Strategic Abstention from the Office Holder

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PROOF OF CONCEPT

Abstract

Most models of political accountability assume that the incumbent will re-run for office. However, in many scenarios we see leaders take an *early resignation*, only to return to a position of power a few years later. I develop and analyse a three period model where two politicians of unknown ability can either make an effort decision or relinquish control to their opponent. A representative voter then witnesses the effort level made by the person in office, and makes a re-election decision by updating their priors of politician ability. The model demonstrates that an office holder may wish to avoid dealing with a costly state by forcing their challenger into a decision making position, and save themselves present costs in exchange for forgoing the decision making advantage. This model can help explain why Mayors, CEOs and other leaders sometimes return to their original position after a period of hiatus.

1 Introduction

Many political agency models assume that once an incumbent is voted out of office, they are no longer a strategic player. However, every so often we see corporate, political or sporting leaders resign office, only to return at a later stage. Whether this is a strategic action or simply a structural quirk is not immediately obvious.

Examples of this in the corporate world include Michael Dell, former CEO of Dell, and Howard Schultz of Starbucks (Bureau). Michael Dell stepped down in 2004 to assume his new role as board chairman (Hansell, 2004). The transition was claimed to have occurred after a number of other tech companies also saw their CEOs step aside. After his successor then resigned, he reclaimed the CEO title in 2007 (Mingis, 2007). Howard Schultz had a similar story by reclaiming his CEO position after spending eight years as the Chief Global Strategist of Starbucks.

A prominent example of a return in sports would be the former NFL head coach, Bill Parcells. After an extremely successful stint with the New York Giants, he took two years out from the NFL only to return to the NFL as head coach of the Patriots (Haydock, 2022).

Explanations for these movements are hard to understand. Some are clearly strategic, and others appear more opportunistic. One possible motivation is that the leader receives an informational advantage that other players do not. As a result, they are able to predict future difficulties and avoid costly office-holding.

Alternatively, if the value of holding office is large but the incumbent expects to face a strong challenger, it may be strategically optimal for the office holder to abstain from office, only to allow the challenger to reveal their type and effectively 'fall on their sword'. In modern rhetoric this is sometimes referred to as the 'glass cliff' effect, whereby agents, (most commonly women), are placed into positions of power during times of turbulence. Ryan et al. (2016) analyse the evidence supporting glass cliff events, and claim that there is evidence of events occurring on UK Boards of Directors and in some political scenarios. A possible motivation is that once the challenger has demonstrated their inadequacy, the original incumbent, or more likely a close affiliate, can then return to office with less competition.

Examples of resignation and return are harder to come by when looking at individual political office holders. Reasons for this are both structural and perferential. Some would argue that the scale and bureaucratic nature of politics makes it challenging to make any impactful progress in a single term. As a result, momentum effects may make a consecutive term office holding position preferential to a disjoint one.

However, rather than focusing on individual office holders, instead consider a parliamentary system of government. In the UK, what is often considered more important than the identity of the Prime Minister is the party of the Prime Minister. Take for example the term of PM Lizz Truss. She took the PM position after the resignation of Boris Johnson, only to resign 49 days later as the shortest serving Prime Minister in Britain's history. Her successor was Rishi Sunak, formerly Boris Johnson's Chancellor of the Exchequer and similarly Oxford educated, private school politician. The party seemed to take a large divergence when transitioning from Johnson to Truss. But after Truss' hugely unsuccessful period in office, the promotion of Rishi Sunak was considered by many as less of a departure from the Johnson era.

In order to analyse these effects, I develop a model with two politicans and a representative voter. Unlike standard political agency models, I allow the politicians to compete over three consecutive terms, but also *abstain* from office. We attempt to understand whether relinquishing the office holding position may ever be advantageous in the long-run.

2 Related Literature

Past literature takes a more normative approach to the concept of strategic resignation. Harrison et al. (2018) discuss the affects of negative media on *disassociation* at the director level. They theorise that "negative attention from the media and star equity analysts threatens directors' reputations, motivating proactive behavior to mitigate both the external and internal consequences of reputation damage."

Work by Goemans (2008) draws together policy choice and office removal by noting that there may be a number of different reasons for the removal of a politician. He states that leaders may make policy decisions differently if policy affects not only whether they are removed from office, but also how. This alters the incentives of the office holder when choosing policies.

A popular approach to modelling political accountability involves some form of finite horizon stage game, where an incumbent and opponent compete for the office holding position (Canes-Wrone et al., 2001),(Maskin and Tirole, 2004), (Ferraz and Finan, 2009). The actor in the office holding position is forced to weigh the payoff of choosing their immediately preferred policy, against choosing the policy that provides the greatest probability of re-election. Most of these models involve only two periods, which aligns with the fact that political office holding positions often have two term limits. Aruoba et al. (2017) develop a structural model to examine accountability amongst a subset of US Governors. The context of the dataset similarly restricts the politician to holding office for a maximum of two terms, yet the voter maximises a life-time expected utility function.

The two term limit on some political office holding positions has reduced the external validity of models with more than two periods. However, if one does not restrict their attention to positions in politics, but rather include other environments, be it corporate, athletic, or academic, then the term limit is no longer a relevant constraint. For example, a working paper by Roche (0AD) uses a three period model to see why executives may be re-elected after having been removed from office. The paper finds that in the unlikely event of the state of the world changing, voters may want to bring back leaders that previously

matched that state.

Exogenous shocks primarily play one of two roles in the literature. The first is when the shock directly affects the payoff of the leaders. This type of model has been used by Gallego and Pitchik (2004), where the export value of a good is exogenous, and affects the player's ability to make positive payoffs whilst generating export profits for the other players. In the context of dictatorial rule, the structure is such that "more talented dictators are able to survive more negative shocks, so the worst shock in a dictator's reign is informative about the probability of a coup."

Other studies involving decisions over some form of costly effort use the shock as noise to obscure the player's action from the voter. Ashworth and Bueno de Mesquita (2014) studies a model where the observed outcome is a noisy function increasing in the both the politician's effort and their type. (Ashworth et al. (2017) similarly studies such an output function but delves deeper in to the impact of whether effort and type are substitutes or complements.) The voter seeks to maximise output whilst the politician receives a fixed benefit of being in office and incurs a cost that is increasing in effort. Aruoba et al. (2017) incorporate both the moral hazard aspect of costly effort and adverse selection aspect of politician type into their structural model.

3 Model Setup

I propose a three period agency model that allows the incumbent to abstain from office after realising the state.

3.1 Players

There are two politicians and a representative voter. Each politician is arbitrarily labelled i and j, and has a cost of effort equal to $s_k \in \{\underline{s}, \bar{s}\}$ for $k \in \{i, j\}$ and $\underline{s} > \bar{s}$.[1] These are independently drawn from distributions defined $\mathbb{P}[s_i = \bar{s}] = \pi_i \in [0, 1]$. The cost of effort is private information for each politician and remains constant throughout all three periods of the model. It can be referred to as the politician type, and represents the variation in ease with which a politician can deal with the state. For example, a politician with low cost, $\bar{s}$, can be considered more competent, and therefore finds it 'cheaper' to deal with the state of the world.[2]

[1] This is unconventional notation but we refer to the 'low type' as having cost $\underline{s}$ greater than the cost of the high type.

[2] A politician with a low cost is referred to as a high type.

The role of the representative voter is to choose whether or not to re-elect the politician in office. How this plays out in the model is explained at a later stage.

3.2 States

At the beginning of each period, nature draws a state $\theta_t \sim U[0,1]$. This is observed only by the politician in office during each respective period. This state could represent many forms of real-life scenarios, such as the strength of the economy in that period, or a more generalised external shock resulting from events such as geo-political uncertainty or negative media attention.

Allowing only the current period office holder to observe the state represents the informational advantage that they have over both their opposition and the voter. In order to find a real-world example of this advantage, we need look no further than the expertise of the UK Civil Service provided to the Prime Minister, or the private research of internal departments in corporate industry.

3.3 Preferences

For each period, t, the office holding politician (for example politician i) receives a payoff equal to;

$$(1 - \mathbb{1}_{a=1}) \cdot (\Delta - \mathbb{1}_{e=1} \cdot s_i \cdot \theta_t)$$

Where $\Delta > 0$ is a fixed benefit of being in office, identical across politicians and over every period. a is an indicator for whether the incumbent chooses to abstain, and e is an indicator for whether or not the incumbent chooses to exert effort. These will be fully explained in the timing sequence below. Additionally, there is a period discount factor $\beta \in (0,1]$ which is identical for both politicians, and the payoff of being the non-office holder in any given period is zero.

At the end of each period, the abstention decision and subsequent effort is revealed to the voter, whose objective is to maximise the probability that the politician in office is a high type. As a result, the voter updates their belief of the politician being high type using Bayes' rule and re-elects if and only if their posterior for the office holder being a high type is greater than their belief that the challenger is high type.

3.4 Priors

The voter's priors over politician i and politician j at the beginning of period t are denoted $\pi_{i,t} = \mathbb{P}_t[s_i = \bar{s}]$ and $\pi_{j,t} = \mathbb{P}_t[s_j = \bar{s}]$ respectively. We assume that initially $\pi_{i,1} = \pi_i$ and

$\pi_{j,1} = \pi_j$. This ensures that the voter's priors at the beginning of the game sequence are aligned with the distribution from which the types are drawn. An additional assumption is that the posterior at the end of each period becomes the prior for the next.

The politicians will also have priors over each other, as they must make predictions about the actions of their opponents at any given stage. We denote $\pi_{k,t}$ for $k \in \{i, j\}$ as the prior in period t for the belief of politician k's type. Similarly $\pi_{-k,t}$ is defined as the reverse.

3.5 Timing

The timing is as follows;

1. Nature draws a private type, s_i, for each of the two politicians.
2. Nature then draws the state, θ_t, at the beginning of the period.
3. The office holder for that period observes their type and state, then decides whether to surrender the office-holding position to the challenger ($a_t = 1$) or not ($a_t = 0$). This is referred to as the **abstention decision**.

   If not, the office holder makes the decision in step (4). If so, the challenger gains the office holding position and the original office holder now becomes the challenger. The new office holder subsequently realises the period state and goes on to make the decision in step (4).
4. The office holder chooses whether to exert effort or not ($e_t \in \{0, 1\}$). This is referred to as the **effort decision**.
5. The voter then observes the effort level of the office holder and chooses whether or not to re-elect the office holder. If the office holder is re-elected, the process is repeated from (2) keeping the office holder the same. If not, the office holder switches with the challenger. Afterwards, the process is repeated from (2).
6. After three periods, the game finishes.

There are a couple of features of this model that must be noted. First, only the original office holder in each period is allowed to abstain. This prevents the existence of an equilibrium where both politicians abstain infinitely in each period. Although this could be considered as an unrealistic assumption, it is seldom the case that this sort of behaviour is observed, and therefore I don't see this as a departure from reality.

Second, the information observed by the voter in each period differs depending on the action of the original office holder. For example, if the original office holder chooses not to abstain, then the effort level and the abstention decision provides information only on that politician. Labelling this formally, assuming that the original office holder and opponent in period t are indexed i and j respectively, the set of actions observed by the voter would be $(a_{i,t} = 0, e_{i,t} \in \{0, 1\})$.

However, if the original office holder chooses to abstain, then the abstention decision reflects a decision of the original politician, whereas the subsequent effort level is exerted by the opponent. This would be represented as the pair $(a_{i,t} = 1, e_{j,t} \in \{0, 1\})$. Therefore this second action sequence provides information on both of the candidates.

4 Analysis

4.1 A Simple Example

Suppose that we take the type for both politicians to be equal to 1 and common knowledge (i,e $\bar{s} = s_i = s_j = 1$ and $\pi_i = \pi_j = 1$). This is a simplification of the original specification for two reasons. First, both politicians have the same cost of effort, which in the full model occurs only with probability $\pi_i\pi_j + (1 - \pi_i)(1 - \pi_j)$.

Second, both politicians are aware that they have the same cost. This means that when the incumbent decides whether they are better off abstaining, they do not have to take into account whether or not the challenger is *better equipped* to deal with a high state. As we will see later, this neglects certain scenarios that occur as a result of differing types. For example, when an incumbent has a low type and believes that the challenger is a high type. This implies that the probability of the challenger putting in no effort given that they hold office is far lower than the same probability for the low type office holder.

Suppose also that the voter re-elects the office holder with probability one if they exert high effort and re-elect with probability zero if they exert low effort. This simplifies the updating process from the voter's perspective. We will relax this at a later stage.

Due to these simplifications, the only difference in behaviour can be attributed solely to the informational asymmetry associated with being a first period incumbent, and, as an extension, the fact that they have realised the state when the challenger hasn't. Finally, suppose that $\Delta = 0.75$ and $\beta = 0.95$. We solve using backwards induction:

In the third and final period, the incumbent earns 0 if they abstain, Δ if they exert no effort and $\Delta - \theta$ if they exert effort. Therefore, the lack of incentive to exert effort implies that the incumbent will receive a payoff of Δ independently of how θ materialises.

In the second period, the office holder exerts effort if and only if;

$$\Delta - \theta + \beta\Delta \geq \Delta$$

If they abstain, then they receive a period two payoff of 0 and receive a payoff of Δ in the third period if and only if the challenger chooses to exert no effort. Therefore the two period expected payoff given abstention is weakly less than $\beta\Delta$ and dominated by remaining in office and exerting no effort.

The ex-ante expected payoff of being an incumbent in period two is equal to;

$$\begin{aligned}
&\mathbb{E}_\theta[(1+\beta)\Delta - \theta | \beta\Delta \geq \theta] P(\beta\Delta \geq \theta) + \Delta[1 - P(\beta\Delta \geq \theta)] \\
&= \beta\Delta^2 + \frac{1}{2}\beta^2\Delta^2 + \Delta(1 - \beta\Delta) \\
&= \Delta\left(1 + \frac{1}{2}\beta^2\Delta\right)
\end{aligned}$$

The ex-ante expected payoff of being a challenger in period two is equal to the probability that the incumbent exerts no effort times the discounted payoff of holding office in period three. This is equal to;

$$(1 - \beta\Delta)\beta\Delta$$

Therefore, all that is left is to establish the different cases for the first period. We have the following;

1. **Incumbent exerts effort in period one, ($a_{i,1} = 0, e_{i,1} = 1$).** This results in the office payoff minus the state in period one, plus the discounted payoff of remaining in office in period two.
$$\Delta - \theta + \beta\Delta\left(1 + \frac{1}{2}\beta^2\Delta\right)$$
2. **Incumbent doesn't exert effort in period one, ($a_{i,1} = 0, e_{i,1} = 0$).** This is equivalent to taking the office position in period one, and therefore gaining Δ but being moved to challenger for certainty in period two.
$$\Delta + \beta^2\Delta(1 - \beta\Delta)$$
3. **Incumbent abstains and the challenger exerts effort, ($a_{i,1} = 1, e_{j,1} = 1$).** Where the incumbent 'saves face' by allowing the challenger to step in to office, but they gain the discounted expected payoff of remaining a challenger in period two.
$$0 + \beta^2\Delta(1 - \beta\Delta)$$

4. **Incumbent abstains and the challenger doesn't exert effort, ($a_{i,1} = 1, e_{j,1} = 0$).** Finally, this is the case where the incumbent once again relinquishes the office holding position, but the challenger realises the state when they become the office holder, and chooses to exert no effort.

$$0 + \beta\Delta\left(1 + \frac{1}{2}\beta^2\Delta\right)$$

Clearly with $\Delta > 0$ case (2) dominates case (3). By doing the calculations we can also see that the incumbent would prefer to abstain than exert no effort provided the challenger is not planning on making effort (case (4) greater than case (2)). The challenger will not exert effort provided case (2) is greater than case (1), which occurs when θ is greater than 0.76. Therefore, for a state large enough, the first period incumbent is willing to relinquish the office holding position with the understanding that they will regain it in the next period.

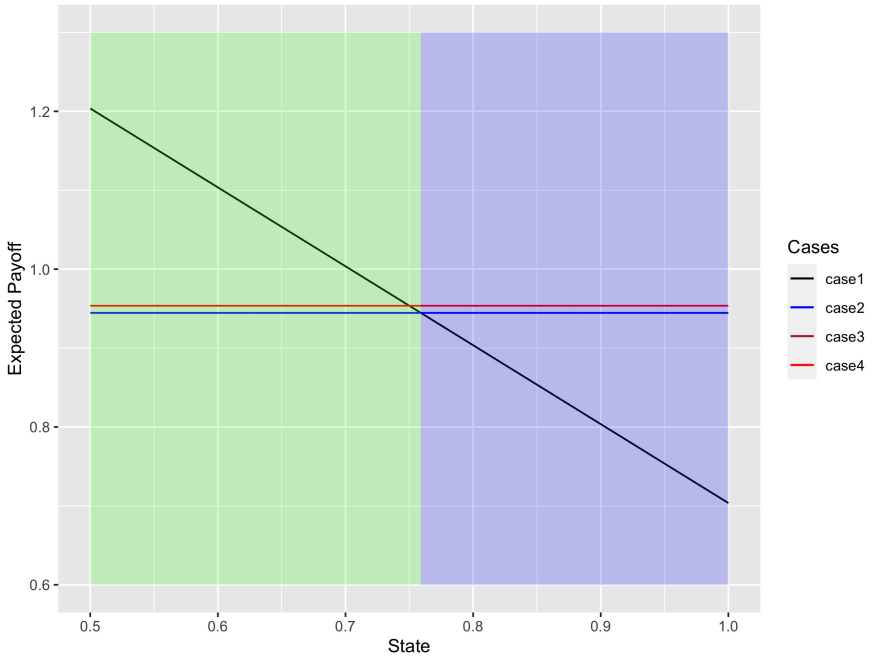

Figure 1: Simple example

Figure 1 shows that, for a fixed Δ and β, the optimal policy is a cutoff in the state. This particular example in which $\Delta = 0.75$ and $\beta = 0.95$ results in an equilibrium strategy where the office holder abstains if $\theta \geq 0.76$ and exerts effort otherwise. The payoffs for case (2) and case (4) are both independent of the state as they involve exerting no effort. Case (1) on the other hand sees the payoff reducing as the state increases. This is because the cost of exerting effort is increasing in the state. If the parameters of Δ and β change

such that the payoff for case (2) is greater than case (4), then abstention would never be optimal. Instead, the strategy would take the form of a cutoff but where the office holder exerts effort for a low enough state and exerts no effort for a high enough state.

Figure 2 illustrates the (β, Δ) pairs for which there exists a $\theta \in [0, 1]$ such that abstention is optimal. Clearly for $\Delta = 0$ the payoff for abstention and exerting no effort is equal. This is because the politician is indifferent between being a challenger and being in office.

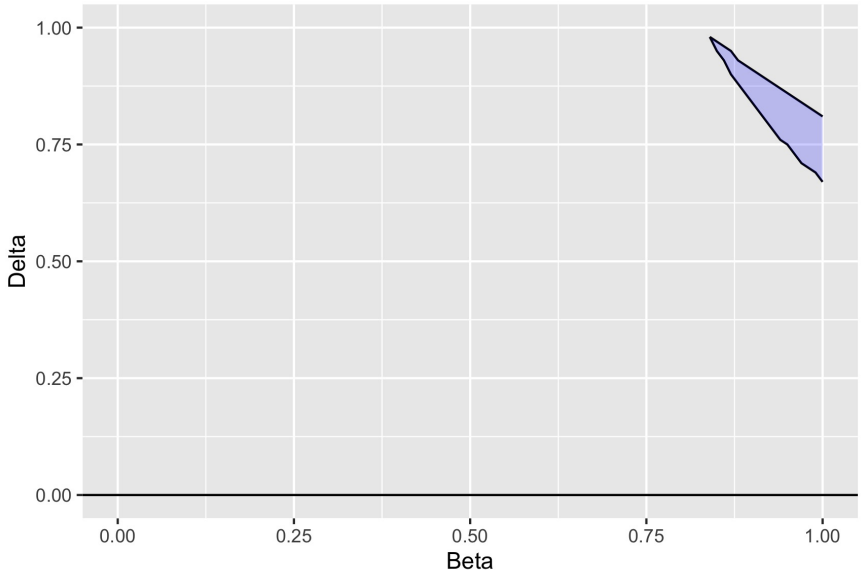

Figure 2: Abstention region for (β, Δ) pairs

4.2 Developing the model with unknown types

The example above supposes that both politicians have the same type, and that this is known. Relaxing this assumption means that the office holders are left to update the type of their opponent, and therefore adjust their expected payoffs based on how they expect their opponent to act. Throughout this sub-section assume that politician i is the politician in office at the beginning of the first period.

We can now repeat the backwards induction in the previous example.

In period three, the payoffs (and therefore conditional strategies) remain the same. For period two, the payoffs also closely resemble those in the example. This is because an office holder in period 2 has almost total control over the outcome of the rest of the

game. The only difference to the above example is the probability of the opponent exerting effort if the original politician abstains. However, the office holder abstaining is still dominated by exerting no effort, therefore it does not affect the overall game outcome.

First period calculus becomes more complicated for two reasons. First, the period one office holder has to take into account the ex-ante expected payoff of being a challenger versus office holder in period two. Second, the period one office holder can now take actions that provide informational gains to the challenger. Abstaining in the first period allows the office holder to gain information on the period one state, and then also allows them to observe the action of the challenger. This may effect the outcome of the original decision.

To tackle the first complication, we must first calculate the expected payoffs of being a challenger or incumbent. For a politician being of type $s \in \{\underline{s}, \bar{s}\}$, the payoff of being an office holder in period two is;

$$\begin{aligned}
&\mathbb{E}_\theta[\Delta(1+\beta) - s\theta | \beta\Delta \geq s\theta] P(\beta\Delta \geq s\theta) + \Delta(1 - P(\beta\Delta \geq s\theta)) \\
=&\frac{\beta\Delta^2}{s}\left(1 + \frac{\beta}{2}\right) + \Delta\left(1 - \frac{\beta\Delta}{s}\right) \\
=&\Delta\left(1 + \frac{\beta^2\Delta}{2s}\right)
\end{aligned}$$

Likewise, the ex-ante expected payoff for a politician, k, of type s being a challenger in period two is;

$$\begin{aligned}
&0 + \beta\Delta \cdot P(\text{Opponent chooses } \ e = 0) \\
&= \beta\Delta\left(\pi_{-k}\left(1 - \frac{\beta\Delta}{\bar{s}}\right) + (1 - \pi_{-k})\left(1 - \frac{\beta\Delta}{\underline{s}}\right)\right)
\end{aligned}$$

The above demonstrates that the belief of one politician's type over another has little effect on the period two decision making. In fact, if the politician is in office at the beginning of period two then their beliefs are of no consequence. However, it will affect the value of being a challenger at the start of that period. Assuming k is the period two challenger, an increase in π_{-k} means that the probability of politician $-k$ exerting effort increases, and therefore k's value of being a challenger decreases. Alternatively, if the politician thinks that the probability of the opponent being strong tends to zero, then they are more confident in the office holder exerting no effort and then giving up the third period payoff.

Now it is necessary to determine the period one calculus of the office holder. We can again break it into four cases based on an effort level conditional on the abstention decision and the expected actions of the opponent. As a reminder, politician i is once again assumed to be the original period one office holder.

1. **Incumbent exerts effort in period one**.

$$\Delta - s_i\theta + \beta\Delta\left(1 + \frac{\beta^2\Delta}{2s_i}\right)$$

2. **Incumbent exerts no effort in period one**.

$$\Delta + \beta^2\Delta\left(\pi_j\left(1 - \frac{\beta\Delta}{\bar{s}}\right) + (1-\pi_j)\left(1 - \frac{\beta\Delta}{\underline{s}}\right)\right)$$

3. **Incumbent abstains and opponent exerts effort**.

$$\beta^2\Delta\left(\pi_j\left(1 - \frac{\beta\Delta}{\bar{s}}\right) + (1-\pi_j)\left(1 - \frac{\beta\Delta}{\underline{s}}\right)\right)$$

4. **Incumbent abstains and opponent doesn't exert effort**

$$\beta\Delta\left(1 + \frac{\beta^2\Delta}{2s_i}\right)$$

In the simplified example, the period one office holder knows with certainty whether the challenger will exert effort or not if they are put into office. However, with this setup, this is dependent on the type of the challenger and therefore can only be calculated in expectation.

To determine what the first period office holder would do, they need to make predictions about what their opponent would do in their position. Once again assume that the original period one office holder is player i. Given that abstention is not an option, a low type opponent (politician j) would choose to exert effort in period one if and only if

$$L = \frac{\beta\Delta}{\underline{s}}\left(1 + \frac{\beta^2\Delta}{2\underline{s}} - \beta\pi_i\left(1 - \frac{\beta\Delta}{\bar{s}}\right) - \beta(1-\pi_i)\left(1 - \frac{\beta\Delta}{\underline{s}}\right)\right) \geq \theta$$

denote the above region as region L. Similarly, denote the high type region H as given below;

$$H = \frac{\beta\Delta}{\bar{s}}\left(1 + \frac{\beta^2\Delta}{2\bar{s}} - \beta\pi_i\left(1 - \frac{\beta\Delta}{\bar{s}}\right) - \beta(1-\pi_i)\left(1 - \frac{\beta\Delta}{\underline{s}}\right)\right) \geq \theta$$

Therefore, given an opponent's belief π_i, the office holder would expect their opponent to behave in the following fashion;

$$P(e=1) = \begin{cases} 0 & \theta \geq H \\ \pi_j & H > \theta > L \\ 1 & L \geq \theta \end{cases}$$

The above provides us with three main pieces of insight. First, both of these thresholds decrease with π_i. An increase in π_i reduces the value of being a challenger in the second period as opposed to the office holder. This implies that there is a smaller region of θ over which the office holder is willing to exert no effort.

Second, the period one office holder is never going to abstain if $\theta \leq L$. This is because the office holder can guarantee that if they abstain, their opponent will exert effort, irrespective of their type. As demonstrated above, abstaining conditional on the opponent exerting effort is dominated by exerting no effort themselves, and therefore this would never occur.

Third, there is only one region in which the office holder's belief of their opponent is of consequence. As π_j tends to zero, the region over θ in which they believe their opponent will not exert effort increases. Similarly decreases as π_j increases.

Conjecture 1: A low type is more likely to exert no effort in period one than a high type.[3]

In this example, the advantage of exerting effort in period one is increasing with the advantage of being an incumbent beginning the second period versus a challenger. As we have suggested above, the payoff of being an incumbent of type s in the second period is given by;

$$\max\{\Delta, (1+\beta)\Delta - s\theta\}$$

whereas the payoff of being a challenger in period two is bounded above by $\beta\Delta$ and therefore always strictly less than being an incumbent.

The first argument in the max function is the payoff if the second period incumbent chooses to exert no effort, and therefore walks away with the fixed payoff of being in office and is voted out at the end with certainty. The right hand side represents the payoff when the period two incumbent chooses to exert effort. Clearly the value of the function is weakly greater if the incumbent is a high type rather than a low type. This implies that, for a fixed θ in period one, the re-election incentives are greater for the high type than a low type, and therefore exerting no effort results in a greater cost for the high type. It then follows that they are less likely to exert no effort.

[3]Note that we are careful to say *exerting no effort* rather than *not exerting effort*. Exerting no effort refers to $(a = 0, e = 0)$ whereas not exerting effort could refer to either abstaining or exerting no effort.

4.3 When would abstention be optimal?

Fix priors π_i and π_j as the priors over the period one office holder and period one challenger respectively. First, suppose that $\theta \leq L$, then the period one incumbent can guarantee that their opponent will exert effort if they take the office holding position. As already demonstrated, abstaining is never optimal if the office holder believes that their opponent will exert effort, therefore the probability of abstention given $\theta \leq L$ is zero, independently of priors.

Now suppose that $\theta \geq H$. In this scenario, the period one office holder knows that their opponent will not exert effort, irrelevant of their type, and so the calculus simplifies to weighing up whether abstaining provides a greater expected payoff than exerting no effort. If this is the case, then abstaining occurs for all $\theta \geq H$, otherwise abstention doesn't occur at all. Importantly, this will depend on the type of the office holder. As the payoff of exerting no effort is independent of the actor's type, but the value of being in office for the second period is not, then abstention is more valuable for the high type than the low type. This implies that either both high and low abstain over the whole region $\theta \geq H$, neither abstain over the region, or the high type abstains and the low type exerts no effort.

When $\theta \in [L, H]$, the scenario leans more heavily on the belief over the opponent. For example, if the office holder believes that their opponent is a high type with probability 1, then they believe with certainty that their opponent will exert effort given the opportunity. However, if they consider the opponent to be low type with probability 1, then they know that they will exert no effort given abstention. As the payoff of the former scenario is greater than that of the latter, the payoff is decreasing with the office holder's belief over their opponent. The payoff of abstention given $\theta \in [L, H]$ can therefore be given as;

$$\begin{aligned}\mathbb{E}_{\pi_j}[u(a=1)|\theta \in [L,H]] =& \pi_j \left(\beta^2 \Delta \left(\pi_j \left(1 - \frac{\beta\Delta}{\bar{s}}\right) + (1-\pi_j)\left(1 - \frac{\beta\Delta}{\underline{s}}\right)\right)\right) \\ &+ (1-\pi_j)\left(\beta\Delta\left(1 + \frac{\beta^2\Delta}{2s}\right)\right)\end{aligned}$$

For the low type, if this payoff is less than the payoff of exerting no effort for all $\pi_j \in [0, 1]$, then the optimal policy is to exert no effort themselves. If, however, there is a region of π_j where the low type prefers to abstain than exert no effort, then this region takes the form of a threshold, $\bar{\pi}_j$ where abstention occurs for all values of $\pi_j \geq \bar{\pi}_j$ and exerting no effort occurs otherwise.

For the high type, witnessing $\theta \in [L, H]$ implies that they prefer exerting effort to exerting no effort. Therefore, for abstention to be optimal, the high type requires that payoff to

also be greater than exerting effort. For the high type, this is going to be a function of both their belief over priors of the opponent and θ. For example, a small θ implies that the payoff from exerting effort is larger than if θ is big. However, if π_j is also large, then abstaining will result in the opponent exerting effort with certainty. Therefore, when fixing π_j, and if abstention is optimal at all, it will be optimal for θ sufficiently high within the range $\theta \in [L, H]$. For any value of θ below this, the optimal policy will be to exert effort.

More work is to be done in this section

4.4 Developing the model with a rational voter

Suppose that instead of the voter re-electing with certainty when $e = 1$ and not re-electing with certainty when $e = 0$, the voter updates using Bayes' rule.

In the second period, the decision is therefore conditional on the amount of effort that they witness. We can define the probability of re-electing conditional on seeing $e = 1$ and $e = 0$ as ν_1 and ν_0 respectively. Suppose that there exists an equilibrium where $\nu_1 = 1$ and $\nu_0 = 0$. This is equivalent to the original simplification. In order for this to occur, we require the probability of being a high type conditional on seeing $e = 1$ to be greater than the prior that the challenger is a high type. Symmetrically, we require the probability of being a high type conditional on seeing $e = 0$ to be less than the probability of the challenger being a high type. The calculation for each is as follows;

$$P(H|e=1) = \frac{\pi_{k,2}\Delta\beta/\bar{s}}{\pi_{k,2}\Delta\beta/\bar{s} + (1-\pi_{k,2})\Delta\beta/\underline{s}} \geq \pi_{-k,2}$$
$$P(H|e=0) = \frac{\pi_{k,2}[1-\Delta\beta/\bar{s}]}{\pi_{k,2}[1-\Delta\beta/\bar{s}] + (1-\pi_{k,2})[1-\Delta\beta/\underline{s}]} \leq \pi_{-k,2}$$

where we assume that k is the office holder and $-k$ is the opponent.

The updating in period one is complex to solve for. For example, a high type first period office holder will assume that they are weakly stronger (in expectation) than the first period challenger. Yet, if they witness a high cost drawn by nature, then it may be in their interest to abstain from office in the first period and force the challenger to choose whether or not to exert effort. In doing so, the voter will update their prior on the challenger and then decide whether or not to re-elect. As the challenger is against a high cost state, they will most likely be forced to exert no effort, therefore lowering the voter's posterior and resulting in the original first period office holder to be re-elected in the second period.

This has two advantages to the original first period office holder. First, they don't have to pay the cost of exerting effort in the first period. Second, it forces the posterior of their opponent down and therefore reduces the competitive pressure for when they take office in the second period. This creates a greater range in which they can exert no effort and still be re-elected.

On the other hand, the voter will also have to update their prior based on seeing the original abstention decision. *** How they are going to do this is not yet clear.***

As a consequence, this model allows for the office holder not only to choose an action which affects their own posterior, but also to choose an action which forces their opponent's posterior to change. In this sense, the office holder can make a costly act which reveals the type of their opponent as well as themselves.

More work is to be done in this section

Next Steps

1. Establish a stronger link between the voter preferences and the office holder's willingness to exert effort. At the moment, the voter preferences are described simply as preferring a high type. Conjecture 1 will help establish a relationship between the type of the politician and the likelihood that they exert effort, but this relationship has not yet been proven formally.

2. What information can the voter gain from observing an abstention? It may be the case that an abstention only occurs when the state is extremely high, which means that there is no information to be gained when an abstention occurs. However, this may mean that a low type will pander towards abstention when actually they would be better off exerting no effort.

3. Are there issues with the voter and the politician having different priors over the other politician? If not, then this assumption can be relaxed.

4. Categorise the abstention regions more formally. This is going to be a function of priors over the opponent and realisations of θ.

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