

## Summary of Results: Options on North Korea

Data Collection Completed: 7/19/2017 Analysis Completed: 7/24/2017

### Introduction

This analysis is derived from giCompute advanced analytics cloud based platform for estimating the decision calculus of the major groups and actors regarding the options on North Korea. giCompute incorporates the principles of game theory, statistics and decision science to calculate the positions stakeholders adopt and more importantly the impact of their actions on the overall outcome. Using this process, we estimated the overall utility values of the various factions and stakeholders involved in the options regarding North Korea. These calculations helped us estimate the degree to which stakeholders would support and influence the range of outcomes related to options on North Korea. We then forecasted a most likely pathway. The results are driven by expert aggregated data through giCompute distributed survey technology. Below are the key results.

### Most Likely Outcome: Status Quo Conditions

giCompute results indicate the most likely outcome is status quo conditions. Under this outcome the conflict remains frozen with continued sanctions and attempts at disrupting North Korea's ballistic missile program. The second most likely outcome is the Trump administration meeting with North Korean leadership as a means of de-escalating tensions in the region. The least likely outcome is a nuclear exchange.

### Determining Factors

The factors determining the outcomes pertaining to options on regarding North Korea are U.S. security concerns, regional security concerns, and the U.S. image from the perspective of the Trump administration.

### Friction

The pathway that generates the most friction between stakeholders is a potential Trump administration meeting with North Korean leadership. The most divergent stakeholders driving this friction are China and Kim Jong Un. Kim Jong Un prefers regional security concerns not be met so that he can continue to use it as leverage for his own political survival. In contrast China prefers most regional security concerns pertaining to North Korea be met as part of its desire for stability on its border. China prefers some of the U.S. concerns be addressed to avoid confrontation. In contrast Kim Jong Un seeks to weaken the American image while raising its security concerns through actions such continued ballistic missile testing.

### Reliability Testing: Monte Carlo Simulations

Monte Carlo simulations were conducted across 40 alternative futures with a 90% variance probability and a change of  $\pm 10\%$  in stakeholder influence. In each simulated alternative future, we randomized 1 factor and 1 factor option while keeping the remaining factors constant. Monte Carlo simulations indicate a 60% chance Kim Jong Un is on a path toward non-nuclear conflict. The simulations also show a 70% chance the United States will either attempt to de-escalate the situation through either secret diplomacy or public diplomacy between the Trump administration and the North Koreans. Because Kim Jong Un is a veto player regarding the options on North Korea, the overall Monte Carlo results suggests the overall options on North Korea will result into status quo conditions whereby the conflict remains frozen, sanctions continue, and attempts at disrupting North Korea's ballistic missile program continue.

## Contents

About giCompute: Multi-Stakeholder Issues Driven by Human Factors .....	3
Estimated Payoff Results for Options on North Korea .....	3
Cost of Friction .....	4
Degree of Stakeholder Convergence.....	5
Reliability Testing: Monte Carlo Simulations .....	5

## About giCompute: Multi-Stakeholder Issues Driven by Human Factors

In our increasingly complex world, decision-makers in governments, corporations, law firms, educational institutions, healthcare organizations, and the news industry increasingly turn to data-driven algorithms to solve problems. Rules based systems, also known as formal modeling, allow us to anticipate individual, group and institutional behavior so long as the theory or formal rules describing the behavior are valid along with the relevant assumptions. Outcomes are driven by multiple factors that vary according to stakeholders’ priorities and levels of influence. Despite advances in data collection and computing technologies such as artificial intelligence (AI), most of the world’s information remains uncaptured when it comes to the daily decisions by people and organizations. We can overcome these barriers by capturing context specific data through the aggregation of stakeholder preferences and testing of factors driving any issue.

## Estimated Payoff Results for Options on North Korea

Below is a table of the estimated utility payoffs score (net benefits) for each of the major groups and stakeholders regarding options on North Korea. The scenario closest to the current reality (status quo) is indexed at a score of zero. Any payoff score greater than zero is a better option than the status quo, while any payoff score less than zero is worse than the status quo. giCompute generates these group and stakeholder payoffs (i.e. utility value or net benefit) by first capturing stakeholder preferences across the factors defined in the issue setup. giCompute then sifts through the full combinations of possible payoff scores to identify the true payoff that corresponds to each scenario outcome.

**Veto Influence Rankings:** Below is the likely outcome for veto players is calculated by using the standard definition in game theory which assumes that if a veto player takes a position other than the weighted aggregate, the default outcome is status quo, i.e. no change.

### Veto Influence Rankings

Most to Least likely outcome				
1. Status Quo – Frozen Conflict / Sanctions	2. Trump meet with Kim Jong Un / Circumvent China	3. Secret Diplomacy / Relief	4. Non Nuc Conflict	5. Nuclear Exchange

### Results By Stakeholder

	Most to Least likely outcome				
	1. Trump meet with Kim Jong Un / Circumvent China	2. Secret Diplomacy / Relief	3. Status Quo – Frozen Conflict / Sanctions	4. Non Nuc Conflict	5. Nuclear Exchange
Kim Jong Un	-17.0	-1.0	0.0	16.0	14.0
Perty Apperatus	-16.0	-3.0	0.0	13.0	4.0
Trump	16.0	3.0	0.0	-13.0	-16.0
Bannon Wing	14.0	3.0	0.0	-14.0	-17.0
DoD	13.0	9.0	0.0	-4.0	-13.0
NSC	13.0	9.0	0.0	-4.0	-13.0
China	13.0	3.0	0.0	-13.0	-19.0
South Korea	14.0	3.0	0.0	-14.0	-17.0
Japan	16.0	3.0	0.0	-13.0	-16.0

**Results:** giCompute results indicate the most likely outcome is status quo conditions. Under this outcome the conflict remains frozen with continued sanctions and attempts at disrupting North Korea’s ballistic missile program. The second most likely outcome is the Trump administration meeting with North Korean leadership as a means of de-escalating tensions in the region. The least likely outcome is a nuclear exchange.

## Determining Factors

Below are the defined outcomes and the factors necessary for each outcome pathway to occur.

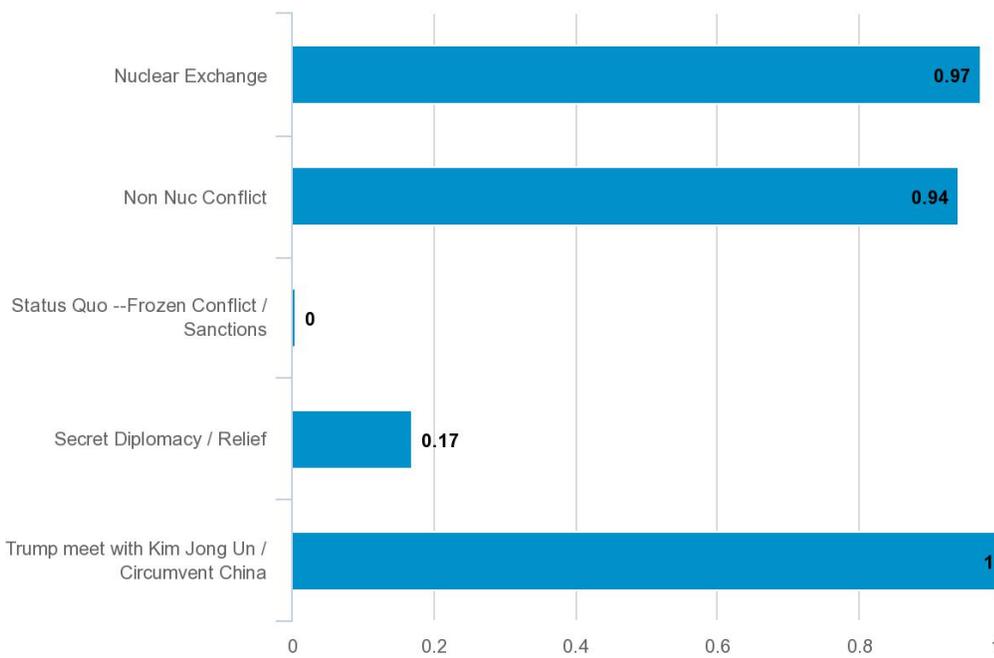
Outcome Pathways 
■ POSSIBLE OUTCOMES    ■ DETERMINING FACTORS

	Nuclear Exchange	Non Nuc Conflict	Status Quo -- Frozen Conflict / Sanctions	Secret Diplomacy / Relief	Trump meet with Kim Jong Un / Circumvent China
US Security Concerns	Conflict Fallout	Worse than SQ	Worse than SQ	Better than SQ	Better than SQ
Regional Security Concerns	Not Met	Not Met	SQ	SQ	Most Met
US Image from Trump View	Weakens image	Weakens image	Status Quo	Status Quo	Improves Image

**Results:** The factors determining the outcomes pertaining to the issue of options on North are U.S. security concerns, regional security concerns, and the US image from the perspective of the Trump administration.

## Cost of Friction

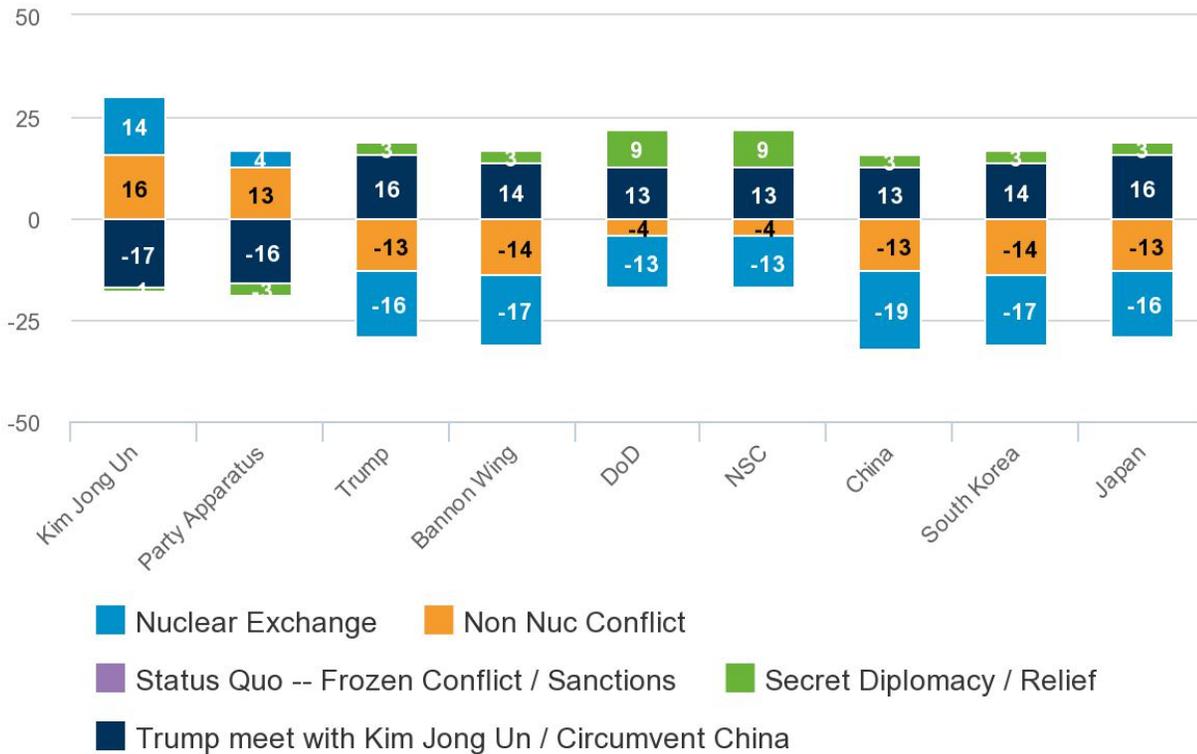
The cost of friction indicates the degree of disagreement between the stakeholders and groups across each scenario.



**Results:** The pathway generating the most friction between stakeholders is a potential Trump administration meeting with North Korean leadership.

## Degree of Stakeholder Convergence

**Degree of Convergence:** The chart below shows the range of utility payoffs for the stakeholders across the various defined scenarios. Misalignment of the bars and colors within the bars indicates disagreement between stakeholders. Alignment indicates agreement.



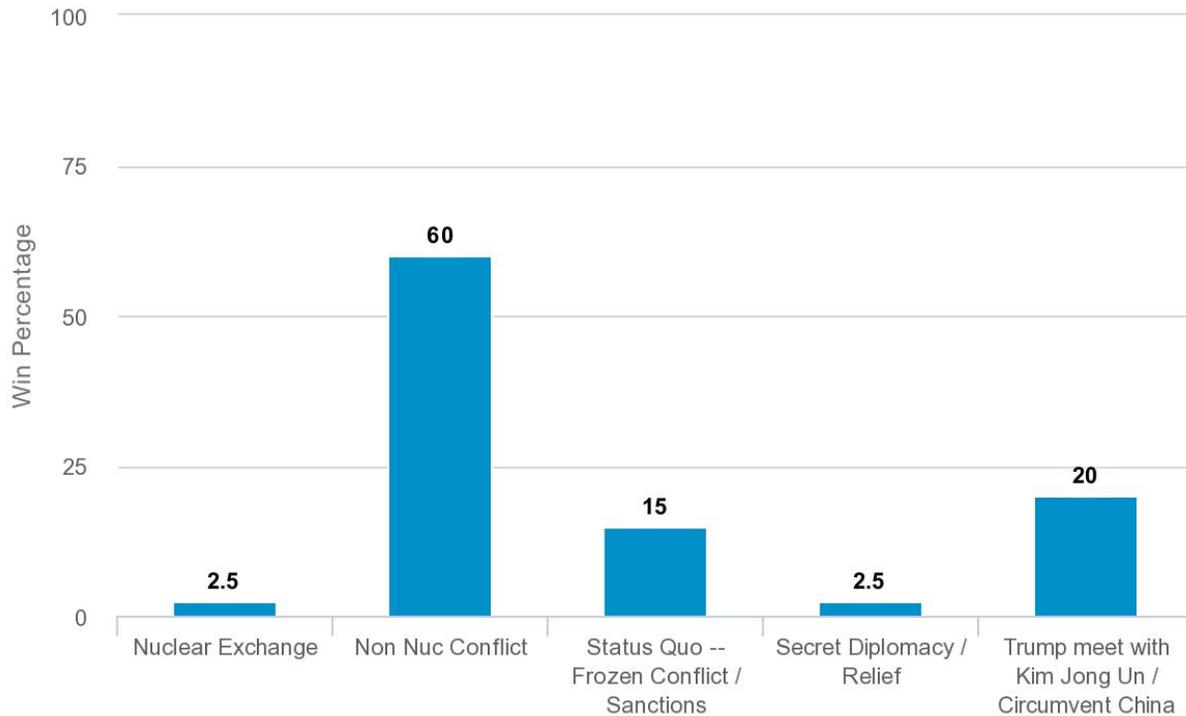
**Results:** The most divergent stakeholders driving this friction are China and Kim Jong Un. Kim Jong Un prefers regional security concerns not be met so that he can continue to use it as leverage for his own political survival. In contrast China prefers most regional security concerns pertaining to North Korea be met as part of its desire for stability on its border. China prefers some of the U.S. concerns be addressed to avoid confrontation. In contrast Kim Jong Un seeks to weaken the American image while raising its security concerns through actions such as continued ballistic missile testing.

## Reliability Testing: Monte Carlo Simulations

We provide two methods to assess the reliability of the model results. Choosing Randomize by Level under Sensitivity Type will activate a Monte Carlo computation while choosing Closest Pair by Level activates a sensitivity analysis computation. The user can select various parameter options for Monte Carlo and sensitivity analysis computations. Number of futures determines how many simulations are run. Influence Percent Variance selects how much the influence of a stakeholder can vary under randomization. Factor level determines how many factors are randomized. A selection of 0 holds it constant. Factor option level selects the number of factor options that are randomized. Shock probability selects the probability that randomization occurs.

Monte Carlo simulations were conducted across 40 alternative futures with a 90% variance probability and a change of ±10% in stakeholder influence. In each simulated alternative future, we randomized 1 factor and 1 factor options while keeping the remaining factors constant.

### Kim Jong Un Sensitivity



	Nuclear Exchange	Non Nuc Conflict	Status Quo -- Frozen Conflict / Sanctions	Secret Diplomacy / Relief	Trump meet with Kim Jong Un / Circumvent China
Overall	0%	32.5%	7.5%	27.5%	32.5%
Kim Jong Un	2.5%	60%	15%	2.5%	20%
Party Apparatus	7.5%	55%	12.5%	7.5%	17.5%
Trump	5%	17.5%	7.5%	7.5%	62.5%
DoD	7.5%	2.5%	15%	17.5%	57.5%
NSC	20%	12.5%	12.5%	17.5%	37.5%
Bannon Wing	5%	7.5%	7.5%	17.5%	62.5%
China	2.5%	17.5%	5%	25%	50%
South Korea	2.5%	12.5%	5%	20%	60%
Japan	5%	7.5%	2.5%	20%	65%

**Results:** Monte Carlo simulations were conducted across 40 alternative futures with a 90% variance probability and a change of ±10% in stakeholder influence. In each simulated alternative future, we randomized 1 factor and 1 factor option while keeping the remaining factors constant. Monte Carlo simulations indicate a 60% chance Kim Jong Un is on a path toward non-nuclear conflict. The simulations also show a 70% chance the United States will either attempt to de-escalate the situation through either secret diplomacy or public diplomacy between the Trump administration and the North Koreans. Because these positions are divergent and Kim Jong Un is a veto player, the most likely outcome remains the status quo where sanctions on North Korea continue and the US attempts to disrupt the ballistic missile program.