

Applying game theory to the government's Spending Review. Is it better to get in first or hold out for a better deal?

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Political negotiation is frequently a game of brinkmanship, played out in the national media with private briefings and leaking of documents, and occasionally public arguments. With the latest Spending Review running its protracted course, we have again seen the same public posturing and hurried backroom deals that epitomise the art of negotiation in politics. It was a regular feature of Gordon Brown's Budget preparations not to tell Number 10 anything about it until it was too late for them to change anything, and David Blunkett wrote in his autobiography about how he threatened violence against then Chief Secretary to the Treasury, Paul Boateng, over money in 2001.

One feature of the Spending Review is that it gives an opportunity for us to test the efficacy of the various negotiating strategies employed by Ministers. The mathematical theory of this kind is called negotiation theory, and is broadly similar to the field of game theory. We can examine some strategies, compare them to what happens in real life, and see whether it's better to negotiate early or hold out.

For simplicity's sake, we will assume that there are only two departments: the Department of Many Things (DMT) and the Department of Everything Else (DEE). The Chancellor has to apply a 10% cut, and if there is no agreement before the deadline then he will apply the same 10% cut to both departments. In this case, it's entirely rational for both departments to move before the deadline, and negotiate any cut less than 10% before the deadline.

Of course, this model is too simplistic, as some departments are 'more important' than others. If we replace the DEE above by the Department of Ephemeral Nonsense (DEN) – like the Department of Social Affairs and Citizenship from *The Thick of It*, or the Department of Administrative Affairs in *Yes, Minister* – then the Minister for Nonsense would be in a much worse position; the default position for the Chancellor might be guessed to be a 30% or more cut for the DEN to soften the blow for the DMT, leaving it with an 8% cut, for example. In this position, the Minister for Nonsense should still want to negotiate early in the hopes of getting a better deal, but now might be offering something like a 15% cut because the deadline deal could be much worse.

Another of our simplifying assumptions – that the Chancellor can unilaterally impose cuts on departments if the deadline passes – is holding us back now. If the Minister for Nonsense and the Minister for Many Things gang up then they can refuse to accept any cuts at all. Of course, this has a decent chance of bringing down the government, which would be A Bad Thing. The more adventurous, or simply recalcitrant, Minister can simply refuse to negotiate initially, and is likely to get a better deal simply to make them go away, particularly if the department is small and so has a small effect on the general picture.

Both of these strategies have been employed in this negotiation. We are seeing some Ministers taking the ganging-up approach, with the movement being dubbed the 'National Union of Ministers'. We also have the example of the Department of Culture, Media and Sport, with the Secretary of State Maria Miller being reported by the *Financial Times* to refuse to accept any cuts initially. This was followed by, according to a tweet from the Department's shadow Dan Jarvis, 'well placed sources in Whitehall' – presumably a sabre-rattling Treasury official – discussing abolishing the Department entirely, and then two weeks later the Culture Secretary agreed a 7% cut, slightly better than average.

One final thing to note though is that this spending review only covers one year: this is not merely a single negotiation in isolation but just one of a series of negotiations, in which the people involved have long memories. The Minister of the DEN above might have his sights set on higher office, and political capital can be gained by opting for a larger than necessary cut: this is the standard principal-agent problem of motivating an aspirant politician eager to climb the greasy pole to act in the best interests of the department he is temporarily in charge of.

The game theory of a multiple-person, multiple-round negotiation is incredibly complex, with most successful strategies appearing to involve the people forming short-term and fluid coalitions as and when it becomes convenient, together with more long-term and structural coalitions, with a strong but not inviolable loyalty. This is roughly how politicians appear to operate, and so from a mathematical point of view they largely behave rationally in their interactions. Although we might not think it at times, they might well be doing their best.

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