurances". These assurances include a commitment to not set a deadline for ending arms sales to Taiwan, not altering the terms of the TRA, and not consulting with China in advance about arms sales decisions. The assurances make it clear that any reduction in U.S. arms sales to Taiwan is contingent upon the PRC's commitment to a peaceful resolution of cross-strait issues, ensuring that Taiwan's defense is not compromised by political pressure from Beijing.<sup>14</sup> Conversely, if the PRC

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<sup>12</sup> Office of the President Republic of China (Taiwan), "Inaugural Address of ROC 16th-term President Lai Ching-te," May 20, 2024, accessed September 10, 2024, <https://english.president.gov.tw/News/6726>.

<sup>13</sup> Ministry of National Defense of the People's Republic of China, May 21, 2024, accessed September 10, 2024, <http://www.mod.gov.cn/gfbw/jmsd/16310117.html>.

<sup>14</sup> Taiwan Documents, "The 'Six Assurances' to Taiwan," 1982, accessed May 17, 2023, <http://www.taiwan-documents.org/assurances.htm>.

adopts a hostile stance towards Taiwan, the United States would likely increase arms sales to Taiwan as a means of strengthening its self-defense capabilities.<sup>15</sup>

A central element of Taiwan's security strategy is the U.S. policy of strategic ambiguity.<sup>16</sup> This approach aims to create a mutual deterrence by keeping the U.S. stance on a cross-Strait conflict deliberately unclear. It leaves Beijing uncertain about whether the U.S. would intervene to defend Taiwan, while also preventing Taipei from assuming that U.S. support is guaranteed, especially if it were to provoke China by declaring independence. The objective of this policy is to encourage restraint on both sides of the Taiwan Strait. The ambiguity surrounding the U.S. commitment to Taiwan's security has, in turn, led to Taiwan's military isolation and strengthened its self-reliance, with the island relying more on limited arms procurement from the United States.<sup>17</sup> To further strengthen security relations with Taiwan, the U.S. Congress introduced the **Taiwan Security Enhancement Act (TSEA)** in 1999. The bill, aimed at expanding U.S. military support for the Republic of China (Taiwan), was passed by the House of Representatives with a strong majority—341 votes in favor and 70 against. The proposed legislation included measures to increase military assistance to Taiwan, such as providing training and equipment, and establishing direct military communication channels between the United States and Taiwan. However, the bill did not pass the Senate and was never signed into law by the president and thus did not take effect.<sup>18</sup>

After more than two decades of engagement policy with China, Washington switched gears under the Trump administration. More than 20 years after China joined the WTO with promises to carry out market reforms, U.S. businesses complained that China's trade and investment policies were unfavorable to U.S. and foreign businesses. In response to what was perceived as "promise fatigue", the Trump administration launched a bruising trade war with China, labeling China a "strategic competitor". As part of its broader approach, Trump approved significant arms sales to Taiwan and supported high-level exchanges of visits between U.S. and Taiwanese officials. One of the most notable moments came when Trump took a congratulatory phone call from then-President Tsai Ing-wen, marking the highest level of contact between the two sides since the 1979 break in official relations. During Trump's presidency, the State Department also removed longstanding restrictions that had governed where and how U.S. officials could meet with Taiwanese

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<sup>15</sup> Larus and Ziętek, "Taiwan's Military."

<sup>16</sup> F. Grzegorzewski, "Strategic Ambiguity in US-Taiwan Relations During the Donald Trump Administration," *Polish Political Science Yearbook* 51 (2022): 59–74.

<sup>17</sup> E. Trojnar, "Taiwan-China-United States Relations: Taiwan's Unique safe House for Better or Worse," in *Taiwan's Exceptionalism*, eds. A. Rudakowska, E. Trojnar and A. Ziętek (Kraków: Jagiellonian University Press, 2019), 60.

<sup>18</sup> "H.R.1838 - Taiwan Security Enhancement Act," accessed July 19, 2025, <https://www.congress.gov/bill/106th-congress/house-bill/1838>.



counterparts, signaling a further shift in U.S.-Taiwan relations. The Biden administration has shown a similar stance towards China, maintaining a firm approach and continuing the trade war. Under Biden, arms sales to Taiwan have persisted, and the U.S. has continued to allow official meetings between U.S. and Taiwanese officials, signaling ongoing support for Taiwan's security and sovereignty. Biden's policies, like those of his predecessor, reflect a commitment to countering China's growing influence in the region while maintaining strong relations with Taiwan.<sup>19</sup> Biden even invited Taiwanese representatives to attend his presidential inauguration.<sup>20</sup> As a further demonstration of its commitment to Taiwan's security, the United States engages in military training and dialogues with Taiwan while regularly conducting naval transits through the Taiwan Strait to reinforce its military presence. In August 2022, then-House Speaker Nancy Pelosi became the first Speaker to visit Taiwan since 1997, meeting with President Tsai Ing-wen a move that provoked a strong military response from China. Following Taiwan's 2024 presidential election, the Biden administration sent an official delegation to congratulate President-elect Lai Ching-te and President Tsai on the DPP's victory, reaffirming U.S. support for Taiwan's democracy. With Donald Trump now serving as the 47th President of the United States, uncertainty is growing in Taiwan over whether the island can continue to count on strong U.S. support—especially in the realm of military aid. A series of statements made by President Trump since returning to office have raised concerns among Taiwanese officials about the future direction of U.S. policy. President Trump's recent remarks have introduced a new layer of ambiguity. While he appears to favor reducing financial commitments abroad, he has remained consistent in refusing to publicly state whether the U.S. would come to Taiwan's defense in the event of a Chinese attack. When asked about such a commitment in February 2025, Trump responded, "I never comment on that. I don't want to ever put myself in that position".<sup>21</sup> This refusal to articulate a clear stance aligns with the long-standing U.S. policy of strategic ambiguity—intentionally leaving China uncertain about the American response to a potential conflict. For Trump, this ambiguity also echoes his embrace of the "madman theory", a belief that unpredictability can serve as a tactical advantage, particularly in negotiations or confrontations with adversaries like China.<sup>22</sup>

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<sup>19</sup> U.S. Department of State, "New Guidelines for U.S. Government Interactions with Taiwan Counterparts," April 19, 2021, accessed May 20, 2023, <https://www.state.gov/new-guidelines-for-u-s-government-interactions-with-taiwan-counterparts/>.

<sup>20</sup> Council on Foreign Relations, "Biden Administration Sends Important Signals for the Future of U.S.-Taiwan Ties," January 28, 2021, accessed May 20, 2023, <https://www.cfr.org/blog/biden-administration-sends-important-signals-future-us-taiwan-ties>.

<sup>21</sup> <https://www.reuters.com/world/trump-declines-answer-question-about-china-taiwan-2025-02-26/>.

<sup>22</sup> T.J. Shattuck, "The Return to Strategic Ambiguity: Assessing Trump's Taiwan Stance," Foreign Policy Research Institute, May 7, 2025, accessed July 20, 2025, <https://www.fpri.org/article/2025/05/the-return-to-strategic-ambiguity-assessing-trumps-taiwan-stance/>.

While Taiwan continues to navigate an increasingly complex security environment, Trump's approach—equal parts pressure and unpredictability—leaves both allies and adversaries unsure of what comes next.<sup>23</sup>

We assumed the United States has vital strategic interests at stake in the Taiwan Strait. Taiwan plays an important geostrategic role in the U.S. security calculus in the Western Pacific. Taiwan's location in the First Island Chain (which runs from Japan to Indonesia) anchors the U.S. network of allies that is critical to the defense of U.S. interests in the Indo-Pacific. China's control of Taiwan would extend the PRC's reach. It would allow the PRC to base underwater surveillance devices, submarines, and air defense units there, compromising U.S. military operations in the region and the ability to defend its regional allies. It would be difficult for the United States to maintain the existing balance of power in the Indo-Pacific. Taiwan is only 70 miles from Japan and 120 from the Philippines. If China annexed Taiwan, Tokyo, and Manila would question U.S. resolve in maintaining regional security. Having lost confidence in the United States, regional allies might opt to bandwagon with China or expand their own militaries, perhaps even develop nuclear weapons. Either option would further diminish U.S. influence in the region.

## The game in the Taiwan Strait

Underlying the cross-Strait tensions is a “balance-of-threat” dynamic involving China, Taiwan, and the United States. According to American political scientist Stephen M. Walt, the behavior of states is shaped by the threats they perceive from other states, rather than simply by their relative power. Walt argues that states prioritize their security in response to the threats posed by others, adjusting their policies and alliances based on perceived dangers.<sup>24</sup> According to Walt, a state's threat level is determined by four key factors: proximity, overall strength, offensive capability, and perceived intentions. Nearby states pose a greater danger than distant ones, while those with larger landmass, population, and economic power are more threatening than smaller states. A state with significant offensive capabilities—allowing it to challenge the sovereignty of others—poses a greater threat than one focused on defense. Additionally, states with aggressive or expansionist intentions are more concerning than those committed to maintaining the status quo. When any of these factors increase, other states are likely to form alliances to counter the rising threat. In the context of the Taiwan Strait, this theory suggests that China views Taiwan as a threat to its territorial integrity and sovereignty, while Taiwan sees China's military rise and aggressive rhetoric as a direct threat to its autonomy. The United States,

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<sup>23</sup> R. Hsiao, “Taiwan Policy under the Second Trump Administration,” *Global Taiwan Brief* 9, no. 22 (2024), accessed September 20, 2024, <https://globaltaiwan.org/2024/11/taiwan-policy-under-the-second-trump-administration/>.

<sup>24</sup> S.M. Walt, “Alliance Formation and Balance of World Power,” *International Security* 9, no. 4 (1985): 3–43.

in turn, perceives China as a strategic competitor, and its commitment to Taiwan's security is partly motivated by the need to counterbalance China's growing influence in the region. Each of these actors responds to the perceived threats from the others, leading to a complex and often tense security environment in the Taiwan Strait.

Our paper anticipates the behavior of the United States and China and tries to answer the question of whether the United States and China are more likely to use force or to seek accommodation in determining the future of Taiwan. We would like to clarify that our use of game theory was analogical and intentionally tailored to the specific contours of this political analysis. While we acknowledge that dynamic modeling—such as sequential or repeated games—could enhance the representation of long-term interactions, our goal was to apply a simplified model that foregrounds the asymmetry of interests and strategic stakes between the United States and China. We assumed the two players (the United States and China) confront four potential situations: maintaining the status quo (SQ), Taiwan's resistance<sup>25</sup> to unification (R), Taiwan's unification with China (U) and war (W) (Table 1). These situations can be represented as a set of possible states  $S = \{SQ, R, U, W\}$ , where  $S$  is the set of all potential outcomes that may result from the interaction of the players' strategies. Each player decides on a plan of action, denoted as a strategy  $s_1$  for the United States and  $s_2$  for China. The outcome of the game is determined by the function

$$S(s_1, s_2) : \{s_1, s_2\} \rightarrow S,$$

which maps the strategies chosen by the players to one of the possible states in  $S$ . Each player receives a payoff depending on the outcome  $S$   $S(s_1, s_2)$ , as defined in the payoff matrix

The players decide on a plan of action and make decisions based on the adopted strategy. Each player receives a payoff depending on the actions chosen by the two players. Payoffs will be represented in a payoff matrix and are numerical, representing the utility or gain. A situation in which no player's outcome can be improved by changing its own strategy is the Nash equilibrium. At this point, each player's strategy is optimal, given the strategies of the other.

Considering the aforementioned scenarios and outcomes, we have generated a hierarchy of preferences for the two players. The hierarchy of preferences refers to the ranking of outcomes according to a player's level of satisfaction or utility. This ordering of preferences helps players make strategic decisions by determining

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<sup>25</sup> We are using the term "Resistance" rather than "Independence" because we believe that it is unrealistic to include Taiwan Independence in the game. Public opinion polls consistently indicate low preference for independence as soon as possible (3.8% in recent polls). Only 22% of recent poll respondents favor maintaining the status quo but moving toward independence. A plurality of poll respondents (33.6%) support indefinitely maintaining the status quo, see Election Study Center, National Chengchi University, July 8, 2024, accessed September 20, 2024, <https://esc.nccu.edu.tw/PageDoc/Detail?fid=7801&id=6963>.

**Table 1. Scenarios and Outcomes for the US.**

Scenarios	Description	Outcomes for US	Outcomes for China
<b>Taiwan Maintain Status Quo (SQ)</b>	The U.S. continues strategic ambiguity, maintaining the One China Policy; acknowledges Beijing's view without consenting to it. China delays action, continues harassment through PLA activities	Regional tranquility. Continuation of U.S. Policy of "Strategic Ambiguity"; The status quo delays any direct confrontation between the U.S. and China over Taiwan	China fails to meet the objective of "Great Rejuvenation of the Chinese Nation" and restoration of China's "historical prestige". The status quo allows the U.S. to maintain arms sales and informal ties with Taiwan, which China sees as a violation of its sovereignty; It complicates China's efforts to isolate Taiwan diplomatically
<b>Taiwan Resistance (R)</b>	The erosion of freedoms in Hong Kong under the "One Country, Two Systems" model has fueled resistance in Taiwan, surveys and public opinion consistently show widespread opposition to unification under the PRC's terms, Taiwan continues to enhance its defensive capabilities, emphasizing asymmetric warfare to deter a potential invasion, the U.S. has increased arms sales and military coordination with Taiwan, encouraging asymmetric defense (e.g., mobile missile systems, drones, cyber capabilities) to make a Chinese invasion costly and complex; Taiwan's democratic resistance to authoritarian pressure symbolizes broader ideological competition between the U.S.-led democratic world and China's authoritarian model; Taiwan gains more international support resisting a superpower like China.  China escalates military actions, such as air and naval operations, while Taiwan resists using force.	The United States reaffirms its credibility with allies in the region. Taiwan's resistance challenges China's ambitions and strengthens U.S. strategic positioning however increases the risk of a major-power conflict. For Washington, Taiwan is not just about territory it's about the future of the Indo-Pacific order and U.S. leadership credibility. Taiwan's resistance aligns with U.S. efforts to deter Chinese aggression and uphold the rules-based international order.	Continued regional tensions without resolution, China fails to meet the objective of "Great Rejuvenation of the Chinese Nation" so as long as Taiwan remains administered separately from the mainland, the PRC's "rejuvenation" is incomplete. Challenge to CCP Legitimacy and National Unity. This also setbacks for "One Country, Two Systems" Model. Taiwan's resistance forces China to commit more military, economic, and diplomatic resources to a single issue — potentially at the expense of other strategic objectives. The stronger Taiwan's stance, the more likely it is to inspire multilateral countermeasures (e.g., sanctions, defense coordination), isolating China. Taiwan's continued defiance could fuel frustration or disillusionment among CCP hardliners.

Scenarios	Description	Outcomes for US	Outcomes for China
<b>Peaceful Unification (U)</b>	China shrinks Taiwan's diplomatic space or persuades Taiwan's government and people that unification is in their best interest. Taiwan and China agree to union with public or governmental consent. Even peaceful unification could lead to <b>governance challenges and long-term instability</b>	China gains access to the Western Pacific while the U.S. loses a regional ally and credibility. China would gain a major geostrategic advantage, gaining control of Taiwan's territory, technology, and position in key maritime routes; Taiwan is home to TSMC, a global leader in advanced chip manufacturing. Chinese control over this capability could threaten U.S. tech dominance and supply chain security.	China achieves the "Great Rejuvenation" and restores "historical prestige," fulfilling Xi Jinping's China Dream by mid-century; would be a historic and strategic triumph for Beijing; its integration would allow China easier access to the Pacific and weaken U.S. deterrence; Would enhance China's technological autonomy and potentially give it leverage over global chip supply chains
<b>War (W)</b>	The U.S. uses military force to prevent China's annexation of Taiwan. Large-scale conflict between China and the U.S., causing significant casualties and long-term instability.	High material and human costs, potential U.S./ Taiwan defeat, global depression, devastation of Taiwan. A U.S. victory confirms hegemonic status in Indo-Pacific; Potentially catastrophic war between the world's two largest militaries; Would likely involve heavy losses, cyberattacks, satellite warfare, and possible escalation into other regions.	War undermines PRC's grand strategy and could discredit the notion of Taiwan as naturally part of China, risking global conflict and undermining the "Great Revival of the Chinese Nation". Even with success, China's military would suffer severe human and material losses, straining its forces and public morale; Regime stability at risk

which outcomes they consider more favorable. Understanding players' preferences is crucial for predicting their behavior in games. We think that the relationship between China and the U.S. could be described as a highly noncooperative game - Chicken Game. The Chicken Game (or Chicken Dilemma) is a classic game theory model that illustrates the conflict between cooperation and risk-taking in competitive situations. The hierarchy of preferences refers to the ranking of outcomes according to a player's level of satisfaction or utility, denoted as  $U$ . The hierarchy of preferences in this game highlights the asymmetric power dynamics between the United States and China. For the United States, the preferences would be  $U_{USA}(R) > U_{USA}(SQ) > U_{USA}(U) > U_{USA}(W)$  or numerically  $U_{USA}(R) = 4, U_{USA}(SQ) = 3, U_{USA}(U) = 2, U_{USA}(W) = 1$

and for China,

$U_{China}(U) > U_{China}(SQ) > U_{China}(R) > U_{China}(W)$  or numerically  $U_{China}(U) = 4, U_{China}(SQ) = 3, U_{China}(R) = 2, U_{China}(W) = 1$ . These hierarchies reveals the asymmetric power between the two players.

Our model is based on the initial assumption that the interaction between the United States and China can be best understood as a non-cooperative game involving a partial conflict of interests. In such a setting, both players can simultaneously gain and lose depending on their respective decisions. While cooperation is technically possible, it is inherently unstable when structural incentives for unilateral defection exist—especially if one actor expects to benefit more than the other. This asymmetry tends to erode mutual trust and renders collaboration fragile.

We chose the Chicken Game because it effectively captures these strategic dynamics. It models scenarios in which both players are tempted to act unilaterally, even when mutual cooperation might yield more favorable outcomes. The Chicken Game (or Chicken Dilemma) is a classical model in game theory, widely used to describe high-stakes confrontations where actors seek to avoid the worst possible result—mutual escalation—but neither side wants to be seen as backing down first. This accurately reflects the U.S.–China dynamic over Taiwan, where signaling strength, credibility, and strategic resolve often take precedence over compromise.

In this model, the hierarchy of preferences is crucial. The best outcome for a player is to remain firm while the opponent yields—gaining unilateral advantage. Mutual cooperation (both players swerve) is better than escalation, but still inferior to unilateral gain. The worst outcome is when neither player yields, leading to catastrophic mutual loss.

These logics are often illustrated using the metaphor of two drivers racing toward one another in a deadly game of highway chicken. Each must decide independently whether to continue or swerve. If neither swerves, the result is a fatal head-on collision. If one swerves while the other continues, the latter “wins” by appearing fearless, while the former is labeled “chicken” and suffers reputational loss. If both swerve, both survive, but no one “wins” definitively.

In political terms, the Chicken Game helps explain situations where actors are caught between avoiding escalation and appearing weak. This makes it particularly well-suited to model strategic brinkmanship in the Taiwan Strait, where cooperation offers limited reward, and defection carries the risk of severe costs. The game has no dominant strategy, its outcomes hinge on expectations about the other player's choices and on the credibility of threats.

Ultimately, the Chicken Game offers a non-zero-sum framework—a player's win does not entail an equal loss for the other, and both actors can be worse off simultaneously. While other models, such as repeated or sequential games, might capture long-term dynamics more fully, we selected this model for its clarity, tractability, and close alignment with the asymmetrical and risk-prone structure of U.S.–China tensions over Taiwan.<sup>26</sup>

What would the game look like considering the aforementioned hierarchies of preferences? For the United States, the highest value is Taiwan Resistance, represented as  $U_{USA}(R) = 4$ . For China, the highest value is peaceful unification, represented as  $U_{China}(U) = 4$ . In this game, cooperation (C) is valued less by both players compared to defection (D), as it reflects maintaining the Status Quo without achieving their strategic objectives. The payoffs (utilities) for each combination of strategies are represented as follows:

4 Highest payoff for the player who defects (D) while the other cooperates (C).

3 Medium payoff if both players cooperate (C, C), both avoid the confrontation but lose face.

2 Low payoff for the player who cooperates (C) while the other defect (D).

1 The worst payoff where both players stay defect (D,D) - war.

The payoffs for the players can thus be represented in the payoff matrix:

$$\begin{bmatrix} (3,3) & (2,4) \\ (4,2) & (1,1) \end{bmatrix}$$

In the Chicken Game, Nash pointed to two equilibria (**Nash equilibria**): when one player cooperates (C) and the other defects (D). In each case, if one player cooperates and the other player has no incentive to change its strategy offers the highest payoff. In this particular situation, US cooperation means maintaining the Status Quo for Taiwan while defect means to help Taiwan resist unification by force. For the PRC, cooperation also means to keep the Status Quo for Taiwan, but defect for

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<sup>26</sup> This article offers an analytical model based on a Chicken Game with asymmetric stakes, providing a simplified framework to understand the complex dynamics of the Taiwan Strait. Due to space limitations, a full empirical validation of the model was not included. Future research could examine selected case studies—such as the 1995–1996 Taiwan Strait Crisis or N. Pelosi's 2022 visit—to assess whether the logic of the Chicken Game adequately captures real-world decision-making. It is also possible that alternative game-theoretic models (e.g., repeated games, sequential games, or games with incomplete information) might better explain specific situations.

the PRC means Taiwan’s unification with China. The payoffs are denoted as  $U_{USA}(i,j)$  and  $U_{China}(i,j)$ , where  $U_{USA}(i,j)$  reflects the utility for the USA given its  $i$  and China’s strategy  $j$ , and  $U_{China}(i,j)$  similarly reflects China’s payoffs. For the United States, the highest payoff ( $U_{USA}(D,C) = 4$ ) is to help Taiwan resist unification, and for China the highest payoff ( $U_{China}(C,D) = 4$ ) is Taiwan’s unification with the Chinese mainland (Table 2). The mathematical condition for Nash Equilibrium is as follows

$$U_{USA}(D,C) > U_{USA}(C,C) \text{ and } U_{China}(C,D) > U_{China}(C,C)$$

This condition demonstrates that neither player has an incentive to unilaterally change their strategy. These Nash Equilibria illustrate the asymmetric stakes and strategic priorities of the two players.

The asymmetry in stakes between the United States and can be quantified using a utility gap metric, which measures the divergence in payoffs between the players under their respective highest-priority outcomes. This metric provides a quantitative representation of the differing levels of urgency and strategic importance attributed to these outcomes by each player. The utility gap is defined as  $\Delta U = |U_{China}(C,D) - U_{USA}(D,C)|$ . In this game  $\Delta U = 0$ . While the utility gap is equal in absolute terms, the qualitative interpretation of these payoffs highlights the underlying asymmetry.

The most rational behavior to win this game would be to adopt an empathetic strategy. In this case, one player would empathize with the other player’s way of thinking, i.e., respond to a peaceful strategy with a martial one and vice versa. Some analyzing the Chicken Game believe that the sure winner in this game will be the player-state considered ready for anything (crazy-madman strategy). If players are uncertain about the other party’s willingness to withdraw (cooperation), they may

**Table 2. Payoff matrix.**

		China (PRC)	
		cooperation	defect
USA	cooperation	USA:SQ (3); PRC:SQ (3)	USA:U (2); PRC:U (4)
	defect	USA:R (4); PRC:R (2)	USA:W (1); PRC:W (1)

This payoff structure reflects the dynamics of a Chicken Game with asymmetric stakes, where China’s pursuit of peaceful unification represents a strategic imperative tied to national identity, while the United States prioritizes regional stability and ally credibility, resulting in differing levels of urgency and risk tolerance that shape their strategic decisions.



adopt a mixed strategy in which they do not state their preferences, leading them to become less predictable (policy of ambiguity).

The geostrategic realities of the Western Pacific make the defense of Taiwan vital to U.S. national security interests. Defending Taiwan will be possible by strengthening the PRC containment coalition. The United States must consider whether some U.S. allies and partners in the region will recognize the importance of Taiwan to their own interests and will therefore be willing to engage directly in its defense. Others, however, might prioritize the threats that China directly poses to them higher than defending Taiwan.<sup>27</sup> The United States chooses its commitment level to defend Taiwan against mainland China. This commitment level can be operationalized as the probability that the United States will join the war to defend Taiwan if mainland China attacks Taiwan. It is also important to consider how U.S. allies in the region will behave. The question is whether they will support the U.S.

## Conclusion

An August 2024 Brookings report by Michael E. O’Hanlon raised the pressing question of whether the United States and China could truly go to war—and if so, under what conditions and with what consequences.<sup>28</sup> O’Hanlon identifies a PRC blockade of Taiwan as the most likely scenario for escalating tensions across the Taiwan Strait. To prevent such a development, he advocates a strategy of enhanced deterrence, urging the United States to work closely with its allies to project unity and resolve. He further emphasizes that deterrence must be both military and economic with military preparation focusing on Taiwan’s defense and economic policy aimed at ensuring allied resilience against prolonged confrontation.

O’Hanlon distinguishes between “peaceful” and “war” strategies on both sides: for China, a blockade may be framed as peaceful, while direct attacks signify war; for the U.S., withdrawal is peaceful, whereas military intervention constitutes war. These distinctions align with the logic of game theory, particularly the Chicken Game, where each side must weigh the risks of escalation against the costs of concession.

In the cooperative scenario (the “rewards” path), both parties avoid escalation and preserve the status quo, perhaps through compromise. In the defect-defect scenario (the “penalties” path), mutual intransigence could result in war, even total war. Thus, U.S.–China relations over Taiwan fluctuate between tension, deterrence, and détente, depending on reciprocal actions and shifting strategic calculations.

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<sup>27</sup> D. Blumenthal *et al.*, *From Coercion to Capitulation. How China Can Take Taiwan Without a War* (American Enterprise Institute, May, 2024), 5, accessed September 20, 2024, <https://www.aei.org/research-products/report/from-coercion-to-capitulation-how-china-can-take-taiwan-without-a-war/>.

<sup>28</sup> M. O’Hanlon, “Could the United States and China really go to war? Who would win?,” Brookings, August 15, 2024, accessed October 10, 2024, [https://www.brookings.edu/articles/could-the-united-states-and-china-really-go-to-war-who-would-win/?utm\\_campaign=This%20Week%20in%20Foreign%20Policy&utm\\_medium=email&utm\\_content=320450663&utm\\_source=hs\\_email](https://www.brookings.edu/articles/could-the-united-states-and-china-really-go-to-war-who-would-win/?utm_campaign=This%20Week%20in%20Foreign%20Policy&utm_medium=email&utm_content=320450663&utm_source=hs_email).

However, the applicability of game theory—particularly in its static form—has its limits. Game theory assumes rational actors with stable preference hierarchies and often abstracts from social, historical, and ideological contexts. It does not account for domestic political pressures, emotion-driven misperceptions, or shifts in leadership that may fundamentally alter strategic choices. As such, while the model offers useful insights into the structural logic of interaction, it cannot fully capture the evolving nature of real-world decision-making.

For example, the return of Donald Trump to the U.S. presidency has reintroduced strategic ambiguity, in contrast to Biden's more explicit commitments. Trump's mixed signals—ranging from criticism of Taiwan's role in the chip industry to his reluctance to engage in foreign wars—underscore the instability of deterrence under changing leadership.<sup>29</sup> As Bonnie Glaser of the German Marshall Fund has noted, Trump's aversion to military entanglements does not necessarily preclude a forceful response to Chinese aggression, but it does introduce additional uncertainty into the strategic equation.<sup>30</sup>

Public support is another critical unknown. If U.S. and European leaders struggled to mobilize public opinion against Russia after its invasion of Ukraine, it is unclear whether they could sustain domestic backing for a military confrontation with China a far more powerful adversary with deep global economic ties.

In this complex and shifting environment, a compromise outcome that maintains the status quo appears to be the most plausible, but not inevitable, solution. The logic of the Chicken Game suggests that as long as both actors perceive existential risks in escalation, they are incentivized to cooperate out of fear, not trust. Yet, the game's outcome is not predetermined: changes in leadership, national priorities, or alliance dynamics may tilt the balance toward either confrontation or accommodation.

Thus, while the Taiwan Strait remains a textbook case of strategic brinkmanship, the interaction between Beijing and Washington is shaped not only by rational choice but by evolving geopolitical conditions. Recognizing these factors is crucial for understanding the limitations of predictive models— and for crafting policies that are responsive to the deeper volatility at the heart of U.S.–China relations.

## Ethics and consent

Ethical approval and consent were not required.

## Data availability statement

No data is associated with this article.

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<sup>29</sup> R.C. Bush, *Difficult Choices: Taiwan's Quest for Security and the Good Life* (Washington, DC: Brookings Institution Press, 2021).

<sup>30</sup> "Would Donald Trump Defend Taiwan?," *Newsweek*, accessed April 8, 2025, <https://www.newsweek.com/donald-trump-china-taiwan-us-defense-2056293>.