Why is it hard to defeat an incumbent president in the United States?

By
Márton Bence Szabó

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Supervisor: Professor Ádám Szeidl

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Abstract

This thesis tries to explain why incumbent presidents usually win elections in the United States again after their first tenure. I built a theoretical model in that voters cast their ballot based not only on the policy choices of the candidates but also based on their talent level. Primary elections have a crucial role in my model because they allow for the incumbent to choose more moderate policy and help him to win the general election. I also show in my model that the chances of the other party can depend on the number of their primary candidates.

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1 Introduction

Eight of the last twelve presidents of the United States, including the last three, have won the general election as an incumbent, and eleven of them have won his primary election in his respective party. It would be very important to understand this phenomenon, because the two parties are otherwise similarly successful during this period. A better understanding could help candidates to optimally allocate their resources, and to enter the competition only in cases when they have substantial chance of winning. A lot of research has been devoted to finding the optimal position for each of the two political parties along a continuum of political opinion but I do not know any model that focuses on the question why the incumbent has a great advantage.

The simple model by Downs (1957) which showed that if voters choose the party closest to them on the continuum, and parties are completely free to move the only pure strategy equilibrium for the two parties is when they are at the position of the median voter, also fails to predict the consistent party divergence that we can observe. Researchers recently have recognized the importance of primaries in connection with this observation.

Although empirical studies (Ansolabehere *et al.* 2001; Stone and Simas 2007) have shown that high quality candidates choose more moderate policies, still very few models have used talent level as a factor in voters' decisions. It seems obvious that voters prefer a more talented candidate to a less talented one if they choose the same policy, but it is important to try to capture this preference through their utility in order to be able to identify optimal location positions as a function of talent level.

I try to explain these facts with a theoretical model in my paper which includes party primaries and talent level as a factor in voters' decisions. My model assumes that voters have better information about the incumbent's talent level, which is assumed to be high, and therefore

he can choose a more moderate policy to win his primary. In the opposing party no candidate has this advantage, and therefore his policy position is usually worse than that of the incumbent. My results show that the number of candidates in the other party can have a significant effect on general election outcome but they also predict the reelection of the incumbent with high probability.

Since Downs (1957) started to investigate two party competition based on Hotelling's (1929) results, a lot of research was devoted to this question. The approaches included for example more than one policy dimensions, and the introduction of non-voting as a function of the distance of either party's position. But only a few papers focused on the fact that the United States apply a two-stage election process. Up until recently the three most frequently cited papers which investigated primary elections as a force which can cause persistent party divergence were Coleman (1971,1972), and Aranson and Ordeshook (1972). In the Aranson and Ordeshook model, candidates have an expectation about the probability of victory in both rounds as a function of their policy choice, and they choose their spatial location to maximize the product of the two probabilities. In the Coleman model some voters in the primary election are concerned about whether the primary victor will be able to win the general election with his location or not. Recently lots of papers used these two models as a baseline (Owen and Grofman 2006; Cadigan and Janeba 2002; Meirowitz 2005) so researchers have recognized the important implications of primary elections.

The few papers I am aware of that consider policy selection in a model with primaries and general elections with candidates of differing quality are Adams and Merrill (2008), Kartik and McAfee (2007), Snyder and Ting (2011) and Hummel (2009). They differ from my model in a crucial assumption: I assume that talent level will be revealed only during the presidential campaign, so voters in primaries can only decide based on policy positions. They assumed that

voters already know the talent level of candidates during the primaries so my approach to the question is not really close to the above mentioned papers.

The remainder of my thesis is organized as follows: Section 2 presents the model, Section 3 contains the results, and in Section 4 I discuss my results and present ideas for future research.

2 Model

2.1 Setting

Let there be a continuum **I** of citizens with single peaked preferences over policy outcomes, denoted on the real line **R** between 0 and 1. Each citizen chooses to join one of the two parties or remains independent. We assume here for simplicity that this decision has been made in the past. The two parties are the Democratic Party (D) and the Republican Party (R). The members of the Democratic Party are distributed uniformly between 0 and D^r with median$\frac{D^r}{2}$. Similarly the members of the Republican Party are distributed uniformly between R^l and 1 with median$\frac{1-R^l}{2}$. So the members of the Democratic Party come from the very left up to some point on the line and the members of the Republican Party come from some point on the line up to the very right. Every person can be a member in maximum one party and everyone who is not a member of either party is independent. They are entitled to vote in the presidential election but not in the primaries. Given this full voter turnout assumption, in the two-candidate general election, the winning candidate will be the one who is preferred by the median general election voter. Candidates are exclusively motivated by the possibility of winning elections.

In my model voters cast their votes not only on the basis of the policy choices of the candidates but also on their talent level. Talent level is measured on a 0 to 1 scale, according to

a uniform distribution with an expected value of 0.5. Talent level is revealed during the presidential campaign in my model, meaning that voters know the talent level of the incumbent president (and is a former presidential candidate is taking part in either primaries, they know his talent level as well), but they do not know the talent level of the other candidates in the primaries. This highlights for example the importance of television debates which are common in presidential campaigns and can be considered as a mechanism to reveal the talent level of the candidates.

Throughout my analysis I will consider the case when voters vote sincerely during primaries. In the presidential election they will vote sincerely for sure meaning that independents will choose the candidate who gives them the highest utility. Party members however may vote in primaries either strategically or sincerely. Sincere voting during primaries means that they vote for the closest member to them regardless of the chances of this candidate to win the general election. Forward-looking or strategic voting means that they vote for the candidate who gives them the highest expected utility after the whole voting process. Although both forms of voting have been used in theoretical models, I will apply sincere voting throughout my analysis.

In connection with the sincere voting assumption, I also assume that each primary candidate can only choose policy from his party interval, and each member of the Democratic and Republican Party will vote for their respective candidate in the presidential election even if the candidate from the other party would give them higher utility. So I implicitly assume that there is an extra "party" utility for party members if they vote for their own "democratic" or "republican" policy in the presidential election, and this is high enough to compensate them for the possible advantage of the other party's presidential candidate in better talent level and policy distance combination. There have to be independent voters, and the population median voter

has to be independent due to this assumption, otherwise the presidential result would only depend on the fraction of Democratic and Republican members.

To summarize voting behavior in my model, party members vote first in primaries, based on their candidates' policy choice and (expected) talent level. These party members will support their party's candidate at the general election for sure, and independents will decide between the two presidential candidates based on their policy choice and by then revealed talent level. The expression which describes the voting decision for independents and the voting decision for party members during primaries is:

$$\alpha * \boldsymbol{T} - (1 - \alpha) * |\boldsymbol{P} - x|.$$

T is the talent level of a given candidate, **P** is the policy choice of a given candidate, and x is the location of a given voter. α and 1-α are the voter's weights on talent level and policy distance respectively. I assume that these weights are common knowledge. Each party member computes this expression for every candidate during primaries and he chooses the one who gives the highest value for him. Independent voters use this expression to decide between the two presidential candidates in the general election.

I will show with two additional assumptions that the incumbent president can win his primary for sure applying a pure strategy. First, the president's talent level has to be above the average level. Second, the incumbent can only face one challenger from his own party and this challenger has to have an unknown talent level (so he could not be a former presidential candidate). When these assumptions are satisfied, the incumbent faces only one challenger and this challenger has a lower (expected) talent level, because talent level is revealed only during presidential campaigns. In this case the incumbent needs to get to a specific distance to the party median but he does not need to go up to the party median voter due to the expected talent level gap between him and his challenger.

I will examine in the other party how the number of candidates affects the position of the primary winner and, therefore, implicitly the probability of winning the presidential election by this party. I will have here one additional assumption: every candidate has the same expected talent in primaries (0.5) which means that no former presidential candidate enters the competition in this party. This assumption combined with the sincere voting assumption means that we have to deal with a basic Hotelling (1929) problem here. I will use the well-known baseline result for two candidates and I will compare the winner's location to this case.

It is useful at this point to describe the timing of the electoral process in my model:

1. The incumbent president chooses his policy first, which can be interpreted as the policy he chose during his first four year tenure. The policy can be anything but it seems reasonable to assume that voters will think that he would continue his previous policy from his first tenure.
2. The candidates from the other party and the sole challenger to the incumbent from his own party simultaneously announce their intention to participate in primary elections. The number of participants will become common knowledge.
3. Each primary candidate (other than the incumbent) chooses a position on their party interval and the party members vote in primaries to determine which candidates will be supported by the 2 parties in the general election. Winners of the primaries are determined by simple plurality rule (If there is a tie winners are determined by a random draw).
4. The talent level of the presidential candidates is being revealed during the presidential campaign.
5. The presidential election takes place, all members of the electorate vote for one of the two candidates and the winner is declared. The policy for the next four years is implemented.

2.2 Discussion

Talent level in my paper includes the candidates' personal images along dimensions as charisma, empathy and also campaigning skills. Although these factors are widely believed to influence election outcomes (Grose 2005; Grose, Bystrom and Hate 2004), very few theoretical work on two-stage elections has analyzed the situation where voters consider both policy choice and nonpolicy-related talent factors. The papers which considered talent level as a factor in voters' decision (Adams and Merrill 2008; Hummel 2009) assumed that voters know the talent level of candidates prior to the primary election. In their analysis primary elections help to select more talented candidates then a random draw would do. In contrast to their analysis, I assume that talent level is revealed only during presidential campaign. Thus my analysis produces a negative conclusion about primaries, and parties would do better if they select candidates randomly and make his policy position as close to the population median as possible. Competing parties organize primaries in many countries but in most of the countries there are no party primaries, i.e. the World is divided in the question whether primaries improve the chances of parties at the general election or not.

Sincere voting during primaries seems to be a strong assumption as empirical studies (Abramowitz 1989; Stone and Abramowitz 1983) suggest that some primary voters consider the candidates' chances in the general election. However, if the number of voters in the primary is large, which is definitely the case in the United States, the chance of a vote being pivotal is negligible. Furthermore, citizens may get some extra utility from casting their ballots for the candidate they most prefer, so it may be rational to vote sincerely even if there is a non-zero chance that their ballot will be pivotal.

Since I assumed that the incumbent is more talented than the average talent level among candidates, he has a talent advantage during his primary. There can be several reasons behind

this assumption. I do not investigate the case when there is no incumbent president but most probably in that case we get a president from the presidential election that has above average talent level. We can also think that if a president has below average talent level he will not try to get reelected or his own party will dismiss him during his first tenure. Another explanation could be that even if his talent level had been revealed lower than average, if he works with good experts during his tenure, voters will update their belief about his talent level and it will become higher than the average. We can also think that his ability has indeed increased during his first tenure.

Regarding to the incumbent I also assumed that only one challenger with unknown talent level can emerge from his own party. In recent elections it has only rarely occurred that more than one challenger emerged against the incumbent president in his own party so this seems like a plausible assumption. Historically it has been very uncommon that a presidential election loser tries to become a nominee again when his party gives the incumbent president. One potential explanation of this phenomenon can be the fact that presidents sometimes give important positions for former talented losers of presidential elections from their own party what can be interpreted in my model as an attempt to induce them not to challenge him in the following primaries.

This assumption has a crucial implication because it ensures that the president will have one optimal strategy (policy) which he should implement and which will give him the victory in the primaries and the best chance in the general election. Actually the assumption about the unknown talent level of the other candidate could be weakened to smaller talent level than that of the incumbent president, but because this assumption is needed for the other party, I will assume it here as well.

3 Results

3.1 Primaries with incumbent president

Throughout my paper I will assume that the incumbent president is Republican, so closer to the population median for incumbent will mean a smaller number in the model, while for the other party closer to the population median will mean a higher number for the candidate.

After the incumbent president made his policy choice, one, but only one challenger can enter the primary process with his policy. I will argue after the presentation of the results why this assumption is crucial for the results. After the challenger made his policy choice, voters of the party will vote after they took into account the policies and the talent levels of candidates.

The optimal policy location for the incumbent will be at the point where he gives the same (expected) utility for the party's median voter as a challenger would give him at his location. Expected utility for a voter comes from expected talent level minus policy difference between the voter and the candidates. Now I investigate only at the Republican Party level so 0.5 will be the party median; Republican Party voters will be measured on a 0-1 interval, so the incumbent should be on the left side of the party's median voter. The incumbent chooses his policy, such that:

$$\alpha * T^I - (1 - \alpha) * |P^I - 0.5| = \alpha * 0.5$$

α and $(1 - \alpha)$ are the voter's weights on talent level and policy difference respectively and T^I and P^I denote the incumbent's talent level and policy choice. We want to determine the optimal policy position for the incumbent as we take his talent level and the voters' weights exogenous and known.

Proposition 1. *The optimal policy location for the incumbent president will be at*

$$P^I = 0.5 - \frac{\alpha}{1-\alpha} * (T^I - 0.5)$$

We can clearly see from this result that a more talented incumbent can choose a more moderate policy (closer to zero which is the party boundary). It also shows us that as voters put more weight on talent level the incumbent can again choose a policy closer to the population median, and further from his party median.

The president should apply this equilibrium strategy and he wins his primary for sure. With the implementation of this strategy, if the challenger chooses the party median voter's location, the median voter and all voters to the right will randomize between him and the president, so the president would clearly win the primary (75% to 25%). Also when the challenger chooses a location on the right side of the party median, the incumbent obviously wins the primary as the party median favors him over the challenger in this case. The challenger also cannot move to the left side of the party median because the incumbent has a "gap" due to his higher talent level and he beats everyone for every voter who moves closer to him then $0.5 - P^I$ (The challenger could move to one more place, to the left side of this "gap" but he would clearly loose the primary with that also).

We should also see that the incumbent president has no other optimal strategy because if he chooses any policy to the left of this optimal point, a challenger could pick the median voter's point (or even left to this point depending on the president's choice) and win the primary. On the other hand, the president has no incentive to pick a policy on the right side of this because even tough up to the same distance on the other side of the party's median voter he would still win the primary, but it would decrease his chances for reelection.

In contrast to the president, the challenger has no optimal response to the president's equilibrium strategy. In this case, when the incumbent apply his equilibrium strategy, if the

challenger chooses the median voter's optimal point, as I mentioned above, the median voter and all of the voters to the right will randomize between him and the incumbent president, so he would maximize the number of votes if he places himself "infinitely" close from the right to the median voter.

These results can explain why an opponent for the incumbent president from his own party does not exist in many cases. If the president implements his optimal strategy there is no way to beat him, therefore if we assume for example that the costs of campaigning exceed the utility from a lost primary, no challenger will enter. Another important fact which can be explained with this model follows from the above discussion: an incumbent president lost his party's primary only once after the Second World War and it was during the Vietnam War, so it can be considered as a very special case.

The assumption about the number of challengers is crucial because if more than one challengers enter the primaries, the result would be even closer to the population median. In that case, the president should have an expectation about how many challengers may enter, and he should maximize his expected utility regarding to winning probabilities in the primary, and in the general election. He could still win the primary with this policy but because there are more candidates, it could be worth being even more to the left from his party's median and increase the probability of winning the general election, while decreasing the probability of winning his primary. In the one challenger case there is no such problem because the incumbent can win the primary for sure with the computed policy but he would lose it for sure with a less Republican policy.

In this sense the incumbent would clearly benefit from more opponents because he would still have an option to choose the equilibrium strategy for one opponent and win the primary for sure, but if he would choose another policy it should give him higher expected

utility. The problem is here that in my model I assumed that the incumbent chooses the policy first, which is basically his first tenure policy, but if more challengers would be allowed he should know the exact number of challengers before he makes his policy choice, and if some expected challengers would not enter after the incumbent's policy is revealed, he could easily lose the primary.

3.2 Primaries in the other party

In the other party, candidates first reveal their intention to compete for the presidential nomination, and after that they simultaneously choose their policies. Voters vote sincerely meaning that they choose the candidate lying closest to them on the line. Each candidate has an expected talent level of 0.5 because we assumed that no former presidential candidate enters the contest.

If these assumptions are satisfied, we have a simple Hotelling (1929) spatial model which can be applied also to industrial organization models where we have a homogenous good with fixed price (for example newspapers) and sellers are able to differ only in their locations. Hotelling (1929) showed in his analysis that with two firms the only pure strategy equilibrium is where both firms are located at the median consumer (at 0.5). It is also a well-known fact that no pure strategy equilibrium exists with three firms because we cannot have a firm alone in a polar position (i.e. closest to the end points). He would have an incentive for sure to move closer to the middle but with three firms they cannot be at the same point because at least on one side of this point there would be a larger share then 1/3, so firms would have an incentive to jump out from this point.

In Industrial Organization a lot of research was devoted to different versions of this model. Researchers included for example advertising, price competition and product differentiation to this basic model, however I could not find an equilibrium solution for the

basic model as the number of firms increases. In my social choice context, I should use the basic model and I investigate how the primary winner's position changes as the number of candidates is changing. If voters vote sincerely, we clearly have this situation because candidates have to win first their primary. They have to choose a winning point in the equilibrium and if there are multiple possible winning positions with equal shares, they all prefer the location closer to the population median. In this sense candidates cannot really think strategically in the primary phase. We should also note that, based on this logic, it does not matter whether or not the candidate knows his talent level (arguments can be made both for, and against this assumption) because the crucial point here is that voters do not know his ability.

I will present here only the possible equilibria for the four and five candidate cases and compare them with each other, a comprehensive proof and equilibrium conditions can be found in the appendix.

Proposition 2.(i) *If there are four competing candidates in the primaries, we will only have one equilibrium where two candidates are located at 0.25 in their party voter's space and two candidates are located at 0.75.*

This means that all four candidates will have 25% in expectation at the primaries and the winner's expected location would be at the median voter. However we cannot have a winner with the median voter's preference which has important implications. If the incumbent president has particularly high talent level, this option looks promising to the other party. In the two candidate case the winner will come from the party median for sure which fact, paired with a really talented incumbent, means a sure loss. In this case, however, there is a chance that the winner will be relatively close to the population median so he will have a chance to beat the incumbent president.

Proposition 2.(ii) *Also only one possible equilibrium can emerge with five candidates: two candidates are located at 1/6, one candidate is located at ½ and two candidates are located at 5/6.*

The candidate at the median voter wins the primary with one third of the votes. So in this case the winner will come from the party median voter's position as in the 2 candidate case. Based on this, we can say that this case does not seem to be to compelling for the party: again a talented incumbent president can be hardly defeated from the party's median position.

3.3 General Election

3.3.1 Solving the model

In the general election the two winners from the primaries compete against each other. They cannot change their chosen policies from the primaries, and their talent level will be revealed for everyone during the campaign period. Party members will vote for their candidates, and independent voters will decide based on their utility.

Talent revelation means that the incumbent president loses part of his advantage because there is a possibility that voters will find the other candidate more talented. He will, however, carry over his possible policy advantage which he gained during the primaries due to higher expected talent level in the primary election.

We got possible winning locations for Democrat candidates, and we should compute their chances of winning the general election depending on the incumbent's talent level. With this method we can choose the optimal number of primary candidates for them, because the incumbent's talent level is common knowledge before the whole primary process starts. The locations of the winning candidates were computed on a 0-1 scale, so we have to convert this scale to the whole 0-1 interval of all voters.

As I argued earlier, the population median voter will decide the outcome of the general election, so we should compare his utility for the two candidates. His utility from the Democratic (challenger) Party's candidate:

$$\alpha * T^C - (1 - \alpha) * |D^R * P^C - 0.5|,$$

where T^C is the talent level of the challenger and P^C is the policy choice of the challenger measured only on his party interval. Voters of the Democratic Party are located from 0 to D^R, so $D^R * P^C$ gives us the location of the Democratic Party primary winner on the whole interval.

Similarly the utility from the incumbent is the following:

$$\alpha * T^I - (1 - \alpha) * |R^L + (1 - R^L)P^I - 0.5|$$

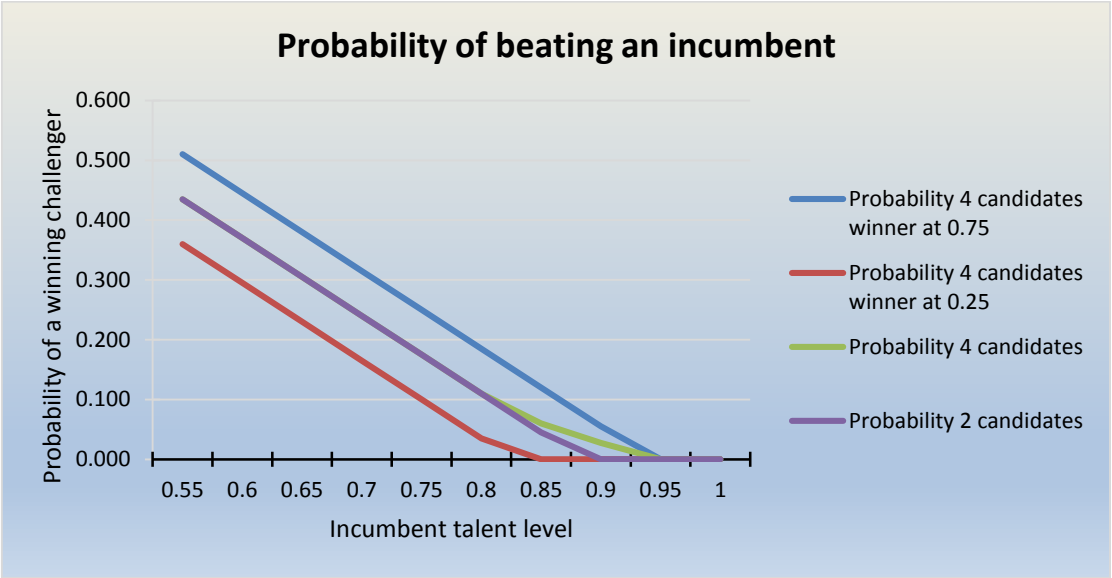
I investigate how the challenger party can beat the incumbent, i.e. for which values of T^C is the first expression larger than the second. I have to plug back the expression for P^I for the incumbent, to get the following result:

Proposition 3. *The challenger wins the general election, if and only if*

$$T^C \geq 2 * T^I + R^L - R^L * T^I - 1 + D^R * P^C + \frac{0.5 - D^R * P^C - 0.5 * R^L}{\alpha}$$

From our inequality T^I, D^R, R^L and α are common knowledge at the start of the campaign, therefore we can always compute the probability of winning for the Democratic Party depending on the position of the challenger. We get this probability if we just solve the inequality as equality, and multiply both sides with -1 and add 1 to both sides. On the left side we will get $1 - T^C$ which is exactly the probability that the talent level of the challenger will be above the threshold. It is useful to illustrate the probability of a winning challenger. Graph 1 shows the probability of winning as T^I increases. I fixed $\alpha = 0.5$, $D^R = 0.3$ and $R^L = 0.7$. According to my assumptions voters give equal weight to talent level and policy distance. There

are 30% who will vote for the Democratic Party in every case, and 30% who will vote for the Republican Party in every case. 40% of the voters are independent in the general election, and they make their decisions based on the before presented rule.



1. Graph

The blue line shows the probability with 4 candidates when the winner is from the better location, and the red line shows the probability with 4 candidates when the winner is from the worse location. Since the expected position of the winner is at the median, and the utility functions are linear, the weighted probability is the same with 4 candidates as with 2 (and 5) candidates as long as the possibility of winning with a candidate at 0.25 becomes zero. From this point the weighted probability with 4 candidates is strictly higher than the probability with two candidates. We can say that if the incumbent is talented, and the Democratic Party is risk neutral in probabilities, they strictly prefer 4 candidates over 2 or 5 candidates.

3.3.2 Comparative statics of the solution

It is useful to analyze this inequality. We should note that as the required talent level for the challenger decreases, the probability of beating the incumbent increases. We can clearly see

that the right side is increasing in T^I because 2 is greater than R^L for sure. This result is pretty obvious because it means that as the talent level of the incumbent president increases the required talent level for the challenger also increases. It is decreasing in $D^R * P^C$ because $\alpha < 1$, which means that as the challenger moves closer to the population median, his required talent level for winning the general election decreases. Not surprisingly it is also decreasing in R^L because $(T^I + \frac{0.5}{\alpha}) > 1$ if $T^I > 0.5$. This means that as the most liberal Republican member goes further from the population median, the required talent level of the challenger decreases. In sum, we can say that higher incumbent talent level decreases the possibility of change in the White House, and better policy position of the challenger, and worse policy position of the incumbent increases the probability of a president change.

It is more interesting to investigate how the weight on talent level affects the probability of beating the incumbent. If we take the first derivative of the right side with respect to α, we get the following expression:

$$\frac{D^R * P^C + 0.5 * R^L - 0.5}{\alpha^2}$$

When this expression is greater than zero (so the nominator is greater than zero), the required talent level is increasing in α, so the probability of beating the incumbent president is decreasing in α. The interpretation of this is that if $D^R * P^C$ is large and $0.5 * R^L$ is large, the challenger favors the situation when voters put relatively small weight on talent level. This is not surprising because when $D^R * P^C$ is large, the challenger is relatively close to the population median, and when $0.5 * R^L$ is large, the incumbent's party starts relatively far from the population median, and therefore the incumbent has to be relatively far from the population median. In this case it seems obvious that the challenger prefers the case when voters put large weight on the chosen

policy. On the other hand, if $0.5 > D^R * P^C + 0.5 * R^L$, the challenger has a better chance to beat the incumbent when voters put more weight on talent level.

We already know that both parties prefer to have more party members meaning that they favor a situation when their most moderate voter is as close to the population median as possible. However, it is interesting to explore the situation when both parties have the same amount of voter, i.e. they are symmetric on the population median. In this case it is interesting to see whether the challenger party prefers large parties or small ones. If we plug back $D^R = 1 - R^L$ to our inequality, we get the following coefficient for R^L:

$$1 + \frac{P^C}{\alpha} - T^I - P^C - \frac{0.5}{\alpha}$$

We can see from this expression that it is increasing in P^C, which means that better position for the challenger can cause positive coefficient for R^L, therefore higher R^L will decrease the probability for the challenger to win. Based on this, if P^C is high enough to get a positive coefficient for R^L, the Democratic Party will prefer small R^L, which means two big parties and few independents. This result is also logical because if a Democratic candidate has a relatively good position on his party interval, he will prefer large parties to translate his good location into a distance advantage as big as possible. We should note here that the location of the incumbent is included in the equation through T^I and α, so we can only get high enough P^C if the challenger's location on his party interval is better than the incumbent's position (Getting a positive coefficient for R^L is equivalent with the inequality which describes the situation when the challenger is closer to the population median: $1 - P^C \leq 0.5 - \frac{\alpha}{1-\alpha} * (T^I - 0.5)$).

In contrast to this result, a high T^I can cause a negative coefficient for R^L and therefore a higher R^L will increase the chances of the challenger. Following the previous logic, high T^I will translate into a favorable location for the incumbent, and therefore small parties would help

the challenger because in this case the location advantage of the incumbent would only mean a moderate distance difference.

4 Conclusion

The aim of my thesis has been to extend the standard Downsian model to explain the high winning percentages of incumbent presidents in the United States. My simple model predicts that due to the fact that voters are already aware of the incumbent's talent level, the incumbent has an advantage in choosing his policy. He can choose a more moderate policy which increases his chances to win the general election. However, the other party can influence their own chances because, depending on the number of primary candidates and primary outcomes, we can get different probability functions for a presidential change.

My results contradict in a way to the existing literature about the usefulness of primaries when talent level is also taken into account in voting decisions. My model suggests that the challenger party would be better off if they choose a candidate randomly, and make his policy choice be the most moderate policy possible. The reason behind this is my assumption about the revelation time of talent level. In reality, primaries are organized sequentially by parties, and traditionally early primaries have the biggest impact on the primary outcome. I think my assumption is especially valid for these early primaries because only very few voters have enough time and information to be able to identify the true talent level of the candidates.

I think one area of future research could be to model some way this sequential feature of primaries. I did not include in my analysis the case when there are six candidates in the challenger party but in that case two candidates at different locations can emerge as a potential presidential candidate. In these cases, for example, we could assume that all other candidates exit the primary process after they settled on their equilibrium positions, which is often the case

in reality due to high campaigning costs, and voters get a signal about the talent levels of the remaining candidates and can vote based on these signals.

Another possible direction of future research could be to allow uncertainty about the number of in-party challengers for the incumbent. In this case his policy choice should be based on expectations about the number of in-party challengers and possible locations of them and, compared to my model, it would be possible to beat the incumbent at the primary stage.

Finally, I think it would be interesting to extend the basic Hotelling (1929) model to N voters (firms), and investigate whether there is any convergence to the median in the possible winning positions. Preliminary computations suggest that as N increases, the possible equilibrium locations are not unique.

5 Appendix

5.1 Proof of Proposition 2

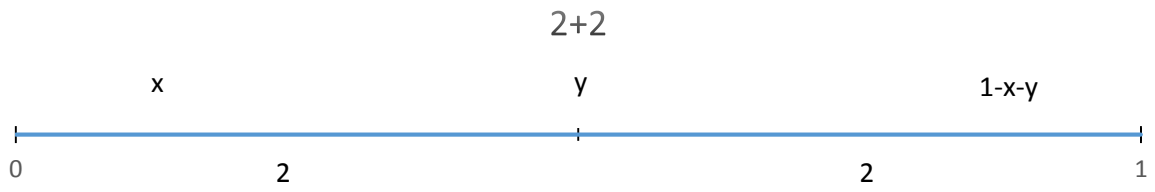
I present here the proof of the challengers' locations depending on the number of candidates. Hotelling's (1929) paper presented a proof for the two candidate case, and it is also a well-known fact that there is no pure strategy equilibrium for 3 candidates. Before I discuss the possible cases, we should note that in equilibrium there can't be a candidate alone in a polar position because he would necessarily have an incentive to move inside as long as he would be "infinitely" close to the next candidate. We should also note that the only possible case, when all candidates are at the same point, is with two candidates, because otherwise at least one side of this point would give a higher share of the votes to the candidates then the common location point. These two observations explain why a pure strategy equilibrium exists with two candidates, but there is no pure strategy equilibrium with three candidates. Based on this logic, I will only present the cases when there are at least two candidates in the polar positions, and I will not present the case when all candidates are at the same point.

Candidates are basically competing for shares on the 0-1 line, and therefore if we want to get pure strategy equilibria, we have to ensure that candidates do not have an incentive to move to any other place along the line. This case occurs when they cannot get a bigger share out of the interval at any other place than their current position. If we translate this assumption to mathematical language, we can see that an equilibrium occurs at the solution of an inequality system. In the cases where no equilibrium emerges, I only present those inequalities which rule out a pure strategy equilibrium. In the cases where an equilibrium emerges, I present the whole inequality system and, obviously the solution. I computed the solutions with Mathematica.

Proof of Proposition 2.(i)

With 4 candidates the only possible location possibility is with 2-2 candidates at the same location.

2+2 case



I will present the inequalities based on the graph, so x is the distance between 0 and the first 2 candidates; y is the length between the candidate pairs; and $1-x-y$ is the distance between the second pair of candidates and 1. To investigate whether or not it is worth for a candidate jumping out of his position, I always assume, that if he jumps at either edge, he gets the whole interval. Of course, if he jumps between candidates, he gets half of the interval where he jumps. In this particular case if a candidate jumps to the left edge, he can get x alone; and if he jumps to the right edge, het gets $1-x-y$ alone. If he jumps in the middle, he gets $\frac{y}{2}$.

$$\begin{cases} \frac{x}{2}+\frac{y}{4} \geq x \\ \frac{x}{2}+\frac{y}{4} \geq \frac{y}{2} \\ \frac{x}{2}+\frac{y}{4} \geq 1-x-y \\ \frac{1-x-y}{2}+\frac{y}{4} \geq x \\ \frac{1-x-y}{2}+\frac{y}{4} \geq \frac{y}{2} \\ \frac{1-x-y}{2}+\frac{y}{4} \geq 1-x-y \end{cases}$$

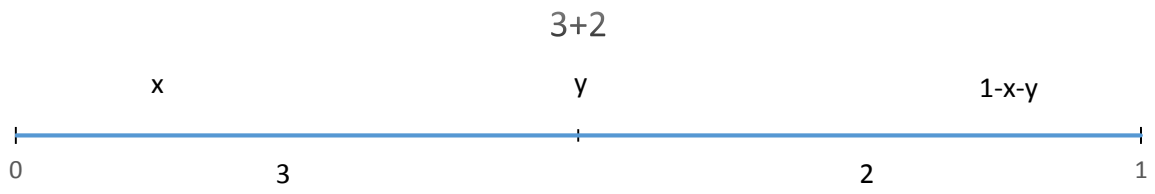
The only solution of this inequality system is $x = 0.25$ and $y = 0.5$. It means that two candidates will be at 0.25, and two candidates will be at 0.75. All candidates will get the same

25% of votes. The expected winner's location will be at the party median but the winner cannot be at the party median.

Proof of Proposition 2.(ii)

With five candidates based on my arguments the two possible location possibilities are 3-2 candidates at the same location and 2-1-2 candidates at the same location.

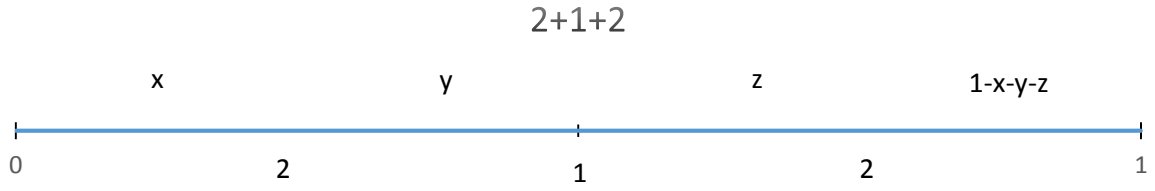
3+2 case



$$\begin{cases} \frac{x}{3}+\frac{y}{6} \geq x \\ \frac{x}{3}+\frac{y}{6} \geq \frac{y}{2} \end{cases}$$

These two inequalities already rule out a solution, therefore we do not need to write up the other conditions.

2+1+2 case



$$\begin{cases} \frac{x}{2}+\frac{y}{4} \geq x \\ \frac{x}{2}+\frac{y}{4} \geq \frac{y}{2} \\ \frac{x}{2}+\frac{y}{4} \geq \frac{z}{2} \\ \frac{x}{2}+\frac{y}{4} \geq 1-x-y-z \\ \frac{y}{2}+\frac{z}{2} \geq x \\ \frac{y}{2}+\frac{z}{2} \geq 1-x-y-z \\ \frac{1-x-y-z}{2}+\frac{z}{4} \geq x \\ \frac{1-x-y-z}{2}+\frac{z}{4} \geq \frac{y}{2} \\ \frac{1-x-y-z}{2}+\frac{z}{4} \geq \frac{z}{2} \\ \frac{1-x-y-z}{2}+\frac{z}{4} \geq 1-x-y-z \end{cases}$$

The only solution of this inequality system is $x = \frac{1}{6}$, $y = \frac{1}{3}$, and $z = \frac{1}{3}$. It means that a candidate will be at the median voter's location and two-two candidates will be at $\frac{1}{6}$ and at $\frac{5}{6}$. The candidate at the median voter's location will win the primary election with $\frac{1}{3}$ of the votes, all other candidates will get $\frac{1}{6}$ of the votes.

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