Summary of Results: Crisis in Catalonia

***Data Collection Completed*: 11 Nov 2017; *Analysis Completed*: 11 Nov 2017**

Background

Catalonia is a wealthy semi-autonomous region in north-eastern Spain. On October 27th the Catalan parliament overwhelmingly voted for independence. A large proportion of Catalans complain they pay a disproportionate share of taxes compared to people located in other Spanish regions. Catalonia comprises 16% of Spain's population, but accounts for 25.6% of Spain's exports, 19% of the GDP, and 20.7% of foreign investment. Catalans also complain that Spain's changes to their autonomous status in 2010 undermined their distinctive Catalan identity. In response to the independence vote, the Spanish government removed Catalan leaders, dissolved parliament, and called for regional elections set for 21st of December 2017. As an act of defiance, Catalan President Carles Puigdemonet encouraged civil servants to ignore the central government's orders. The crisis threatens to disrupt Spain's economy and political structure. European countries are concerned that Catalonia's defiance can encourage other secessionist movement in Europe.

Most Likely Outcome: Limited to No Change on Autonomy and Taxes

Given the factors driving the conflict and the positions of the stakeholders involved, the most likely outcome for the crisis is for Catalonia to gain little to no more autonomy and for no significant taxation changes to occur. This will result in Catalonia returning to conditions similar to the pre-crisis conditions, with Catalonia retaining some autonomy over its governance, while remaining in the centralized tax system.

Determining Factors

Federal taxation and the autonomy of Catalonian governance are the two main factors driving this crisis. These factors are derived from giStrat analysis of the crisis and public statements made from stakeholders involved in the conflict.

Friction

Friction is the degree of disagreement among stakeholders involved in the scenario. An outcome with more friction indicates there is more disagreement between stakeholders. The outcome that generates the most friction among stakeholders is Catalonia gaining independence.

Reliability Testing

Monte Carlo simulations indicate a 70% chance the Spanish government will impose pre-crisis conditions without compromise on taxation and governance policies. Monte Carlo simulations are a statistical method of determining the likelihood of the outcomes by randomizing some of the inputs to simulate uncertainty.

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Estimated Payoff Results for Outcomes of the Crisis in Catalonia

The outcomes for crisis in Catalonia range from Catalonia gaining independence to Spain imposing political and military control on Catalonia, with the status quo being Spanish imposed control until new elections are held. Below is a table of the estimated utility payoffs score (net benefits) for each of the major stakeholders involved in the crisis in Catalonia. The table depicts the payoffs for each outcome per stakeholder. 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 (the software used to run this model) generates these stakeholder payoffs (i.e. utility value or net benefit) by first capturing stakeholder preferences across the determining factors driving the crisis. giCompute then sifts through the range of possible factor combinations to identify the payoff that corresponds to each scenario outcome for each stakeholder. Based on an aggregation of the different payoff scores, the software then ranks the outcomes from most likely (left) to least likely (right).

Overall Results

RANKED OUTCOMES | OUTCOME/GROUP SCORE

Most to Least likely outcome

	1. Pre-Crisis Status Quo – Some autonomy on governance / centralized taxes	2. Some Autonomy on Governance and Taxes	3. Politically Imposed Control Until Elections	4. High Autonomy on Governance and Taxes	5. Political and Military Imposed Control	6. Recognize Independence
Influence Driven Outcome	4.52	0.16	0.0	-4.07	-6.18	-9.52
Egalitarian Outcome	4.53	0.86	0.0	-3.2	-6.05	-9.09
Cost of Friction	386.39	1150.67	0.0	1950.36	527.27	2434.98
Group: People Alliance Party	2.79	-6.73	0.0	-13.76	-7.64	-19.61
Group: Other Parties	-0.71	-2.47	0.0	-3.18	-6.35	-9.82
Group: PSOE	6.5	1.42	0.0	-5.92	-4.0	-12.75
Group: Catalonians	6.09	9.09	0.0	11.87	-4.0	11.17
Group: Internationals	8.0	3.0	0.0	-5.0	-8.25	-14.44

Veto Influence Rankings: The likely outcome for veto players is shown below. 'Veto players' is a standard definition in game theory. If a veto player takes a position other than the aggregate, the default outcome is status quo, i.e. no change.

Veto Influence Rankings

Most to Least likely outcome

1. Pre-Crisis Status Quo – Some autonomy on governance / centralized taxes	2. Some Autonomy on Governance and Taxes	3. Politically Imposed Control Until Elections	4. High Autonomy on Governance and Taxes	5. Political and Military Imposed Control	6. Recognize Independence

Results: giCompute results indicate the most likely outcome is a return to pre-crisis status quo conditions. Catalonia will retain some autonomy over its governance but will remain in the centralized tax system. The second most likely outcome is a slight increase in the autonomy of Catalonia and limited taxation reform. The least likely outcome is Catalonia gaining independence. This sequencing of outcomes occurs regardless of any veto powers.

Determining Factors

Below are the defined outcomes and the factors necessary for each outcome pathway to occur. These factors are derived from giStrat analysis of the crisis and public statements made from stakeholders involved in the conflict. The factors are broken down into a range of the different ways they can be met, called “factor options.” These factor options are then used to define what must occur for each outcome to be realized. For example, for Catalonia to be recognized as independent, the parties would have to agree that Catalonia can secede and develop an independent tax structure.

Outcome Pathways

POSSIBLE OUTCOMES DETERMINING FACTORS

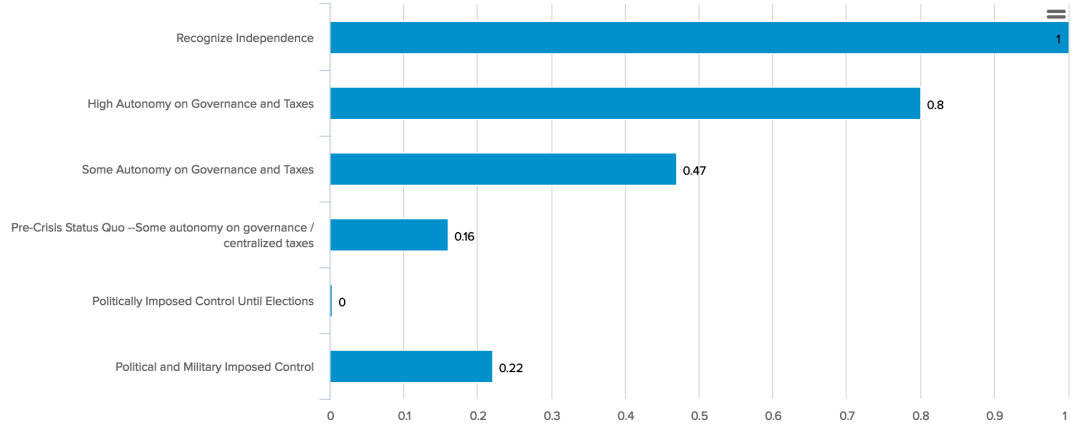
	Recognize Independence	High Autonomy on Governance and Taxes	Some Autonomy on Governance and Taxes	Pre-Crisis Status Quo -- Some autonomy on governance / centralized taxes	Politically Imposed Control Until Elections	Political and Military Imposed Control
Governance	Secede	High Autonomy	Some Autonomy	Pre Crisis Status Quo	Political Imposition	Military Imposition
Taxation	Independent Tax Structure	Reform Tax Rate and Allocation	Reform Tax Rate and Allocation	Pre Crisis SQ	Pre Crisis SQ	Pre Crisis SQ

Results: The factors determining the outcomes pertaining to the issue of Catalonia are the governance of the region (ranging from Catalonia seceding to Spain imposing military control), and the taxation policy of the region (ranging from an independent tax structure to pre-crisis tax conditions).

Cost of Friction

The cost of friction indicates the degree of disagreement between the stakeholders for a given outcome. An outcome with more friction indicates more disagreement between the involved stakeholders.

Cost of Friction For Outcomes

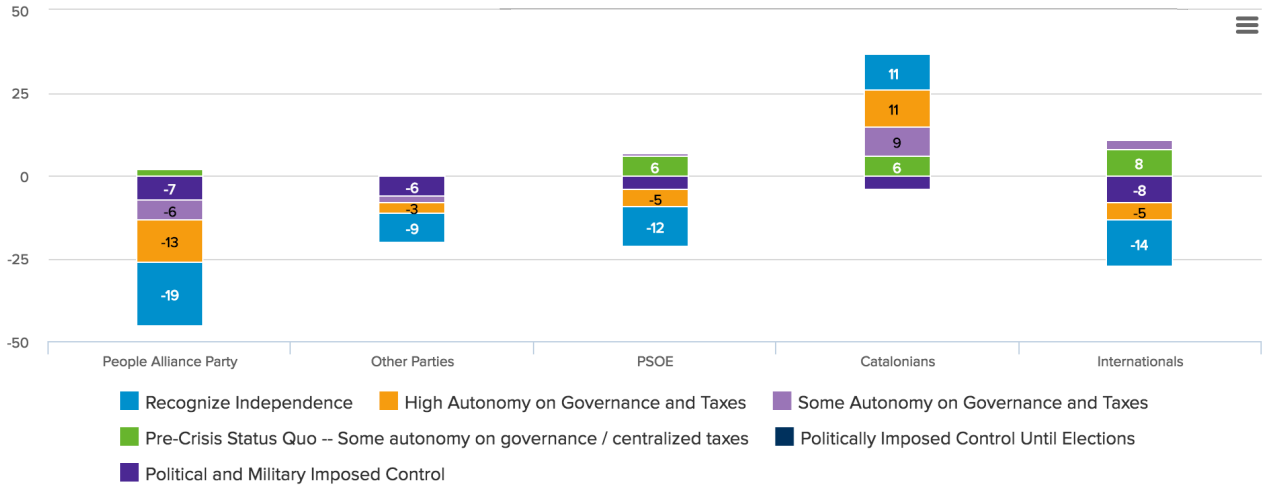


Results: The pathway generating the most friction between stakeholders is Catalonia gaining independence. This is due to the pro-government stakeholders, namely the People's Alliance Party who heavily disagree with the independence efforts. It would be incredibly difficult to convince those stakeholders to allow Catalonia to secede.

Degree of Stakeholder Convergence

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

Degree of Convergence For Stakeholder Groups

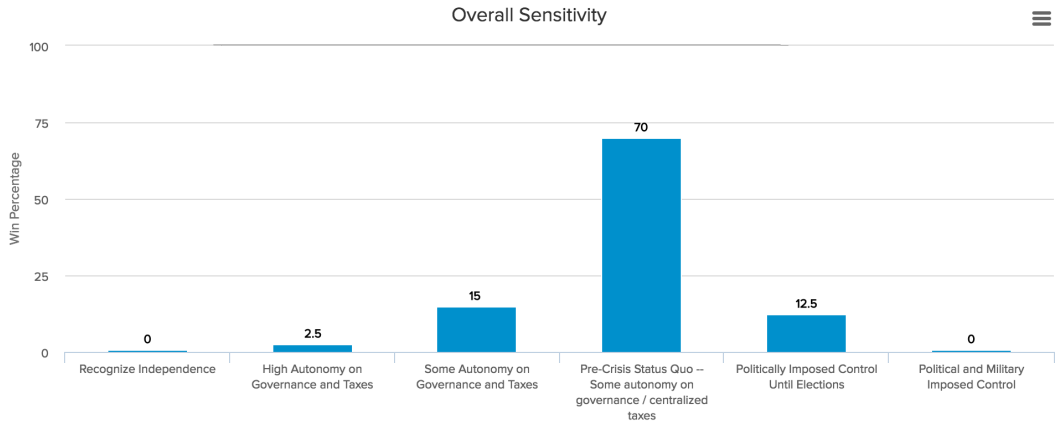


Results: The pathway generating the most friction between stakeholders is Catalonia gaining independence. The most divergent stakeholders driving this friction are the People's Alliance Party and leftist Catalan groups PDCAT Party. The People's Alliance Party, being most influenced by PM Rajoy, adamantly demand Catalonia return to its pre-

crisis governing status with moderate autonomy and the pre-crisis taxation levels, ensuring the significant revenue from taxing the region is not lost. In contrast most Catalan groups prefer Catalonia either secede or gain more autonomy, and that Catalonia implement an independent taxation policy which would lower taxes on the region.

Reliability Testing: Monte Carlo Simulations

Monte Carlo simulations are a statistical method of determining the likelihood of the outcomes by randomizing some of the inputs to simulate uncertainty. Monte Carlo simulations were conducted across 40 alternative futures with an 85% variance probability.***



	Recognize Independence	High Autonomy on Governance and Taxes	Some Autonomy on Governance and Taxes	Pre-Crisis Status Quo – Some autonomy on governance / centralized taxes	Politically Imposed Control Until Elections	Political and Military Imposed Control
Overall	0%	2.5%	15%	70%	12.5%	0%
PM Rajoy	10%	5%	12.5%	57.5%	10%	5%
Deputy PM Santamaria	12.5%	2.5%	5%	70%	10%	0%
SG Cospedel	10%	5%	12.5%	57.5%	12.5%	2.5%
Hardliner Ranks	15%	5%	17.5%	12.5%	50%	0%
Pablo Iglesias (Podemos)	5%	67.5%	7.5%	2.5%	7.5%	10%
Albert Rivera (Ciudanos)	5%	10%	5%	17.5%	60%	2.5%
Lideres territoriales	2.5%	7.5%	2.5%	60%	17.5%	10%
SG Sanchez	12.5%	7.5%	10%	52.5%	10%	7.5%
Socialist Rank	12.5%	15%	50%	7.5%	2.5%	12.5%
Puigdemont	62.5%	12.5%	0%	7.5%	17.5%	0%
PDCAT	12.5%	70%	7.5%	7.5%	0%	2.5%
Other secessionist parties (CUP and ERC)	65%	5%	7.5%	5%	7.5%	10%
Pro union parties	12.5%	2.5%	10%	67.5%	7.5%	0%
Civil society organizations (indep)	82.5%	0%	5%	5%	0%	7.5%
Civil society organizations (union)	7.5%	5%	7.5%	67.5%	10%	2.5%
US	7.5%	2.5%	17.5%	62.5%	7.5%	2.5%
EU	10%	7.5%	7.5%	47.5%	15%	12.5%
UN	17.5%	5%	20%	47.5%	10%	0%

Results: The simulations indicate that both extremes, Catalan independence and military-imposed control are highly unlikely. The winning outcome remains pre-crisis conditions, whereby Catalonian autonomy and taxation policies do not change. Under this direction, Catalonia retains some autonomy in its governance while maintaining the unchanged

taxation rates and no control over the allocation of revenues going back to the Spanish central government.

***The randomization factors for the Monte Carlo simulations are as follows: ±15% in stakeholder influence; randomizing the preference of 1 factor and 2 factor options while keeping the remaining factors constant.

About *giCompute*: Clarity in a Complex World

Our decision analytics platform—*giCompute*—can forecast any issue with an 80-90% accuracy rate. The cloud-based platform merges computational decision algorithms with inputs from subject matter analysts to anticipate results in complex negotiations and dispute resolution, including legislative and regulatory affairs. The applications for our software include forecasting of multi-factor, multi-stakeholder issues; political and regulatory risk; and conflict negotiations. The platform is designed for professional analysts, students, and everyday practitioners seeking to translate qualitative data and expert insight into reliable quantitative analytics. *giCompute* quickly calculates results, predicts outcomes, tests reliability of results, and then games out alternative pathways.