Game Theory: Sequential move games in international diplomacy

ZZBU5611 – Assessment 2b Case study

Introduction

International politics and diplomacy feature often in news and current affairs. In many cases, they represent major historical turning points and flash points such as the US/China diplomatic conflict over Taiwan.

This report examines the diplomatic strategies employed by politicians such as US Congresswoman Nancy Pelosi in her recent visit to Taiwan, through the lens of game theory. It will illustrate the sequential games of incomplete information and the payoffs affecting the decision to visit (or not) a contested territory.

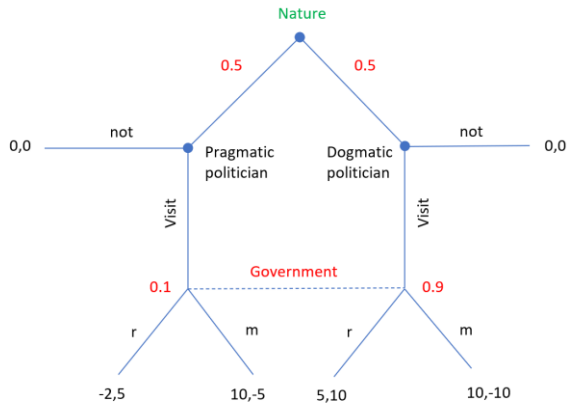
Methodology

Consider the scenario in which there exists a sequential game with two players – the diplomat as the informed player and the foreign government as the uninformed player. A sequential game is one in which: one player makes a move before another player, and the costs and benefits (payoffs) are realised once all parties have made their move.

In this game, the diplomat can be one of two "***types***": a pragmatic diplomate or a dogmatic diplomat. The significance of type is that each type results in a different payoff for both players. An informed player is such because they know their own type, however, this information is not known to the uninformed player – this is known as an asymmetry of information, and it puts the informed party at an advantage over the uninformed party because the uninformed party must rely on their best guess (or ***beliefs***) about the informed player's type to maximise their expected payoff.

Each player also has specific moves or strategies that can be played. The diplomat may choose to visit or not visit a contested territory. The foreign government may choose to retaliate or maintain status quo. Which moves players choose will dictate the payoffs for each player.

We can visually represent this scenario in the figure below with the payoffs for each strategy shown numerically as: [payoff for the informed party], [payoff for the uninformed party]



Nature is a non-strategic player. It does not collect payoffs but determines the likelihood of the type of diplomat (pragmatic or dogmatic). In this case, both types are considered equally likely. The payoffs above show that if the diplomat does not visit the contested territory, the game ends with both the diplomat and the foreign government getting a payoff of 0 – the situation where nothing happens.

Alternatively, the diplomat may choose to visit. In this case, the dotted line represents the foreign government's belief that the diplomat is pragmatic type or dogmatic type. In our scenario, the

government holds the belief that 1 in 10 diplomats who visit are pragmatic, and 9 in 10 are dogmatic. This belief makes sense because a pragmatic diplomat is less likely to make a bold decision (visit) that would increase the tensions between two societies. On the other hand, a dogmatic diplomat may put their principles and ideals ahead of what may be most practical for the current situation.

If the government believes that the diplomat is dogmatic type, the government will receive a payoff of 10 for playing a retaliatory strategy. Alternatively, if the government maintains the status quo, it will receive a payoff of -10. This is because the perceived inaction of the government towards a dogmatic diplomat would negatively impact the credibility of future threats while acting in retaliation would instead increase future threat credibility. If the government believes that the diplomat is pragmatic type, the government will receive a payoff of 5 for playing a retaliatory strategy and -5 for maintaining status quo.

The different payoffs between a dogmatic and a pragmatic diplomat is attributed to the level of perceived antagonism one has towards the government. The government would have a higher incentive to retaliate against a highly antagonistic (dogmatic) diplomat who contests their sovereignty versus a more pragmatic diplomat.

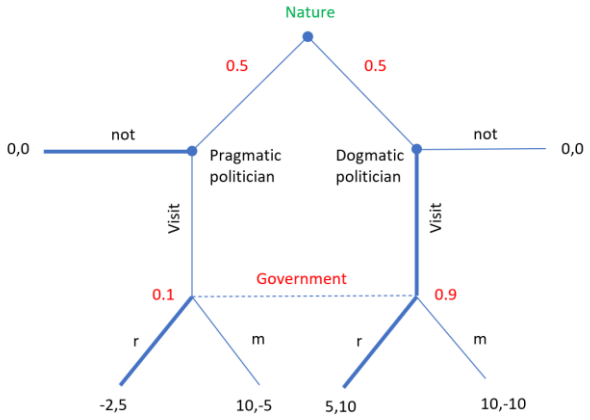
Findings and discussion

To consider the likely actions of the government, we first consider the expected payoff of retaliatory tactics: $0.1(5) + 0.9(10) = \mathbf{9.5}$. The expected payoff of maintaining the status quo is $0.1(-5) + 0.9(-10) = \mathbf{-9.5}$. This shows that retaliation is the best response for the government if the diplomat is either pragmatic or dogmatic. Inaction in both cases would negatively affect the credibility of all future threats from the government. But what about the diplomat?

If the pragmatic diplomat visits the contested territory, they will receive a payoff of -2 in the event of retaliation, or 10 if the government maintains status quo. In retaliation, the pragmatic diplomat would be perceived to have inadvertently escalated conflict to the detriment of both parties, while in status quo, the diplomat would be perceived to have managed the situation so skilfully that the government did not retaliate. Knowing that the government would always play a retaliatory strategy means the expected payoff from a visit for a pragmatic diplomat would be -2. Hence the pragmatic diplomat should choose the payoff of not visiting which is 0.

However, if a dogmatic diplomat visits, they would receive a payoff of 5 in the event of retaliation, or 10 if the government maintains status quo. If we consider visiting to be self-deterministic, *the self-deterministic act would itself constitute a payoff* for a dogmatic diplomat. In addition, the reputational and political effects may be a positive outcome despite the anticipated government retaliation. If the government maintains status quo, the diplomat would be perceived to be highly self-deterministic *and* skilled to have avoided retaliation. Knowing that the government would be retaliatory, the dogmatic diplomat should choose the to visit the disputed territories and receive a payoff of 5 versus not visiting and receiving a payoff of 0.

The final game tree is illustrated below, and an equilibrium can be seen where the dogmatic diplomat visits, receiving a payoff of 5, and the pragmatic diplomat stays receiving a payoff of 0. The government would play the strategy of retaliation receiving a payoff of 10 for the dogmatic diplomat and 0 for the pragmatic diplomat who never visited. This is known as **Perfect Bayesian Equilibria** where every player's strategies are a best response given their beliefs about what other players did, and beliefs make sense given the strategies. It is more costly for the pragmatic diplomat than the dogmatic diplomat to make such a diplomatic visit. The chosen strategy is thus **a signal to the traits** of the diplomat who made the choice.



Conclusion

We have shown that in using game theory, one can determine the **Perfect Bayesian Equilibria** for a 2-player sequential game of incomplete information between a diplomat and a foreign government. When applied to real scenarios like the Chinese-Taiwan conflict and the visit of Nancy Pelosi, we can see that Nancy's visit signals her traits as a dogmatic politician.

In retaliation, China has halted US cooperation on a range of issues notably climate change. In the early days post her visit, there appears to be significant political backlash to Nancy's visit from her opponents, characterising the visit as "unwise". However, there was also significant support from segments of American politics and voters. Despite the media "noise", it seems that Nancy Pelosi may have already achieved the payoff she was seeking and revealed her dogmatic traits when she wrote in The Washington Post "By traveling to Taiwan, we honor our commitment to democracy: reaffirming that the freedoms of Taiwan — and all democracies — must be respected."