Norwegian School of Economics
Bergen, spring 2015

An alternative model of political agency

Ole-Andreas Halse Næss

Supervisor: Eirik Gaard Kristiansen

Master Thesis in Economic Analysis

NORWEGIAN SCHOOL OF ECONOMICS

This thesis was written as a part of the Master of Science in Economics and Business Administration at NHH. Please note that neither the institution nor the examiners are responsible − through the approval of this thesis − for the theories and methods used, or results and conclusions drawn in this work. I would like to thank Eirik Gaard Kristiansen for excellent guiding.

Abstract

This paper develops an alternative political agency model. We add uncertainty related to the payoff of electing the challenger and then we model effort by the politicians as an investment in a public good that will be realized if and only if the incumbent is reelected. We find that uncertainty related to the challenger has an ambiguous effect on the level of investment, but that more uncertainty makes the incumbent less willing to invest when the politicians care about the payoff from the investment. Using this model we then proceed to find that there can exist a level of uncertainty where the incumbent would be willing to invest in a non-electoral system, but the presence of elections make the incumbent unwilling to invest. In this case the voter might be better off without elections. Then we find that the effect of electoral biases on the level of investment is depending on the level of uncertainty. Longer terms of office can increase the incentives to invest in the public good.

Content

1. INTRODUCTION 6

2. THEORETICAL LITERATURE 8

2.1 THE EFFECT OF ELECTORAL INCENTIVES 8

2.2 INCENTIVES AND SELECTION 9

2.3 CAREER CONCERN MODELS 10

2.4 BESLEY'S POLITICAL AGENCY MODEL 13

2.5 THE MASKIN AND TIROLE POLITICAL AGENCY MODEL 15

2.6 MISALIGNED INCENTIVES 17

2.7 POLITICAL MYOPIA 18

2.8 THE IMPACT OF THE TERM LENGTH 19

2.9 UNREASONABLE ASSUMPTIONS OF POLITICAL AGENCY MODELS 19

3. AN ALTERNATIVE MODEL OF POLITICAL AGENCY 21

3.1 INTRODUCTION 21

3.2 THE MODEL 22

3.2.1 Set-up 22

3.2.2 Timing of the game 23

3.2.3 Second period investment 24

3.3 THE CASE WHERE THE INCUMBENT DOES NOT CARE ABOUT THE VOTER 24

3.3.1 Without electoral accountability 25

3.3.2 Electoral accountability and the optimal reelection rule 25

3.3.3 Electoral accountability without commitment 28

3.3.4 Comparison with and without accountability 29

3.3.5 The effect of uncertainty on the selection and incentives 29

3.4 THE CASE WHERE THE INCUMBENT CARES ABOUT THE VOTER 30

3.4.1 Without electoral accountability 30

3.4.2 Electoral accountability with a commitment rule 31

3.4.3 Electoral accountability without commitment 32

3.4.4 The effect of uncertainty on the selection and incentives effect 35

3.4.5 Can the voter be better off without elections? 36

3.4.6 The commitment problem of the voter and longer terms 38

3.5 COMPARISON WITH OTHER MODELS 39

4. BIASED VOTER 41

4.1 HIGH LEVEL OF UNCERTAINTY 41

4.2 INTERMEDIATE LEVELS OF UNCERTAINTY 41

4.3 LOW LEVELS OF UNCERTAINTY 42

4.4 COMPARISON WITH OTHER MODELS 43

5. MODELING THE EFFECT OF THE TERM LENGTH 44

5.1 SET-UP 44

5.2 SHORT TERMS OF OFFICE 44

5.3 LONGER TERMS OF OFFICE 46

5.4 COMPARISON OF DIFFERENT TERM LENGTHS WHEN $\beta\alpha r \geq 1$ 47

5.5 COMPARISON OF DIFFERENT TERM LENGTHS WHEN $\beta\alpha r \leq 1$ 47

5.6 COMPARISON WITH OTHER MODELS 48

***6.* UNCERTAINTY RELATED TO THE RETURN ON THE INVESTMENT 50**

6.1 SET-UP OF THE GAME 50

6.2 SEPARATING EQUILIBRIUM 51

6.3 POOLING EQUILIBRIUM 52

6.4 SELECTION AND INCENTIVES EFFECT 53

6.4.1 Selection and incentives effect in the separating equilibrium 53

6.4.2 Selection and incentives effect in the pooling equilibrium 54

6.5 EXPECTED PAYOFF OF THE VOTER 54

6.6 COMPARISON WITH OTHER MODELS 55

7. EMPIRICAL LITERATURE 57

7.1 ELECTORAL INCENTIVES 57

7.2 DISENTANGLING THE EFFECTS FROM INCENTIVES AND SELECTION 58

7.3 THE EFFECT OF THE TERM LENGTH 59

7.4 UNCERTAINTY AND INVESTMENT 59

7.5 POLITICAL MYOPIA 60

8. CONCLUSION 61

9. REFERENCES 62

1. Introduction

> The aim of every political Constitution is, or ought to be, first to obtain for rulers men who possess most wisdom to discern, and most virtue to pursue, the common good of society; and in the next place, to take the most effectual precautions for keeping them virtuous whilst they continue to hold their public trust.
>
> (Madison, 1788[1972])

In contrast to the quote above social choice theory takes a dim view of elections. Arrow's famous impossibility theorem shows that it is not always possible to aggregate individual preferences into coherent group preferences that satisfy minimal criteria of fairness (Arrow, 1951). The Gibbard-Satterthwaite theorem builds on Arrow's theorem and shows that every voting system that is not manipulable has other unreasonable features (Gibbard, 1973, Satterthwaite, 1975). McKelvey's chaos theorem shows that voting systems will produce cyclical results in multidimensional settings (McKelvey, 1976). How can we then justify the electoral system?

One tradition argues that these results are without practical relevance (Mackie, 2003, Dowding, 2006). However, Riker (1982) argues that the social choice theorems imply that we must reject the notion of elections as a way of expressing the true preferences of the people. If we cannot aggregate preferences and elections are manipulable and cyclical then there can be no popular opinion that expresses the preferences of the people (Riker,1982). This contrasts Rousseau's idea of democracy as the "general will" of the people (1762[1950]) and Riker thus rejects Rousseau's *populist democracy*. However, Riker has an alternative justification for democracy, which he defines as the *liberal notion of democracy* (Riker,1982). Elections provide the people with a mechanism to keep the politicians accountable through the possibility of reelection. According to Riker the function of elections is to "throw the rascals out", and more generally to keep a check on politicians and keep them accountable. This notion of democracy is not new. As the quote above suggests, Madison expressed much of the same ideas in the Federalist Papers (1788[1972]).

Translated to a modern language, the quote from Madison explains that an electoral system should elect more competent politicians and give the elected politicians incentives to exert effort. When Madison wrote the Federalist Papers there did not exist a formal framework for the analysis of such problems, but this has changed with the development of game theory and agency theory. The *liberal notion of democracy* is well-suited to be modeled as a principal-agent problem where the politician is the agent and the people is acting as a principal. In politics the people generally cannot promise monetary payment conditional on the politician acting in the interests of the people (though Besley (2004) provides a discussion of different payments to politicians). However, the people have the opportunity to reelect the politician, and can in some cases use this instrument to incentivize the politician to act in the interests of the people.

Throughout this paper we in most cases assume that politicians and voters are rational. This assumption is admittedly not very realistic and it has been subject to a thorough critique (Wolfers,2002, Caplan,2011). In this paper we refer to politicians rather than parties as the political actors. In presidential elections this makes sense, but in parliamentary electoral systems parties get elected into office. Parties can be divided in factions (Dewan & Squintani, 2012), and then it can matter whether we use the party or the politician as the unit of analysis. However, we will assume that the politician and the party have the same preferences, and refer to the politicians as the only political actors. It is also assumed that the politician either is in position or opposition, but this is also a simplification. In Switzerland the distinction between position and opposition is not clear (Church & Vatter, 2009).

In this paper we will develop an alternative framework to analyze political agency problems. In section 2 we will go through some influential theories in the field of political agency. In section 3 we develop an alternative model of political agency, and we expand this model with a biased voter (section 4), different term lengths (section 5) and uncertainty related to the incumbent (section 6). In section 7 we present a short review of the empirical literature in the field.

2. Theoretical literature

2.1 The effect of electoral incentives

Some of the first efforts to model political agency were made by Barro (1973) and Ferejohn (1986). In the literature following these papers electoral accountability has been the key feature. In a basic model in this tradition, the elected politician does not want to exert effort in office, but can be incentivized to exert effort through a suitable reelection rule. This can be seen as a pure moral hazard problem, where the reelection is the mechanism that the principal can use to keep the agent accountable. A basic version of this problem can be modeled in a two-period setting with one incumbent (e.g the president or ruling party), one passive challenger and one representative voter. The politician gets a rent R from being in office, but effort is costly (e) and the future is discounted (β). In the models in this tradition we do not think that politicians care about the implemented policies, so the politicians only care about getting reelected. In the second and last period there is no effort because there are no incentives through reelection possibilities. The people can then choose to reelect the incumbent if and only if a certain effort has been made, and the highest possible effort is such that the following equality holds:

$$R = R - \bar{e} + \beta R$$

The left hand side is the payoff from zero effort, while the right hand side shows the payoff of exerting effort, and the maximum effort level is such that the incumbent is indifferent. After the first period effort has been exerted the voter is indifferent between reelecting the incumbent and electing the challenger, so the voter can reelect the incumbent without acting irrationally. Ferejohn (1986) also expands this to an infinite-period setting. In the basic model above there will not be more effort in an infinite setting. We denote V as the continuation value of the voter, and we only look for stationary strategies:

$$V = R - e + \beta V$$

By not exerting effort the incumbent gets R, so the highest effort is given by:

$$R = R - \bar{e} + \beta \frac{R - \bar{e}}{1 - \beta}$$

$$\bar{e} = \beta R$$

The models in this tradition in general have appealing features for the voters. The equilibrium strategies are sequentially rational, and the equilibrium is the one preferred by the voter (Ashworth, 2012).

2.2 Incentives and selection

The models in the previous section are pure moral hazard models where all politicians are similar. On the other hand, in pure adverse selection models the goal is to avoid selecting corrupt politician or alternatively to select the most competent politician (Besley and Prat,2006). In general we would like the electoral models to be able to select the best politicians *and* give the elected politicians incentives to exert effort. Fearon (1999) shows that the pure moral hazard models are not robust to heterogeneity in the competence of politicians. In the second (and last) period there will generally be no effort, such that the voter is indifferent between reelecting the incumbent and electing a random drawn challenger. Because of this indifference, the voter can just as well elect the challenger after the incumbent has exerted effort. Voting rules based on indifference conditions are thus considered fragile (Fearon,1999). If there is just a small variation in competence (and if voters prefer a competent politician) then the voter is no longer indifferent, and the voter will reelect the incumbent if and only if the incumbent is more competent than the challenger. The less competent incumbent will then not act in the interests of the voters in the first period, because no matter how much the people appreciate this effort, there will still be incentives to vote for a more competent politician (given that second period effort is zero). Similarly, an incumbent that with certainty is more competent than the challenger has no incentives to exert effort in the first period because the voter still prefers the incumbent in the second period.

Fearon (1999) then suggests that electoral models will not always incentivize effort when allowing for heterogeneous candidates. This potential conflict between the two effects of elections is incorporated in newer political agency models which we will discuss below. This

represents a principal-agent problem where there is both hidden action (moral hazard) and hidden information (adverse selection). Present political agency models focus on these two issues simultaneously. Elections function as a mechanism to give the elected politicians incentives, but also as mechanism to elect more competent politicians.

2.3 Career concern models

One response to the Fearon critique is to use the career concern models first developed by Holmström (1982, 1999) in a political setting (Persson and Tabellini,2002, Ashworth,2005, Alesina and Tabellini, 2007) . These models assume that the voter wants to elect a competent politician and wants the elected politician to exert effort. Again we assume that the politician gets a payoff R from being in office and also that effort is costly for the politician. But in this model the cost of effort is a convex function. In the second (and last) period there will not be any effort, so the goal of the voter after the first period is to reelect the incumbent if the incumbent is more competent than the challenger. Neither the voter nor the incumbent observes the competence of the incumbent, but they observe the performance, which is the sum of competence, effort and luck. The luck is assumed to be drawn from a normal distribution with mean 0, and the competence is normally distributed with a mean m:

$$\pi_t = \theta_j + e_t + \varepsilon_t$$

The voter observes π, but does not know if a large π is due to much effort, a competent politician or luck. However, for a certain anticipated level of effort (${e_1}^a$) the voter can use Bayesian updating to find the probability that the incumbent is more competent than challenger. Because uncertainty and competence both are normally distributed we can solve the problem analytically. Then these models define $\lambda = \frac{{\sigma_\theta}^2}{{\sigma_\theta}^2 + {\sigma_\varepsilon}^2}$ and Bayesian updating shows that the posterior expectation about the competence level of the incumbent is given by the following expression:

$$\lambda(\pi_1 - {e_1}^a) + (1 - \lambda)m$$

The voter knows that the challenger's competence is drawn from a normal distribution with mean m, so the voter reelects the incumbent whenever the following inequality holds:

$$\lambda(\pi_1 - {e_1}^a) + (1-\lambda)m \geq m$$

This weighted average of the performance and the prior depends more on the prior when the random uncertainty is very large, because performance then becomes a less precise signal of competence. The above expression can be simplified to the following inequality:

$$\pi_1 \geq m + {e_1}^a$$

Elections become a selection mechanism, because incumbents with more competence are more likely to get reelected. The incumbent knows that there will only be reelection whenever the first period performance is large enough. But the incumbent does not know his own competence or the realized value of the luck. This means that the incumbent must estimate the probability of getting reelected for different levels of effort, and find the optimal effort. The incumbent thus maximizes this expression:

$$R * P(\pi_1 \geq m + {e_1}^a \mid e) - c(e)$$

Again the model takes advantage of the fact that both competence and luck is normally distributed to rewrite this expression and find the probability of reelection.

$$\theta_j + \varepsilon_t \sim N(m, {\sigma_\theta}^2 + {\sigma_\varepsilon}^2)$$

$$R * P\left(\theta_j + \varepsilon_1 \geq m + {e_1}^a - e \mid e\right) - c(e)$$

$$R\left[1 - \phi\left(\frac{{e_1}^a - e}{\sqrt{{\sigma_\theta}^2 + {\sigma_\varepsilon}^2}}\right)\right] - c(e)$$

Taking the first order conditions of this expression provides the optimal level of effort:

$$\frac{R}{\sqrt{{\sigma_\theta}^2 + {\sigma_\varepsilon}^2}} * \varphi\left(\frac{{e_1}^a - e^*}{\sqrt{{\sigma_\theta}^2 + {\sigma_\varepsilon}^2}}\right) = c'(e^*)$$

This model assumes that the rational voter correctly anticipates the level of effort. Otherwise the voter could have done better by adjusting expectation. This means that the first-order conditions above can be simplified to the following expression:

$$\frac{R}{\sqrt{2\pi({\sigma_\theta}^2 + {\sigma_\varepsilon}^2)}} = c'(e^*)$$

This is the basic result describing the equilibrium level of effort (Alesina and Tabellini, 2007). This expression implicitly provides the equilibrium level of effort. Then the models shows that when the uncertainty about the competence of the incumbent increases, the level of effort decreases. In this case effort will less likely determine whether the politician gets reelected. The same logic applies for the random luck. More randomness decreases the probability that effort will be affecting the reelection process, and because effort is costly this leads to less effort. The voter anticipates the correct level of effort, so the probability for the incumbent to get reelected is actually the same as the probability of reelection if zero effort was the equilibrium.

The career concern models are able to combine effort and competence into a single framework. This highlights the notion that the function of elections is to select competent politicians *and* give them incentives to act in the interests of the people. However, the model has made restrictive assumptions about the distribution of competence and random luck. If one of these random variables belonged to another distribution than the normal distribution, then Bayesian updating could have been more analytically difficult. More problematically, the model assumes that voters are capable of doing these calculations. The model also simplifies the electoral settings by discarding policy preferences. It can be argued that it is not always reasonable that the incumbent does not get any private signals about his own competence. Sometimes we would expect that the incumbent knows more about his own competence than the voter. In the career concern models we so far assumed that the voter was unbiased, meaning that the voter reelected the incumbent if the posterior probability of the competence of the incumbent is higher than the anticipated competence of the challenger.

An advantage of the career concern models is the flexibility. We can extend the payoff function when reelecting the incumbent with a small incumbency advantage term k, which means that reelecting the incumbent gives the voter an additional payoff. The conditions for reelecting the incumbent can then be written like this:

$$\lambda(\pi_1 - {e_1}^a) + (1-\lambda)m + k \geq m$$

Using the same derivation as above we rewrite the payoff function and then find the first order conditions, again using that the voter is not fooled in equilibrium:

$$R * P\left(\theta_j + \varepsilon_1 \geq m + {e_1}^a - e - \frac{k}{\lambda} \,\middle|\, e\right) - c(e)$$

$$\frac{R}{\sqrt{{\sigma_\theta}^2 + {\sigma_\varepsilon}^2}} * \varphi\left(\frac{-\frac{k}{\lambda}}{\sqrt{{\sigma_\theta}^2 + {\sigma_\varepsilon}^2}}\right) = c'(e^*)$$

The standard normal distribution takes on a maximum value for $\varphi(0)$, so as long as the cost of effort is convex we can observe that incumbency advantage leads to less effort. This also holds for any bias towards electing the challenger. The intuition is that when the voter is biased the effect of effort on the probability of reelection decreases. If the voter is sufficiently biased in favor of the incumbent, the incumbent knows that just a small level of effort will be enough to be reelected with a large probability.

2.4 Besley's political agency model

Besley (2006) uses a different framework for political agency modeling. In the baseline model there are two time periods where an elected politician makes a binary decision $e \in \{0,1\}$. One voter wants the decision of the politician to match the state of the world ($s \in \{0,1\}$). The voter gets a payoff of Δ if the action matches the state and zero otherwise. The incumbent knows the state of the world, and his type can be either congruent or dissonant ($P(t = congruent) = \pi$). The congruent incumbent has the same preferences as the voter while the dissonant incumbent gets a private benefit from choosing the opposite policy. The voter has the choice between reelecting the incumbent or electing a challenger that is congruent with the same probability. All politicians get a benefit E from staying in office. However, the dissonant also gets a benefit $r \in [0, R]$ from choosing the opposite action, where r is drawn each period from a distribution with CDF $G(r)$ and mean μ. The incumbents down weights the future with a discount factor of β. In the second period both types take their favorite action because there are no electoral incentives to make them do otherwise (Besley, 2006). The voter observes the payoff after the first period, so the congruent politician has no incentives to choose anything other than his favorite policy in the

first period ($e_1 = s_1$). However, the dissonant politician faces a dilemma. Choosing his favorite policy is best in this period, but if he rather pretends to be congruent there is a possibility of reelection. The optimal action of the dissonant then depends on the realized value of r_1, and the dissonant chooses to act congruently if and only if $r_1 \leq \beta(\mu + E)$. The right hand side is the payoff the dissonant incumbent can expect by acting congruently while the left hand side is the payoff of acting against the interests of the voter and not get reelected. The probability that the dissonant voter acts in the interests of the voter is then given by $\lambda = G[\beta(\mu + E)]$. Bayes' rule then provides the voters with the following posterior probability of the incumbent being congruent after observing an incumbent acting congruently:

$$P(congruent|acting\ congruently\ in\ period\ 1) = \Pi = \frac{\pi}{\pi + (1-\pi)\lambda}$$

The posterior probability depends on the action of the dissonant incumbent, but it will never be smaller than the prior, which makes acting as a congruent incumbent a good signal to send the voters. If the rent from being dissonant is sufficiently low there exists an equilibrium where the dissonant incumbent acts congruently in the first period to get reelected (Besley,2006). In equilibrium both types choose $e_1 = s_1$ and get reelected. In the second period the dissonant choose $e_2 = 1 - s_2$. So when the rent from being dissonant is low enough elections will incentivize more effort, but not select more competent politicians. Contrary, when the rent from being dissonant is higher elections will select better politicians, but not make politicians exert more effort.

We can observe that there is a trade-off between the effect of incentives and selection. If the dissonant incumbent chooses not to act congruently, the probability that the second-term incumbent is competent is given by $\pi + (1-\pi)\pi$ which obviously is larger than π. However, the voter prefers incentivizing effort because this with certainty increases the payoff in the first period.

2.5 The Maskin and Tirole political agency model

Maskin and Tirole (2005) use much of the above framework including two time periods and an incumbent that can be congruent or non-congruent (which is the same as dissonant in the Besley model). The incumbent in this model also has a binary choice of action $x \in \{a, b\}$ with a corresponding binary state of the world, and the incumbent is still congruent with a probability π (with $\pi \geq 1/2$). It is assumed that there is one representative voter that wants to match the action with the state of the world, and gets a payoff of 1 if there is a match and 0 otherwise. But in this model the voter does not have the opportunity to observe whether the action chosen by the incumbent is correct before the election. The voter knows that $P(x = a) = p$, where $p \geq 1/2$, and can choose to reelect the incumbent or elect a challenger that is assumed to be congruent with the same probability. Maskin and Tirole (2005) investigate how different levels of policy and office motivation affect the chosen policies. The incumbent gets a rent of R by being in office and an additional rent of G by choosing the favorite policy. The degree of office motivation is denoted by δ, which is given by the following expression:

$$\delta = \beta \frac{G + R}{G}$$

We can see that when the discount factor (β) is very low, which means that the incumbent cares little about the future, there is weak office motivation. On the other hand, if the rent from being in office is very large it follows that the incumbent has as strong office motivation. With a strong office motivation the incumbent is willing to take a non-preferred action in the first period if it increases the probability of reelection.

When there is a strong office motivation ($\delta \geq 1$) both types want to take the action that provides them with the largest probability of reelection. But because both types want to stay in office it is not possible for the congruent type to signal the congruence to the voter. Taking the action a is however a good signal as the voter thinks a is the best action. So both types choose action a and get reelected. After observing the action a the voter reelects the incumbent even though she is indifferent between the incumbent and the challenger. There is another equilibrium where both types choose the unpopular action, but this is considered as a less natural equilibrium (Maskin and Tirole,2005). In the second period the incumbent

chooses his favorite policy. So the expected welfare for the voter is given by the following expression:

$$W = p + \pi$$

The second term is the second period payoff where the incumbent is congruent with a probability π. The first term is given by the probability that the likely action chosen by both candidates is the correct action. Maskin and Tirole call this a full-pandering equilibrium, because the incumbent does what the voter thinks is correct. In this case there are no effects of selection. The incumbent in place in the second term is as likely to be congruent at the incumbent at the start of the first period. However, there exists an effect of incentives. With a probability of larger than ½ the non-congruent incumbent acts in the interests of the voters in the first period. But we can observe that this effect of incentives can also be negative, because the congruent incumbent acts against both personal interests and the voter's interests to get reelected when $x = b$.

When there is weak office motivation (δ≤1) both types choose their preferred policy in the first period. This means that the non-congruent incumbent always chooses the action that the voter does not prefer. But she does not know the type of the incumbent from the action. The action a is still a good signal, because this action is chosen by the congruent incumbent in the most likely state. So the voter reelects after a and elects the challenger after action b. The expected payoff for the voter is given by the following expression:

$$W = \pi(1 + p + (1 - p)\pi) + (1 - \pi)(p\pi)$$

The incumbent is congruent with probability π and then reelected with probability p, but when the congruent incumbent is not reelected there is also a possibility that the challenger is congruent. We can observe that elections in this case have a positive selection effect. The probability that the incumbent will be congruent in the second period is given by $\pi(p + (1 - p)\pi) + (1 - \pi)p\pi$ which is larger than π. But in this the case electoral incentives are not strong enough for the non-congruent incumbent to act in the interest of the voters. So this model argues similarly to Fearon (1999) that there can be a conflict between incentivizing incumbents and selecting the best incumbents. The pandering equilibrium in Maskin and Tirole model implies reelecting the incumbent even though the voter in fact is

indifferent between the incumbent and the challenger. According to Fearon such indifference conditions are fragile.

We can note that while incentivizing the non-congruent type is always beneficial for the voter in the Besley model, this does not necessarily hold in the Maskin and Tirole model. In the Besley model the voter observes the payoff before the election, which means that the non-congruent incumbent can do less harm, because the voter will not be fooled into reelecting after a non-congruent action. In the Maskin and Tirole model the voter has less information about the actions.

2.6 Misaligned incentives

In the Maskin and Tirole model we have seen that there is a pandering equilibrium where the incumbent chooses according to the prior of the voter. The reelection incentives can be so strong that even the congruent incumbent acts against the interests of the voters to get reelected. This means that electoral incentives can have negative welfare consequences.

Canes-Wrone et al (2001) give an important contribution to the pandering literature. In their model the politician wants to act in the interest of the voter *and* stay in office, and only get a positive payoff if both of these conditions are satisfied. The incumbent wants to match the action with the state of the world, but a non-competent incumbent only gets an imprecise signal about the true state. The voter does not know the state of the world, but learns it with a certain probability. The voter can also be biased in favor of the incumbent or the challenger. A priori she thinks that one of the states is more likely. Canes-Wrone et al (2001) show that if the probability that the voter learns the state is sufficiently low and the bias is low, then the non-competent incumbent sometimes chooses the more likely action even though he gets the opposite signal. This result has an intuitive interpretation. If the voter is biased in favor of the challenger the incumbent will only have a chance of getting reelected if the voter is informed about the state, and hence there are no incentives to pander. Similarly, if the voter most likely learns the state, then the incumbent is not willing to play against his signal.

Daley and Snowberg (2009) have developed a model where the incumbent must allocate their time between working on campaign and public policy. In this model campaigning work is a cheaper way of signaling competence, which means that incumbents will spend time on campaigning even though the voters prefer otherwise. The voters are not fooled, but they are forward-looking and campaigning is an effective signal of competence, which implies too much campaigning. In this case the electoral accountability is the reason that the incumbent chooses to act against the interests of the voters. This is an example of "multi-task models" inspired by Holmström and Milgrom (1991).

Lohmann (1998), Ashworth (2005) and Ashworth and Bueno de Mesquita (2006) have also developed multi-task models. In these models inefficiencies arise even if the incumbents have the same preferences as the voters. Without elections the incumbent would have chosen the best policy for the voter. But the incumbent in addition has incentives to take the action that increases the voters' posterior about the competence of the incumbent, because this increases the probability of reelection. In contrast, the inefficiencies in the pandering models arise because of ex-ante uncertainty about which policy that is best for the voters.

2.7 Political myopia

Politicial myopia arises when politicians are biased towards short-term politics. Politicians may borrow too much if they think they are losing the election to make it more difficult for the next leaders (Persson and Svensson,1989, Alesina and Tabellini,1990). There can also be a short-term bias due to the fact that politicians have more incentives do what the voters want before an election (Nordhaus,1975). Bonfiglioli and Gancia (2013) developed a model where the incumbent invests too little in long-term projects because short-term effort improves current performance. The incumbent wants to get reelected and short-term effort sends a stronger signal of competence. A rational voter anticipates this, which means that the short-term bias does not increase the probability of reelection, but still leads to underinvestment. In this model the incumbent has more incentives to long-term investment

when there is a lot of uncertainty related to performance. This makes short-term effort a less precise signal of competence, and thus gives the incumbent more incentives to make a long-term investment.(Bonfiglioli and Gancia, 2013). Aidt and Dutta (2011) show that political myopia is not an inevitable consequence of long-term investments, but that it can be a problem given interactions between observation lags, growth and constraints on revenue. Persson and Tabellini (1999) built a model where taxation on capital is used to invest in public good. Uncertainty about the electoral outcome reduces the level of investment because the incumbent is less certain to be in power after the election.

2.8 The impact of the term length

Institutional features will impact the predictions from the political agency models. Persson and Tabelinni (2002) investigate how different electoral systems impact the incentives of the incumbents. There exists a large literature on the effects of term limits (Smart and Sturm, 2013, Besley and Case,1993), but the effects of the duration of the time in office does not span an equally large literature. In the Maskin and Tirole model (2005) the term length does not matter as long as voters are risk neutral. When voters are risk-averse shorter terms are more desirable. In a two-period setting it is more risky to have one incumbent for a long term than to draw two random incumbent for one period each. Optimal term length is found by balancing this advantage with the transaction costs related to switching leaders. In the classical accountability papers it can be shown that in general shorter term length is better for the voter (Dal Bo and Rossi,2008). In these models shorter terms make the incumbents exert more effort and extract lower rent. Schultz (2008) has developed a model where shorter term leads to more accountability, but also more distortions because the incumbent wants to manipulate the swing-voters before the election. Dal Bo and Rossi (2011) have developed a model where longer terms are better if the payback of legislative effort lies in the future.

2.9 Unreasonable assumptions of political agency models

The political agency models in this tradition present a highly simplified picture of elections. In this tradition the voters agree that some candidates are more competent than others, and

everyone wants to reelect these competent politicians. The voters also agree that there is such a thing as exerting effort in office, and the people agree on which political behavior that can be labeled as effort. In reality people have different views on competence and effort. An even larger problem is that we know that people have policy preferences. For example, if Norwegian farmers and workers vote for respectively the agrarian Centre Party and the Labour Party, an intuitive explanation can be related to the different groups having different preferences. It is artificial to assume that people vote only to incentivize effort and elect more competent politicians. Theoretically speaking there are many reasons and explanations for voting behavior (Erikson, 1981, Blais & Young, 1999, Banzhaf & Walsh, 2008). Berganza (2000) presents three different functions of elections. One function is to discipline elected politicians and another function is to elect more competent politicians. A third function of elections is to aggregate conflicting interests (Berganza, 2000). This perspective of elections is at the core of a central branch of political economy (Downs, 1957, Meltzer & Richard,1981), where restricting the domain of preferences can allow for coherent aggregation of preferences (Black,1948). Political agency models generally discard elections as a method of aggregating non-aligned preferences. Elections function only as a mechanism for selection and incentives, and thus agency models clearly lose some of their power.

3. An alternative model of political agency

3.1 Introduction

When a politician is elected it is usually around 4-5 years until the next election. In some cases the identity of the opponents in the next election is visible from the start of the period, but more often there is some uncertainty related to the challenger. In U.S. presidential elections the identity of the challenger is rarely known with certainty until a year before the election. This means that the incumbent must choose actions without knowing the strength of the challenger. In the Besley model (2006) and the Maskin and Tirole model (2005) this does not pose a problem. In these models the challenger is assumed to be drawn from the same distribution as the incumbent, and this distribution (congruent/non-congruent) is everything that the voter knows about the incumbent. The incumbent has actions that will guarantee that their posterior probability of being congruent is at least as high as the prior, and by acting this way they can guarantee reelection. But this is problematic for two reasons. When no information is revealed the voter is indifferent, which can be considered as a fragile equilibrium according to Fearon (1999). Secondly, it is intuitively unlikely that *ex ante* there is an action that will guarantee reelection. In reality it is probably more likely that the challenger sometimes win the next election regardless of the office-motivation of the incumbent. We will model this by allowing the payoff of electing the challenger to vary, and let the voter know the realized value of this payoff before the election. In this way the voter has an informational advantage over the incumbent. This approach introduces selection effects into the model even when all incumbents are of the same type.

Contrary to the Besley (2006) and Maskin and Tirole (2005) papers we do not allow for politicians to deliberately desire the opposite policy of the people. Intuitively it feels more appropriate to let the non-congruent politicians not care about the payoff of the voter rather than having the *opposite* preferences. Of course these models use the non-congruent approach as a way of simplifying complex political decisions to a binary choice. In the Besley model the rent from acting non-congruently can be varied to change the level of non-congruency, but the Maskin and Tirole model assumes symmetry between the congruent and non-congruent incumbent. This means that the payoff for the non-congruent from doing the

opposite action is the same payoff as the congruent gets from acting in the interests of the voter. We will thus not use the concept of congruent and non-congruent politicians in this paper.

We will also think of the effort of the politicians as an investment in a public good, which means that there is a time-delay between the action of the incumbent and the realization of the payoff. We do this to capture the idea that some political projects take time to finish, and this also allows us to find the effects of political myopia and different term lengths. We assume that all voters have the same preferences about this investment, such that we can use one representative voter in the model. By thinking of the effort as an investment in a public good the concept of all voters having the same preferences becomes less artificial. Still it is clearly not the case that all voters benefit equally from public goods.

3.2 The model

3.2.1 Set-up

In accordance with much of the literature in this field, we choose to analyze the electoral agency problem as a three-player problem in a two-period setting. There is one incumbent who was elected before the game started, one politician in the opposition (the challenger) and one representative voter. The incumbent has a certain amount of time or money (T) which can be delegated to a long term investment (I) or personal spending (S). The personal spending can be interpreted as corruption, but if we think of T as a time constraint then S also includes working hours spent on personal enhancing issues and career-promoting activities. The investment can be interpreted as investing in a public good that benefits all of the voters in the society. The return on this investment is given by r. We assume that the incumbent cares about spending, but that the incumbent also prefers a high level of investment. An explanation for this can be that investment is beneficial for the voter and that the incumbent partially cares about the interests of the voter. The challenger has a passive role in this game. The voter has to choose between reelecting the incumbent and electing the challenger. The payoff of electing the challenger is not known at the beginning of the game,

but it is distributed according to a common known uniform distribution. This random shock is realized after the incumbent makes the investment decision and before the voter decides on reelection. The voter can also be biased in favor of the challenger ($\sigma \geq 0$). This bias means that if the incumbent provides the voter with a payoff of zero, she will most likely elect the challenger. Unless otherwise is explicitly formulated we assume that the bias is equal to zero. If the voter reelects the incumbent the payoff of the investment is realized, but if she elects the challenger the investment will not be finished and gives no payoff. We assume that the incumbent discounts the future. We also restrict every variable and parameter to be non-negative. We can then show the payoff functions for the voter and the politician with these expressions:

$$U_v(I) = rI_1\{1_{inc}\} + \{(\eta)1_{cha}\}$$

$$U_p(S, I) = S_1 + \{\beta(S_2 + \alpha r I_1)\}_{if\ reelected}$$

$$T_t = I_t + S_t$$

$$\eta \sim U\left[-\frac{1}{2\psi} + \sigma, \frac{1}{2\psi} + \sigma\right]$$

Obviously these are simplifying assumptions. By focusing only on two periods we make the game easier to solve, but also less realistic. Similarly there are in reality much more than one voter, but it is not easy to make a model with a realistic number of voters. The strategies depend on the actions of the other players, so with for example one million voters we would get a strategy space so large that a solution would be difficult to obtain. To assume that the incumbent either uses the resources on investment or personal spending is also a simplifying assumption. The point of this model is more to represent some mechanisms that are present in real-life elections than to give a complete picture of the electoral process

.

3.2.2 Timing of the game

We will assume that the game is played according to the following time process. The central elements are that the voter has an informational advantage over the incumbent, and that the payoff from the investment is only realized if the incumbent is reelected.

1) The incumbent chooses the level of investment in period 1.

2) The payoff of electing the challenger is realized.

3) The voter chooses between the incumbent and the challenger.

4) The investment from period 1 is realized if the incumbent is reelected, and the elected politician chooses investment in period 2.

5) The game ends and payoffs are realized.

3.2.3 Second period investment

In the second period the incumbent chooses whether to invest if the incumbent is still in office. But as this game only has two periods and the payoffs of the investment is not realized until the next period, there are no incentives for investment in the second period. The voter is rational, so we know that the voter correctly assumes zero investment in the second period when making the electoral decision.

$$S_2 = T \; and \; I_2 = 0$$

3.3 The case where the incumbent does not care about the voter

We will analyze the model in two different settings. First we will assume that the incumbent does not care about the investment and the resulting payoff to the voter, but only wants to maximize personal spending. In the second setting we will assume that the incumbent cares about the investment. For each of these two settings we will compare the expected payoff of the voter in a system with electoral accountability with the corresponding expected payoff without such accountability. A lack of accountability can be the case in an autocratic system, but for us the lack of accountability in period 1 can occur due to long terms in office. In this case the incumbent *is* accountable, but at a later stage.

First we can go through the case where the politician does not care about the investment and the voter ($\alpha = 0$). The electoral accountability can still encourage investment because a high level of investment increases the probability of reelection, which in turn leads to more personal spending in the next period.

3.3.1 Without electoral accountability

We will first investigate the case where there is no electoral accountability, which means that there is no election for the incumbent to care about in the game. In this setting no elections implies zero investment:

$$S_1 = T \text{ and } I_1 = 0$$

$$EU_v = 0$$

The incumbent in this case does not care about the investment or the voter and has no incentives to invest in a system without accountability.

3.3.2 Electoral accountability and the optimal reelection rule

In general binding agreements are difficult to achieve in electoral situations. After the first period is over the voter is not obliged to reelect the incumbent even though the incumbent has acted in the interests of the voter. In the classic pure moral hazard models discussed above there was no uncertain payoff related to the challenger, which implied that the voter did not lose anything by reelecting the incumbent. But our model also differs due to the fact that the payoff of the investment is not realized until the next period. This effect works in the opposite direction as the investment gives voters incentives to reelect the incumbent. First we will investigate the case where the voter can credibly commit to a reelection rule, while we later will discuss the more realistic case of no credibility.

The voter would prefer the incumbent to invest the entire budget, but knowing that the incumbent discounts the future this solution will not be possible. A solution for the voter will then be to set the reelection rule to make the incumbent accept the deal. The incumbent is indifferent between accepting or not when the following equality holds:

$$T - \bar{I_1} + \beta T = T$$

We get this investment level and expected payoff:

$$\bar{I_1} = \beta T \ \ and \ \ \bar{S_1} = T(1-\beta)$$

$$EU_v = r\beta T$$

This corresponds to the models in the tradition of Barro (1973) and Ferejohn (1986). However this is not necessarily the optimal reelection rule in our setting. When committing to reelection there will be investment, but at the same time the voter never gets the payoff from the challenger, even in the cases where the random variable η is realized as a very high value. The voter then gets the incentives effect of elections, but will not get the effect of selection. The payoff of electing the challenger can be positive or negative while the payoff from a non-investing incumbent is zero. This means that the voter can choose between zero and a positive payoff even though investment is zero. As uncertainty increases this weighted average of zero and a positive payoff also increases. The payoff without investment is given by:

$$EU_v = P(0 \geq \eta) * 0 + \big(1 - P(0 \geq \eta)\big) * E[\eta | \eta \geq 0] = \frac{1}{8\psi}$$

When ψ is small this ex ante expected payoff is higher than the payoff with investment because of this selection effect. The threshold for ψ is given by:

$$\psi \leq \tilde{\psi} = \frac{1}{8r\beta T}$$

For a small ψ the voter prefers this situation, but another, and potentially better, solution would be to encourage investment *without* committing to reelection. Using this strategy the voter can get both the effect from selection and the effect of incentives. We can (for now) assume that the voter only reelects the incumbent if investment is above a certain threshold, and that she is not obliged to reelect even though the threshold is reached. In this case the expected payoff is given by the following expression:

$$EU_v = P(r\tilde{I} \geq \eta) * r\tilde{I} + \Big(1 - P(r\tilde{I} \geq \eta)\Big) * E[\eta | \eta \geq r\tilde{I}]$$

In this case we assume that the voter can choose not to reelect the incumbent even though the payoff of electing the incumbent is higher. The incumbent knows that to be reelected a certain level of investment is necessary, although investment is not a sufficient condition for reelection. The voter must set the threshold such that the incumbent prefers investing knowing that there will be no reelection if the challenger is strong.

The voter now reelects the incumbent if the expected payoff from the investment exceeds the payoff from electing the challenger. The incumbent does not know the payoff from the challenger, but the incumbent can find the probability for reelection given an investment.

$$P(incumbent\ gets\ reelected) = P(rI_1 \geq \eta)$$

$$P(\eta \leq\ rI_1) = min\left[\frac{1}{2} + \psi(rI_1), 1\right]$$

A probability cannot be negative, and this expression cannot be negative as investment cannot be negative. As expected we see that the probability of reelection increases with the amount of investment and return on the investment. We also see that when the uncertainty about the challenger increases (small ψ) the probability of reelection depends less on the amount of investment. The investment threshold is given where the following inequality holds with equality:

$$T - I + \beta T\left[\frac{1}{2} + \psi rI\right] \geq T$$

$$\tilde{I} = \frac{\beta T}{2 - 2\psi\beta rT}$$

We are here assuming an interior probability solution($\frac{1}{2} + \psi r\tilde{I} < 1$), and then we get the following expected payoff:

$$EU_v = \left(\frac{1}{2} + \psi r\tilde{I}\right)(r\tilde{I}) + \left(\frac{1}{2} - \psi r\tilde{I}\right)\left(\frac{1}{4\psi} + \frac{r\tilde{I}}{2}\right) = \frac{r\tilde{I}}{2} + \frac{1}{8\psi} + \frac{1}{2}\psi(r\tilde{I})^2$$

But how can this be a credible commitment? After all, the incumbent knows that there is a possibility that the payoff of electing the challenger is negative. So by deviating and setting investment equal to zero the voter prefers the incumbent with a probability of one half. How

can the voter credibly commit not to reelect the incumbent in this case? Given the nature of the electoral systems in democratic countries it is unlikely that such a commitment can be made. In a similar way she cannot credibly commit to reelect the incumbent if a certain level of investment is made. After the investment decision is made the voter will always have incentives to vote for the challenger if the payoff of the challenger is larger. We will mostly focus on situations where binding electoral agreements cannot be made.

3.3.3 Electoral accountability without commitment

In the more realistic case of no commitment the voter will reelect the incumbent if and only if the return from the investment is larger than the payoff from electing the challenger. The maximization problem for the incumbent in the first period is given by the following expression assuming an interior probability solution:

$$\max\ S_1 + (\frac{1}{2} + \psi(r(T - S_1)))\beta(S_2)$$

This reflects the fact that incumbent wants to stay in office, but at the same time does not want to waste resources on investment if the challenger is strong. We know that the optimal second period choice is $S_2 = T$. If there is much uncertainty the probability that investment leads to reelection decreases, which in turn reduces the incentives to invest. If ψ is smaller than the following threshold there will be no investment:

$$\psi \leq \tilde{\psi} = \frac{1}{\beta r T}$$

When the level of uncertainty is low it is better for the incumbent to invest a certain amount such that reelection is guaranteed. But when the level of uncertainty is high the incumbent has to invest more to secure reelection, and then it is better not to invest and still get reelected with a probability of one half.

$$\psi \leq \tilde{\psi}\text{:}\quad S_1 = T \text{ and } I_1 = 0$$

$$\psi \geq \tilde{\psi}\text{:}\quad S_1 = T - \frac{1}{2\psi r} \text{ and } I_1 = \frac{1}{2\psi r}$$

The expected payoffs for the cases are given by the following expressions:

$$\psi \leq \tilde{\psi}:\ EU_v = \frac{1}{2} * 0 + \frac{1}{2} * E[\eta|\eta \geq 0] = \frac{1}{8\psi}$$

$$\psi \geq \tilde{\psi}: EU_v = \frac{1}{2\psi}$$

We can see that the voter prefers investment, which is the incentives effect of the election. Intuitively this also makes sense because the incumbent sets investment to guarantee reelection, which means that the investment level is such that the voter gets a payoff as large as the maximum level from the challenger. But on the other hand the incumbent only chooses to invest when uncertainty is low. The expected payoff of the voter can be higher when there is much uncertainty because this is a situation where the selection effect is stronger.

3.3.4 Comparison with and without accountability

Without accountability the incumbent is not willing to invest and the voter gets a payoff of zero. In a system with electoral accountability the voter gets a positive payoff. When the uncertainty is low there is an incentives effect that makes the incumbent invest. For higher level of uncertainty the incumbent is unwilling to invest, but electoral accountability is still beneficial for the voter because of the selection effect. The voter has the opportunity to select the challenger only when she prefers the challenger, so we have the following result:

Proposition 3.3 *If the incumbent does not care about the voter then the voter always prefers to have elections.*

3.3.5 The effect of uncertainty on the selection and incentives

Uncertainty has a mixed effect on the expected payoff of the voter. A very large uncertainty can be beneficial for the voter even though there is no investment. This selection effect is increasing in uncertainty because the voter always has the safe option of reelecting a non-investing incumbent. For lower values of uncertainty ($\psi \geq \tilde{\psi}$) the incumbent always get reelected, such that there are no selection effects. However, in this case there is an incentive effect of elections.

As uncertainty decreases from a high level the payoff of the voter decreases as the selection effect becomes weaker. Then there is jump in the payoff whenever the uncertainty is low enough for the incumbent to be willing to invest. For every uncertainty level lower than this the incumbent will set the level of investment slightly above the level where the voter is indifferent between reelecting the incumbent and the maximum payoff from the challenger. When there is very little uncertainty (ψ goes towards infinity) the incumbent knows that the voter's payoff from electing the challenger most likely will be zero. The incumbent can invest ε and still be reelected with probability one because the voter cannot credibly commit to not vote for the incumbent when it is in the voters interest to vote for the incumbent.

3.4 The case where the incumbent cares about the voter

In this section we will assume that the incumbent cares about the realization of the investment. This means that the incumbent cares about the payoff the voter gets from the investment. However, we find it natural to assume that the incumbent only cares about the part of the voter's payoff that can be attributed to the actions of the incumbent, and not the payoff that is resulting from the challenger.

3.4.1 Without electoral accountability

If there are no elections and hence no accountability then the maximization problem for the incumbent in the first period can be written like this:

$$\max \; S_1 + \beta(S_2 + \alpha r(T - S_1))$$

As above there are no incentives to invest in the second period because the game ends before the payoffs eventually will be realized. The solution obviously depends on the parameter values. In particular a low β makes the future less important which discourages investment, and low values of α and r also makes the investment less valuable to the incumbent.

$$\beta\alpha r \geq 1 : \; S_1 = 0 \text{ and } I_1 = T, \; S_2 = T \; and \; I_2 = 0$$

$$\beta\alpha r \leq 1 : \; S_1 = T \text{ and } I_1 = 0, \qquad S_2 = T \; and \; I_2 = 0$$

The intuition behind this threshold is clear. If the future does not mean anything for the incumbent ($\beta = 0$) there are no incentives to exchange payoff today with meaningless payoff in the future. The more effective the investment (large r), the more the incumbent is willing to invest. Similarly the incumbent invests more when he cares more about the voter. The expected payoff for the voter in these two cases is given by the following expressions:

$$\beta\alpha r \geq 1\text{: } EU_v = rT$$

$$\beta\alpha r \leq 1\text{: } EU_v = 0$$

3.4.2 Electoral accountability with a commitment rule

Again we start by discussing the case where the voter can credibly commit to a reelection rule before we move on to the more realistic case of no commitment. Let us (for now) assume that the voter reelects the incumbent if and only if the incumbent invests the entire budget in the first period. When the parameter values are such that the incumbent would have invested in absence of the election ($\beta\alpha r \geq 1$) this reelection rule is non-problematic. When $\beta\alpha r \leq 1$ there is a tradeoff for the incumbent. By keeping everything in the first period there are no reelection possibilities, but there will be a better payoff in the first period which is the most important period. By investing the incumbent gets the return from the investment in addition to the opportunity to use the budget for himself in the next period. The incumbent chooses to invest when the following inequality holds:

$$\beta(T + \alpha rT) \geq T$$

Whenever the incumbent is patient, cares more about the voter and the investment gives a good return, it is easier to make him accept the investment agreement. We can see that this inequality is significantly easier to satisfy than $\beta\alpha r \geq 1$. If β is close to 1 then the inequality holds except in the case where αr is very small. But if this expression still does not hold then the voter can decide a reelection level of investment lower than T:

$$T - \breve{I}_1 + \beta\left(T + \alpha r\left(\breve{I}_1\right)\right) = T$$

$$\breve{I}_1 = \frac{\beta T}{1 - \beta\alpha r}$$

From now on we will focus on cases where the voter cannot make credible commitments.

3.4.3 Electoral accountability without commitment

We have seen that when the incumbent would prefer no investment the voter can incentivize investment through a suitable reelection rule. But this is not a credible reelection rule. The incumbent knows that reelection depends on the realization of the random shock, so a rational incumbent knows that there will be reelection if the challenger is weak. When the incumbent decides about the investment level he correctly anticipates the probability that there will be reelection for a given level of investment. The incumbent thus maximizes the following payoff function:

$$\max\ S_1 + (\frac{1}{2} + \psi(r(T - S_1)))\beta(S_2 + \alpha r(T - S_1))$$

$$= S_1 + \left(\frac{1}{2} + \psi rT\right)(\beta T + \beta\alpha rT) - \left(\frac{1}{2} + \psi rT\right)\beta\alpha r S_1 - (\beta T + \beta\alpha rT)\psi r S_1 + \psi\beta\alpha r^2\ (S_1)^2$$

$$= \left(\frac{1}{2} + \psi rT\right)(\beta T + \beta\alpha rT) + \left[1 - \left(\frac{1}{2} + \psi rT\right)\beta\alpha r - (\beta T + \beta\alpha rT)\psi r\right] S_1 + \psi\beta\alpha r^2\ (S_1)^2$$

We solve this model for high and low levels of uncertainty. When there is a low level of uncertainty the incumbent can guarantee reelection through a sufficient investment, and then we must modify this payoff function to account for the fact that the reelection probability cannot exceed one.

3.4.3.1 High level of uncertainty

This function is convex for interior solutions, so we do not find the optimum by taking the first order conditions. Assuming an interior probability solution we find that full investment is better than no investment whenever the following inequality holds:

$$T + \frac{\beta T}{2} \leq \beta(\frac{1}{2} + \psi rT)(T + \alpha rT)$$

This simplifies to:

$$1 \leq \beta r(\frac{\alpha}{2} + \psi T + \alpha\psi rT)$$

$$\psi \geq \overline{\psi} = max\left[\frac{\frac{1}{\beta r} - \frac{\alpha}{2}}{T(1+\alpha r)}, 0\right]$$

The incumbent invests everything if ψ is greater than this threshold and nothing if it is smaller. We can see that if the incumbent is very interested in the investment ($\beta\alpha r \geq 2$) there will be investment regardless of the uncertainty related to the challenger.

Proposition 3.4.3.1 *If the level of uncertainty is too high the incumbent is not willing to invest.*

3.4.3.2 Low level of uncertainty

If ψ is big enough the incumbent gets reelected without making a full investment. When the level of uncertainty is very low the payoff of electing the challenger will very likely be close to zero, so it is possible for the incumbent to invest and get reelected with certainty. This situation can only occur when the following inequality is satisfied:

$$\psi \geq \hat{\psi} = \frac{1}{2rT}$$

So when $\psi \geq \hat{\psi}$ the incumbent can secure reelection. In the previous paragraph we found that the incumbent was willing to invest whenever $\psi \geq \overline{\psi}$. Intuitively we would think that $\hat{\psi} \geq \overline{\psi}$, but for some parameter values this inequality does not hold:

$$\hat{\psi} \leq \overline{\psi}$$

$$\beta\alpha r \leq \frac{2-\beta}{2}$$

When the incumbent cares sufficiently little about the return on the investment, the probability corner solution will be reached at lower uncertainty level than $\overline{\psi}$. To simplify the notation we assume that $\beta\alpha r \geq \frac{2-\beta}{2}$. We have already described the situation where $\alpha = 0$, and the situation with a very small $\beta\alpha r$ is not that different from α=0, so this does restriction does not substantially change the model. This threshold also has an appealing intuitive

feature, because it says that if the incumbent has the opportunity to guarantee reelection trough suitable investment, then the incumbent chooses to make the investment.

If the incumbent chooses to invest this means that the incumbent does not have to make a full investment to secure reelection. The incumbent can choose to set the level investment equal to the above threshold, and this will be better than full investment given that the following inequality holds:

$$T - \frac{1}{2\psi r} + \beta\left(T + \alpha r\left(\frac{1}{2\psi r}\right)\right) \geq \beta(T + \alpha r T)$$

This will not hold when $\beta\alpha r \geq 1$. After all, this is a situation where the incumbent wants to maximize investment, so even though further investment does not increase the probability of electoral gain the incumbent still wants to increase investment.

Using the same logic we know that when $\beta\alpha r \leq 1$ the incumbent will not invest more than the threshold. Investing to the threshold is better than zero investment if this condition holds:

$$T - \frac{1}{2\psi r} + \beta\left(T + \alpha r\left(\frac{1}{2\psi r}\right)\right) \geq T + \frac{\beta T}{2}$$

$$\psi \geq \tilde{\psi} = \frac{1 - \beta\alpha r}{r\beta T}$$

This condition is always satisfied in this setting, due to the above assumptions and restrictions, which means that the incumbent always prefers some investment over zero investment when the uncertainty level is low. The intuition is that if ψ is so large that the incumbent can get reelected with certainty, an incumbent who only to a small degree cares about the voter faces a tradeoff, because only a small investment probably will lead to reelection. So when the uncertainty is sufficiently low an incumbent that cares little (or nothing) about the investment will still make an investment. But since the goal of investing is to secure reelection we can notice that the investment is not larger than necessary to get reelected.

Proposition 3.4.3.2. *If there is a low level of uncertainty the incumbent makes a large investment if* $\beta\alpha r \geq 1$. *Otherwise the incumbent invests just enough to get reelected.*

Below we have summarized the conditions for investment for the different parameter values.

Uncertainty level	Payoff from investment	Investment level
$\psi \geq \hat{\psi}$	$\frac{2-\beta}{2} \leq \beta\alpha r \leq 1$	$I_1 = \frac{1}{2\psi r}$
$\psi \geq \hat{\psi}$	$\beta\alpha r \geq 1$	$I_1 = T$
$\hat{\psi} \geq \psi \geq \overline{\psi}$	$\frac{2-\beta}{2} \leq \beta\alpha r \leq 2$	$I_1 = T$
$\psi \leq \overline{\psi}$	$\frac{2-\beta}{2} \leq \beta\alpha r \leq 2$	$I_1 = 0$

Table 3.4.3

3.4.4 The effect of uncertainty on the selection and incentives effect

Generally we can observe that more uncertainty is associated with a lower level of investment. This is intuitive as more uncertainty reduces the probability of getting the payoff from the investment realized. In accordance with the theoretical literature we have found that there are two mechanisms through which elections can be beneficial for the voter. Elections give *incentives* to the politicians to invest in a public good and elections give the voter an option to *selec*t a more preferred politician. We have shown the effects of these two mechanisms given different levels of uncertainty and for different preferences of the incumbent. When there is very little uncertainty ($\psi \geq \hat{\psi}$) we have seen that the incentives effect makes the incumbent invest. In this case the incumbent invests enough to get reelected with certainty, so there is no selection effect of elections. But in this case the selection effect would have been weak anyway, and that is also the reason that the incumbent is willing to invest. For intermediate values of uncertainty $\hat{\psi} \geq \psi \geq \overline{\psi}$ the selection effect is weak enough for the incumbent to be willing to invest, but at the same time there is so much

uncertainty that the voter sometimes prefers the challenger. In this case the voter gets both a selection and incentives effect. The incumbent chooses to invest even in the case where the incumbent does not care about the result of the investment. By investing at least to the maximum payoff of electing the challenger, the incentives effect is stronger. For high values of uncertainty ($\psi \leq \overline{\psi}$) the investment is a less useful tool to secure reelection. In this case the incumbent chooses not to invest even though the incumbent appreciates the investment. This implies that elections do not incentivize effort. However, in this case the selection effect is strong, which means that the payoff for the voter can be larger even though there is no investment.

3.4.5 Can the voter be better off without elections?

Without elections it is not, by definition, possible to select a more preferred challenger. So the selection effect disappears. Without elections it is similarly not possible for elections to incentivize investment. However, whenever the incumbent is willing to invest only because of the payoff from the investment ($\beta\alpha r \geq 1$), the incumbent has incentives to invest in the absence of elections. With elections we have seen above that it is not certain that the incumbent invests even though $\beta\alpha r \geq 1$. The incumbent cannot guarantee reelection, so it is then the case that the incumbent abstains from investing because the investment might not be realized. We have seen that this happens when $\psi \leq \overline{\psi}$ and $\beta\alpha r \geq 1$. The *incentives* effect is then stronger in a non-electoral setting, but this still does not imply that the voter necessarily is better off without elections. The *selection* effect is in place with elections, and this effect becomes stronger as uncertainty increases. The selection effect of elections dominates the incentives effect whenever ψ is smaller than the following threshold:

$$\psi \leq \underline{\psi} = \frac{1}{8rT}$$

This means that there is a non-empty interval where the absence of elections is better than elections only if $\overline{\psi} \geq \underline{\psi}$, which can be expressed with this inequality:

$$\frac{8-\beta}{5} \geq \beta\alpha r$$

We also know that we need $\beta\alpha r \geq 1$ in order for elections to hurt the voter. This means that we need both of these inequalities to hold for the absence of elections to better for the voter. In addition we need that the uncertainty level is so high that the accountable incumbent is unwilling to invest. To summarize, no elections is only better for the voter when the following conditions are satisfied:

$$\frac{8-\beta}{5} \geq \beta\alpha r \geq 1$$

$$\underline{\psi} \leq \psi \leq \overline{\psi}$$

We can see this does not hold for many parameter values. Assuming β is close to one we need αr to be between 1 and 7/5. If β is small αr must be between 1 and 8/5. So it is only in the case where $\underline{\psi} \leq \psi \leq \overline{\psi}$ and $\beta\alpha r \in [1, \frac{8}{5})$ that no elections can be strictly better than electoral accountability.

When the level of uncertainty is low enough for the incumbent to invest ($\hat{\psi} \geq \psi \geq \overline{\psi}$) the payoff is larger with accountability. We have seen that the voter gets both the *selection* effect and the *incentives* effect with elections, and even though the incumbent always invests without elections we can never have that no accountability is strictly better, because the following inequality always holds:

$$rT \leq max[rT, \eta]$$

When the level of uncertainty is sufficiently low the accountable incumbent and the non-accountable incumbent both choose full investment if they care enough about the result of the investment ($\beta\alpha r \geq 1$).As described in the previous section this is a setting where the incentives effect dominates the selection effect, so as long as the incentives effect takes place the voter is not hurt by the lack of elections. However, if the incumbent cares less about the investment it is still possible that the accountable incumbent is willing to invest, but the non-accountable incumbent will never invest.

Proposition 3.4.5. *If* $\overline{\psi} \geq \psi \geq \underline{\psi}$ *and* $\frac{8-\beta}{5} \geq \beta\alpha r \geq 1$ *then the voter is better off without elections. For all other parameter values electoral accountability is weakly preferred to the absence of elections.*

We can summarize these findings with a table:

Uncertainty level	**Payoff from investment**	**Comparison of the payoff of the voter**
$\psi \leq \underline{\psi}$	$\beta\alpha r \geq 1$	$EU_{acc} \geq EU_{no\ acc}$
$\overline{\psi} \geq \psi \geq \underline{\psi}$	$\frac{8-\beta}{5} \geq \beta\alpha r \geq 1$	$EU_{acc} \leq EU_{no\ acc}$
$\overline{\psi} \leq \psi \leq \hat{\psi}$,	$\beta\alpha r \geq 1$	$EU_{acc} \geq EU_{no\ acc}$
$\psi \geq \hat{\psi}$	$\beta\alpha r \geq 1$	$EU_{acc} = EU_{no\ acc}$
	$\beta\alpha r \leq 1$	$EU_{acc} \geq EU_{no\ acc}$

Table 3.4.5.

3.4.6 The commitment problem of the voter and longer terms

For the parameter values above where no accountability is better for the voter we can observe that the voter is facing a commitment problem. *Ex-ante* she would prefer to agree to reelect the incumbent after full investment, and the incumbent would be happy to invest, because this is a setting where the incumbent does not need electoral incentives to make the investment. But no such binding agreement can be made in a democratic electoral system. The incumbent knows that the voter will not reelect him when the challenger is strong, and when the incumbent considers this probability in the investment decision there will not be investment. In this case the voter is hurt by her own options. We can observe that this situation would not have occurred with longer terms in office. We can think of longer terms as consisting of two short terms. If the incumbent knows that he will stay in power when the payoff of the investment is realized then the incumbent will invest in the first period.

Proposition 3.4.6.*If* $\overline{\psi} \geq \psi \geq \underline{\psi}$ *and* $\frac{8-\beta}{5} \geq \beta\alpha r \geq 1$ *then longer terms of office are beneficial for the voter.*

For other parameter values it is more difficult to draw a conclusion based on this model. When we double the term length there will not be an election in the time period of this game which means that the selection effect will not take place. However, this is primarily a consequence of the way we defined our model. With a longer time period there will of course be elections even though the terms in office are longer. The selection effect can nevertheless still be weaker in this setting because elections take place less frequently. Later in this paper we will model investment decisions in a multi-period setting.

3.5 Comparison with other models

In the career concern models more uncertainty (both uncertainty related to competence and pure luck) reduces the effort by the incumbent. Effort is less useful when there is much uncertainty because effort then has less impact on reelection possibilities. The same effect is present in our model, and makes the incumbent less willing to invest when uncertainty is large ($\psi \leq \overline{\psi}$). However, for low levels of uncertainty we have seen that an increase in uncertainty can make the incumbent invests more to still be guaranteed reelection. The optimal investment level follows a step function in our model, while it is a continuous function in the career concern models. This difference is due to the fact that we assumed that the cost function was convex in the career concern models, while the cost of investment in our model is the linear function of unrealized personal spending. If we change the cost function in the career concern models to a linear function we get that effort is optimal whenever the following condition holds:

$$R * \varphi(0) \geq \sqrt{{\sigma_\theta}^2 + {\sigma_\varepsilon}^2}$$

This expression also shows that there will be effort only when the uncertainty level is low. But in our model there is another effect that dominates when the level of uncertainty is low enough ($\psi \geq \hat{\psi}$) and $\beta\alpha r \leq 1$. The level of uncertainty is so low that the incumbent knows that only a small investment is enough to get reelected, which implies that low levels of uncertainty can reduce the incentives. This effect does not take place in the career concern

model. One reason for this is that strategic decisions related to comparing different payoffs cannot occur when the incumbent does not know his own competence.

4. Biased voter

So far we assumed that the voter reelects the incumbent if and only if the expected payoff of reelecting exceeds the payoff of electing the challenger. This means that in the absence of investment the voter is in expectation indifferent between the incumbent and the challenger. But this is of course a strong assumption. If the incumbent knows that the voter prefers the challenger regardless of the investment level, then the incumbent is not willing to invest. Caplan (2011) describes the non-rationality of voters in terms of different biases. A bias in favor of the challenger or the incumbent can thus be interpreted along these lines. Throughout the section we assume that the bias is not so large that the voter prefers either the incumbent or the challenger with certainty regardless of the actions of the incumbent. A large bias could then mean that the elections lose their importance. We get that the incumbent prefers investment to no investment whenever the following inequality holds:

$$T + \beta T(\frac{1}{2} - \psi\sigma) \leq \beta(\frac{1}{2} + \psi rT - \psi\sigma)(T + \alpha rT)$$

4.1 High level of uncertainty

If the level of uncertainty is high enough $\psi \leq \overline{\psi}$ we already know there will not be investment with a non-biased voter. A bias in favor of the challenger clearly does not give incentives to investment in this setting, because it makes it even less likely that the incumbent will see the return on the investment. An incumbency advantage bias can however make the incumbent more willing to invest because this increases the probability of realization of payoff. A marginal bias will generally not increase investment, but if the bias is of a certain size then the incumbent can be incentivized to invest.

Proposition 4.1. *For high levels of uncertainty a bias in favor of the incumbent may incentivize more investment, while a bias in favor of the incumbent cannot increase the level of investment.*

4.2 Intermediate levels of uncertainty

We can also explain what happens for intermediate levels of uncertainty. As described earlier this is a situation where the incumbent is willing to invest even though reelection is

not guaranteed. In this case we have that there will be investment if the following conditions holds:

$$\psi \geq \acute{\psi} = max\left[\frac{\frac{1}{\beta r} - \frac{\alpha}{2}}{T(1+\alpha r) - \alpha\sigma}, 0\right]$$

We can see that σ different from zero increases the threshold if σ is positive and decreases the threshold if σ is negative. Intuitively it makes sense that increasing the probability of realizing the investment will give more incentives to invest. The level of investment if there is investment is the same regardless of the bias, but a bias in favor of the incumbent makes the incumbent willing to make the investment for a larger value of uncertainty.

Proposition 4.2. *For intermediate level of uncertainty, a small bias in favor of the challenger makes the incumbent less willing to invest, while a small incumbency advantage makes the incumbent more willing to invest.*

4.3 Low levels of uncertainty

If the uncertainty is so low that the incumbent can guarantee reelection $\hat{\psi} \leq \psi$, then the picture becomes less clear. We still assume that $\beta\alpha r \geq \frac{2-\beta}{2}$ which implies that the incumbent chooses to guarantee reelection if possible. A bias in favor of the incumbent has no effect on the reelection probability if the incumbent chooses to invest, but the bias does increase the probability of reelection if the incumbent chooses not to invest. The incumbent will only keep the level of investment if the incumbent would have invested in absence of the electoral incentives ($\beta\alpha r \geq 1$). In other cases the incumbent reduces the level of investment. This is a setting where the incumbent does not care much about the payoff of the investment, but chooses to invest because investment is an easy way of getting reelected. This implies that every small positive bias leads to a small decrease in the investment level. A small bias in favor of the challenger will similarly increase the investment if $\beta\alpha r \leq 1$. The incumbent invests just the necessary amount to get reelected. So when the voter is biased in favor of the challenger the incumbent chooses to invest *more* to still be reelected with certainty. But when the bias is too large the incumbent chooses to invest nothing.

Proposition 4.3. *For low levels of uncertainty a bias in favor of the incumbent will reduce the level of investment if and only if* $\beta\alpha r \leq 1$ *. A small bias in favor of the challenger will increase the investment if* $\beta\alpha r \leq 1$*, but not affect the incumbent if* $\beta\alpha r \geq 1$*. A larger bias in favor of the challenger will reduce the investment.*

4.4 Comparison with other models

In the career concern models discussed earlier any bias will reduce the level of effort. In our model there is not a simple relation between bias and investment. In the career concern models the effect from bias is symmetric, meaning that a positive and negative bias has the same effect, but in our model this is not necessarily the case. In both models the effect of bias and uncertainty is intertwined. When there is very much uncertainty about the competence in the career concern model the effect of the bias becomes smaller, because $\varphi\left(\frac{-\frac{k}{\lambda}}{\sqrt{{\sigma_\theta}^2+{\sigma_\varepsilon}^2}}\right)$ is less different from $\varphi(0)$ when there is much uncertainty. When the random luck increases in the career concern model the performance is a less precise signal of quality, such that the bias gets more importance. In our model the intertwined effect of bias and uncertainty is also ambiguous. If $\beta\alpha r \leq 1$ a low level of uncertainty is most likely to change the investment level, because this is the only situation where marginal a bias with certainty will affect the investment level. However, when uncertainty is high incumbency advantage can increase investment from zero to full investment.

5. Modeling the effect of the term length

5.1 Set-up

So far we have assumed that the electoral term is so long that the payoff from the investment will be realized if the incumbent is reelected, but not otherwise. This is a strong assumption. First of all, the time between the investment and payoff does not need to the same for every investment. And even if all processes are of equal length, this length is not necessary the same as the term length.

In this part of the paper we try to model the effect of term length by adding more time periods to the game. In an infinite-period model the strategy of the incumbent becomes more complex. We will therefore focus on stationary strategies where the incumbent takes the same action each period. We assume that the investment decision is binary and that the uncertainty level is so high that investing does not guarantee reelection. Previously we have shown that corner solutions will arise naturally because of convexity of the payoff function, so restricting the investment decision to be binary is not changing the core content of the model. Initially we also assume that $1 \leq \beta\alpha r \leq 2$. Formally we can express these assumptions like this:

$$\frac{1}{2} + \psi r T < 1$$

$$I \in \{0, T\}$$

In this section we will only model the incentives effect of election, and refrain from analyzing the selection effect and expected payoff for the voter.

5.2 Short terms of office

The incumbent has the choice of investing or not investing. By not investing the incumbent gets a payoff of T in the first period, and is reelected with a probability of ½, because the

probability that the payoff from electing the challenger is negative is ½. In the next period there is also a payoff of T and a probability of ½ for staying in office. This leads to the following expression for the payoff:

$$V(no\ investment) = \frac{T}{1-\frac{\beta}{2}}$$

By investing in every period the payoff in the first periods is given by:

$$V_1 = \beta(\frac{1}{2} + \psi rT)V_2$$

$$V_2 = \alpha rT + \beta(\frac{1}{2} + \psi rT)V_3$$

Using the fact that we only look for stationary equilibriums we can assume that there will be investment in every period. The continuation value in the first period is then given by:

$$V(investment) = \frac{\beta(\frac{1}{2} + \psi rT)}{1-\beta(\frac{1}{2} + \psi rT)}\alpha rT$$

As earlier the incumbent prefers to invest when the uncertainty is low. When uncertainty increases it becomes less likely for the incumbent to see the return on the investment and the incentives to invest decrease. The uncertainty threshold is given by the following expression:

$$\frac{1}{2} + \psi rT \geq \frac{1}{\beta\alpha r - \frac{1}{2}\beta^2\alpha r + \beta}$$

$$\psi \geq \psi_1 = \frac{2 - \beta\alpha r - \beta + \frac{1}{2}\beta^2\alpha r}{2rT(\beta\alpha r - \frac{1}{2}\beta^2\alpha r + \beta)}$$

So when the level of uncertainty is relatively low ($\psi \geq \psi_1$) the incumbent prefers to invest every period and getting reelected with a larger probability rather than not investing and getting reelected with a probability of ½.

5.3 Longer terms of office

We now try to model the effect of longer terms in office by having an election only after every second period. Due to the assumption that $1 \leq \beta\alpha r \leq 2$ there will be investment in the periods that are not immediately followed by an election. We can think that each time period is lasting twice as long as the previous periods. With that interpretation it will still be a stationary strategy for the incumbent to invest every other period. This corresponds to a situation where the incumbent wants to invest, but maybe chooses not to invest in periods before elections because of the uncertainty related to realizing the payoff. If the incumbent does not invest in the periods before the election the payoff is given by the following expression:

$$V(no\ investment\ before\ election) = \frac{\beta T(1+\alpha r)}{1-\frac{\beta^2}{2}}$$

By investing in every period the incumbent gets this payoff:

$$V_1 = \beta\alpha rT + \beta^2(\frac{1}{2} + \psi rT)V_3$$

$$V_3 = \alpha rT + \beta\alpha rT + \beta^2 V_5(\frac{1}{2} + \psi rT)$$

Again using the fact that the incumbent is doing the same in every period we get the following payoff by investing:

$$V(investment) = \beta\alpha rT + \frac{\beta^2\left(\frac{1}{2}+\psi rT\right)}{1-\beta^2\left(\frac{1}{2}+\psi rT\right)}(\beta\alpha rT + \alpha rT)$$

$$= \frac{\beta\alpha rT}{1-\beta^2\left(\frac{1}{2}+\psi rT\right)}\left[1+\beta\left(\frac{1}{2}+\psi rT\right)\right]$$

As in the case with election every period the incumbent does not want to invest if there is too much uncertainty. The threshold is given by the following expression:

$$\psi \geq \psi_2 = \frac{1 - \frac{1}{2}\beta^2 - \frac{1}{2}\beta\alpha r + \frac{1}{4}\beta^3\alpha r}{\beta\alpha r^2 T + \beta^2\alpha r^2 T + \beta^2 r T - \frac{1}{2}\beta^3\alpha r^2 T}$$

5.4 Comparison of different term lengths when $\beta\alpha r \geq 1$

Both with short and long terms investment occurs when uncertainty is low. Generally we cannot say which of these thresholds that is most restrictive, because this depends on the values of several different parameter values, but we assumed that $1 \leq \beta\alpha r \leq 2$. If we also impose some natural restrictions on the discount factor, and assume that the discount factor is relatively close to 1 (e.g 0.9 or 0.95), then we have the following result:

Proposition 5.4 *Given that $\beta\alpha r > 1$ the incumbent chooses to invest if the level of uncertainty is sufficiently low. With elections every period the incumbent invests if $\psi \geq \psi_1$ and with elections every second period the incumbent invests if $\psi \geq \psi_2$. For natural parameter values we have that $\psi_1 \geq \psi_2$, such that there more often will be investment with longer terms.*

5.5 Comparison of different term lengths when $\beta\alpha r \leq 1$

So far we have assumed that $\beta\alpha r > 1$, but in this section we will find out how term lengths affect the investment decision when this inequality does not hold. This affects the action of the incumbent in the period that is not followed by an election, so it will only affect the case with election every second period. The incumbent in this case chooses *not* to invest unless the period is followed by an election, and has the choice between never investing and investing in every second period. The two values are given by the following expressions:

$$V(no\ investment) = \frac{\beta T + T}{1 - \frac{\beta^2}{2}}$$

$$V(investment\ before\ election) = \frac{T(1 + \alpha r\beta^2\left(\frac{1}{2} + \psi rT\right))}{1 - \beta^2\left(\frac{1}{2} + \psi rT\right)}$$

The incumbent chooses to invest every second period whenever:

$$\psi \geq \psi_l = \frac{1 - \frac{1}{2}\beta\alpha r - \frac{1}{2}\beta^2 + \frac{1}{4}\beta^3\alpha r}{rT(\beta\alpha r - \frac{1}{2}\beta^3\alpha r + \beta + \beta^2)}$$

If β is close to 1 we have that $\psi_1 \geq \psi_l$. The intuition is that it is easier to incentivize investment in the period before the election if the incumbent knows that he can choose his favorite action in half of the periods. But on the other hand there will not be investment in the periods that are not followed by an election. In this case the effect of term length on investment level is ambiguous. For relatively low levels of uncertainty an incumbent can be willing to invest every period with short terms, but is only willing to invest prior to elections for longer terms. On the other hand, when there is more uncertainty the incumbent is not willing to invest with short terms, but can be incentivized to invest half the time with longer periods. Intuitively we can think that the incumbent is more willing to what the voter wants half the time when the incumbent can get the payoff from choosing the preferred policy the rest of the time.

Proposition 5.5 *Given $\beta\alpha r < 1$ and election every period the incumbent chooses to invest in every period if $\psi \geq \psi_1$. With elections after every second period the incumbent invests if $\psi \geq \psi_l$. For natural parameter values (β close to 1) we have that $\psi_1 \geq \psi_l$. If $\psi \geq \psi_1$ there will be investment every period with short terms and every other period with longer terms. When $\psi_1 \geq \psi \geq \psi_l$ there will also be investment in every other period with longer terms, but no investment with shorter terms.*

5.6 Comparison with other models

In our model the term length is generally affecting the level of investment. As Dal Bo and Rossi (2011) we have found that longer terms can incentivize effort, but we have also found that if the level of uncertainty is low enough and the incumbent does not care so much about

the payoff from the investment, then there might be less investment with longer terms. In contrast to Maskin and Tirole we generally do not find that difference in term length has no effect. However, for very high and very low levels of uncertainty our model sometimes predicts that the investment level is not affected by the term length.

6. Uncertainty related to the return on the investment

6.1 Set-up of the game

Up until this section the voter has had an informational advantage over the incumbent. The voter has always known the payoff from electing both the incumbent and the challenger. With the exception of the settings with commitment to a reelection rule this has implied that the voter has chosen the incumbent if and only if the payoff from electing the incumbent has exceeded the payoff of electing the challenger. In this part of the paper we will include uncertainty from the voter's point of view about the payoff from the investment. This implies that there is dual uncertainty, and to highlight this notion we disregard the case where there is very little uncertainty related to the challenger in this section. Neither the incumbent nor the voter then knows the exact consequences of their actions.

We assume that the return can be high or low, and it is common knowledge that a certain proportion of incumbents are able to provide a high return. The voter observes the level of investment, but does not observe the type of the incumbent. We restrict the low-type return to be strictly positive, so even though the investment is very non-profitable (close to zero) it still provides the voter with a positive payoff. In this part of the paper we also simplify the investment to a binary decision, and we also assume that the uncertainty related to the challenger is so high that the following inequality holds:

$$\frac{1}{2} + \psi r_i T < 1$$

$$I \in \{0, T\}$$

$$r_i \in \{r_h, r_l\}$$

$$P(r = r_h) = \lambda$$

$$\bar{r} = \lambda r_h + (1 - \lambda) r_l$$

Similarly with previous sections we will also assume that the level of return on investment is on an intermediate level:

$$\frac{2-\beta}{2} \leq \beta\alpha r_i \leq 2$$

6.2 Separating equilibrium

First we can investigate whether a separating equilibrium exists. This implies a situation where the high-type invests and the low type does not invest, and neither of the two types have any incentives to do otherwise. The first inequality below describes the conditions where the high type invests, and the second inequality describes the conditions where the low type does not want to invest given the belief that only high return types invest. Under these conditions there exists a separating equilibrium.

$$\beta(T+\alpha r_h T)\left(\frac{1}{2}+\psi r_h T\right) \geq T+\frac{\beta T}{2}$$

$$\beta(T+\alpha r_l T)\left(\frac{1}{2}+\psi r_h T\right) \leq T+\frac{\beta T}{2}$$

Equivalently we can write it like this:

$$\frac{1-\frac{1}{2}\beta\alpha r_l}{\beta r_h T(1+\alpha r_l)} \geq \psi \geq \frac{1-\frac{1}{2}\beta\alpha r_h}{\beta r_h T(1+\alpha r_h)}$$

If there is too much uncertainty neither of the types wants to invest, and if the uncertainty level is sufficiently low both types will invest. But a separating equilibrium exists for intermediate values of uncertainty.

The only difference between the two expressions is given by the difference in return, so when this difference is small it is unlikely that there is a separating equilibrium. We can observe that the payoff of investing for the low-return type increases in ψ,β,α and r, which makes it less likely that the separating equilibrium exists . When ψ and $\beta\alpha r_l$ are small it means that the low-type incumbent cares less about the next period, because the return on the investment do not matter that much and is only realized with a relatively small probability. The incumbent is thus more willing to do the action that gives the best payoff in the first

period. Using the language of Maskin and Tirole (2005) this can be interpreted as weak office-holding motive. In this case the high-return type has a stronger office-holding motive because this type values the investment more.

Proposition 6.2 *There exists a separating equilibrium where only the high-return type incumbent invests for intermediate values of uncertainty. The size of this interval is increasing in the difference of office-holding motives between the two candidates.*

6.3 Pooling equilibrium

We now turn our attention to the situation where a separating equilibrium does not exist. High values of ψ and $\beta\alpha r$ can be interpreted as strong motive for office-holding, which means that the low return incumbent has more incentives to stay in power. Investing increases the probability of staying in office, so a strong motive for office-holding makes it less likely that there exists a separating equilibrium. When the level of office-motivation is high enough for the low-return type then this incumbent will invest and hence a separating equilibrium does not exist. The voter does not know which type of incumbent he is facing, and reelects the incumbent when the weighted average of the two returns exceeds the payoff from the challenger. This equilibrium exists when the following inequality holds:

$$\beta(T + \alpha r_l T)\left(\frac{1}{2} + \psi\bar{r}T\right) \geq T + \frac{\beta T}{2}$$

The low-return type must be willing to invest knowing that the voter correctly anticipates that the low return will invest. When the share of low-return type incumbent is low it is more likely that this equilibrium exists, because the voter then believes that the investment most likely comes from a high-return incumbent. We can also observe that if the return from the low-type incumbent is not very different from the high-return it is more likely that a pooling equilibrium exists.

Proposition 6.3 *When the level of uncertainty is low both types are willing to invest. A large share of high-return incumbents and a large return for the low-type makes this equilibrium more likely to exist.*

If the level of uncertainty is high enough even the high-return incumbent is unwilling to invest, and then there is a pooling equilibrium where both types chooses not to invest. There is also a pooling equilibrium where neither of the types invests if this inequality holds:

$$\beta(T + \alpha r_h T)\left(\frac{1}{2} + \psi r_l T\right) \leq T + \frac{\beta T}{2}$$

In this equilibrium the voter thinks that the incumbent with certainty is low-return type after observing investment. Given this belief neither of the types invests, and then the voter is not irrational. However, we rule out this equilibrium by using the "intuitive criterion" by Cho and Kreps (1987). We can also note that there is an intermediate level of uncertainty where neither a separating nor a pooling equilibrium exists.

6.4 Selection and incentives effect

6.4.1 Selection and incentives effect in the separating equilibrium

The incentives effect of elections makes the high-return type invest, but the uncertainty is too high for the low-return type to invest. The selection effect in this case consists of two elements. The voter chooses to elect the challenger when the payoff from the challenger is large, which is the same selection as in the previous sections. But we can also note that the second-term incumbent with greater *ex ante* probability will be competent than the first period incumbent. Of course when the second period is reached the voter knows whether the incumbent is the high-return type.

$$P(high\ return\ incumbent|reelected\ ) = \frac{(\frac{1}{2} + \psi r_h T)\lambda}{\left(\frac{1}{2} + \psi r_h T\right)\lambda + \frac{1-\lambda}{2}}$$

This happens because the high-return incumbent is reelected with a larger probability. However, this second effect has no influence on the payoff of the voter in this setting because there is no investment in the second period. We can observe that the two selection effects work in the opposite direction. When ψ is very low there is a strong selection effect related to the challenger, but in this case the probability that the incumbent is the high-return type conditional on reelection is smaller.

6.4.2 Selection and incentives effect in the pooling equilibrium

In this equilibrium both types are willing to invest, which means that elections more often can incentivize investment. However, the voter can no longer use the election to elect the incumbent when returns are higher than the payoff from the challenger, so there is no selection effect related to the type of the incumbent. As earlier there is a selection effect related to the payoff of electing the challenger.

Contrary to earlier settings there is now a probability that the voter makes the wrong decision because she does not know the type of the incumbent. The probability that the voter would have reelected the incumbent if the type was known, but chooses not to reelect is given by the following expression:

$$P(\bar{r}T \leq \eta \leq r_h T) = \psi T(r_h - \bar{r}) = \psi T(1-\lambda)(r_h - r_l)$$

Similarly we can find the probability that the voter reelects the incumbent, but would not have reelected if the type was known:

$$P(r_l T \leq \eta \leq \bar{r}T) = \psi T\lambda(r_h - r_l)$$

In these cases the investment incentives of the elections fools the voter into making non-optimal decisions.

6.5 Expected payoff of the voter

The expected payoff of the voter in the separating is given by the following expression:

$$EU_v = \lambda\left(\frac{r_h T}{2} + \frac{1}{2}\psi(r_h T)^2\right) + \frac{1}{8\psi}$$

The expected payoff of the voter in the pooling equilibrium is given by this expression:

$$EU_v = \frac{\bar{r}T}{2} + \frac{1}{8\psi} + \frac{1}{2}\psi(\bar{r}T)^2$$

It is not intuitively clear whether the pooling equilibrium is better for the voter than the separating equilibrium. On one hand the pooling equilibrium gives more investment which is valued by the voter, such that the voter prefers both types to invest. This means that the incentives effect can be stronger. But on the other hand we have seen that the effect of incentives also leads to sometimes making the wrong decision. So the best situation would be both types investing and then revealing their type before the election. But the low-type would clearly then would not reveal his type because this leads to getting reelected with a lower probability.

When the proportion of high-type voters is very low the voter is better off in the pooling equilibrium, because a separating equilibrium only rarely will result in investment. When the low-type return is very low the voter clearly is better off in the separating equilibrium, as she then is not fooled into reelecting an incumbent with a very low payoff when a better challenger is available. But the low-return incumbent is not willing to invest if this payoff is low enough, which counterbalances some of this effect.

6.6 Comparison with other models

In this section we will compare our model with the Maskin and Tirole model. The two models are based on slightly different assumptions. In our model the low-return type still cares about the voter, and thereby we cannot say that this type has opposite preferences. The closest thing to opposite preferences will be when $\alpha r_l = 0$. From earlier in the paper we know that this condition only leads to investment if the level of uncertainty is very low, and we have assumed the uncertainty is not very low in this section.

In both models the incumbent obviously is more willing to prioritize first period payoff when β is small, as this describes a setting where the future is down weighted compared to

the present. In our model the low type incumbent cares about the voter's payoff from the investment, which limits the low-type's incentives to invest. When r_l is low enough the low-type never invests. So intuitively, the low-type is more willing to fool the voter when the voter has relatively little to lose by being fooled. In the Maskin and Tirole model the non-congruent incumbent has opposite preferences as the voter, and considerations like this are not relevant. So in our separating equilibrium the incumbent chooses not to invest because the payoff from the investment weighted with the probability of reelection is not large enough.

Our pooling equilibrium has similarities with the pandering equilibrium in the Maskin and Tirole model. There is no selection effect in the pandering equilibrium of Maskin and Tirole. Both types choose according to the prior of the voter, so the voter cannot use the first period action to get useful information about the competence. In our model the same logic applies for the types of the incumbent, but there still exists a selection effect because the voter can choose the challenger. This can be seen as a more reasonable interpretation of the electoral process. Even though electoral incentives are so large that the incumbent does anything to get reelected, there should be a possibility that the voter prefers the challenger. In the Maskin and Tirole model the incumbent is always reelected in the pooling equilibrium even though the voter in fact is indifferent between reelecting the incumbent and electing the challenger. In our model neither the high-type nor the low return-type knows if there will be reelection after investment. The random payoff from electing the challenger might exceed the payoff from the investment, and in this case the payoff from the investment is not realized. It is more reasonable to assume that there is not one action that guarantees reelection. We do not have to rely on indifference conditions in our model as the payoff from electing the challenger is a continuous random variable. According to the Fearon critique (1999) the equilibrium based on indifference conditions can be considered more fragile.

7. Empirical literature

7.1 Electoral incentives

A prediction from our model, as well as most other political agency models, is that incumbents in their last term are less willing to act in the interests of the voter. In our model and in the career concern models this happens because effort/investment is costly and does not give any payoff in the last period. In the Besley model and the Maskin and Tirole model the congruent incumbent still acts in the interests of the voters in the last period, but the non-congruent incumbent chooses the opposite action.

In an influential study of electoral incentives, Ferraz and Finan (2011) investigate the relationship between electoral incentives and corruption in local governments in Brazil. They find that first-term mayors, who are subject to reelection incentives, misappropriate 27 % fewer resources than mayors without such incentives. But there might be unobservable characteristics that are correlated with both corruption and reelection. It can be the case that politicians that are more cynical and more intelligent are more corrupt and get reelected with a larger probability. They use Regression Discontinuity Design to compare situations where incumbents barely won with narrow losses. At the threshold (winning margin of zero) there is no difference between the winners and losers if the potential outcomes are continuous and this than be seen as a quasi-experiment (Lee, 2008). Using this specification they still find that second term mayors are more corrupt. They also compare second-term mayors with first-term mayors that get reelected later, and find that their results still hold.

The findings are consistent with the established political agency models. These results can be interpreted as evidence of the positive effect of electoral accountability. But these results are consistent with different models, including models where accountability plays no part. In our model without accountability there is also more corruption in the second period than the first

period (as long as $\beta\alpha r \geq 1$), because the second-term incumbent knows that there is no point in engaging in long-term policies that cannot be finished.

7.2 Disentangling the effects from incentives and selection

In our model, as well as in other agency models there is an effect of incentives and a selection effect. The Ferraz and Finan paper (2011) shows that electoral incentives can affect incumbents. However, there might still be a hidden selection effect. Hypothetical first term mayors without reelection incentives can be even more corrupt than second term mayors. Alt, Bueno de Mesquita and Rose (2011) exploit exogenous variation in term limits of U.S. governors to disentangle the two effects. Some U.S governors cannot get reelected, while others can be reelected once. By comparing first term ineligible governors with first term eligible governors they isolate the incentives effect, and by comparing first term ineligible governors with second term ineligible governors they isolate the selection effect. They find a strong positive effect of both incentives and selection on economic outcomes, and the two effects are roughly equally large (Alt et al, 2011). This paper must assume that the pool of potential politicians is not dependent on the term limit. It is not unthinkable that a different set of candidates enter politics in states with reelection possibilities. Gagliarducci and Nannicini (2013) find that the selection effect strongly dominates. Galasso and Nannicini (2011) use a clever trick to isolate the effect of incentives from the effect of selection. They find that more competent politicians perform better in Italian local governments. However, more competent politicians are allocated to contested districts, so the better performance can also be caused by more electoral incentives. Galasso and Nannicini (2011) then investigate what happens when parties decide to change electoral alliances on the national level. These decisions will generally not be influenced by local level politics, but the influence of changing alliances filters down to the local level. Districts that were contestable before the election could then become safe districts. They find that the effect of having competent politicians on performance still dominated the effect of electoral incentives (Galasso & Nannicini, 2011).

7.3 The effect of the term length

There is a significant variation in term length across the world, which makes cross-country comparisons possible. However, this strategy might be unwise because the length of term is endogenous. We can imagine that the term length connected to other institutional and cultural features, and term length is not randomly assigned. Hypothetically one could think that poorer states choose to have longer terms in office because elections are costly to arrange, and in this case cross-country comparisons might provide us with spurious causal effects. However, in rare cases there are random assignments of term length. Dal Bo and Rossi (2008) study the case of Argentina after the democratization in 1983. The Argentinian Constitution requires renewal of half the House every two years. Normally this is solved by electing half of the seats every second year, but this could not be done in this case as there was no democracy prior to 1983. This led to the decision that half the legislatives in 1983 were randomly picked out to serve for two years and the other half for four years. We can exploit this exogenous variation to find the effect of term length, but we must note that this natural experiment is related to legislators rather than incumbents. Dal Bo and Rossi (2008) find that legislators that were selected for four years have a significantly better performance in the legislature. The natural experiment is useful for causal analysis, but it is more difficult to generalize the findings. Something extraordinary about Argentina in the 1980's can make the results less relevant for other countries at other times. In 2001 Argentina engaged in a similar natural experiment due to modification of term lengths in the Argentinian Senate. This time legislators were randomly assigned to serve for two, four or six years, and again they find that longer-serving legislators perform better (Dal Bo and Rossi, 2008).

7.4 Uncertainty and investment

In our model we assumed that electoral decisions can be seen as an investment where the effect of the effort lies in the future. The findings of Dal Bo and Rossi (2008) also present this view. They explain the difference in performance with longer term legislators being more willing to invest in long-term policies. We can observe that this finding supports our model, which states that longer term incumbents will invest more (at least as long as $\beta\alpha r \geq 1$). There can be other reasons than the "investment logic" to explain the difference in

performance, but to test whether the investment effect is reasonable we can observe the reelection probabilities. They find that short-term legislators that have a greater probability of getting reelected act more like long-term legislators. This is consistent with our model. When the probability of getting reelected $(\frac{1}{2} + \psi rI)$ is close to 1 the maximization problem of a short period incumbent becomes similar to the maximization problem of the long period incumbents. On the other hand, when the probability of getting reelected is very low in our model, there will only be investment with longer terms. This is exactly what Dal Bo and Rossi find in the Argentinian House.

7.5 Political Myopia

Aidt and Dutta (2011) find that democracies-which are subject to electoral incentives- spend more on transfers and less on public good than autocracies, which may be a result of political myopia. Perotti (1996) also point to an empirical negative correlation between frequent changes in the political system and economic growth.

8. Conclusion

In this paper we have developed an alternative political agency model. We have regarded political effort as an investment that is only realized when the incumbent is reelected. We have also added uncertainty related to the payoff of electing the challenger. These two features are in general enough to avoid that the voter is indifferent between reelecting the incumbent and electing the challenger. By making the incumbent choose the level of investment before the quality of the challenger is revealed we are allowing the voter to have an informational advantage. We have then shown how the conditions for investment vary with uncertainty. More uncertainty implies less incentives to invest as long as the politician cares about the payoff from the investment. However, when the level of uncertainty is low an increase in uncertainty can incentivize more investment when the incumbent does not so much about the payoff from the investment. Then we proceed to find that biases have an ambiguous effect on electoral incentives. If the level of uncertainty is high enough the incumbent needs a positive bias to be willing to invest, but when the uncertainty level is low a positive bias can *decrease* the level of investment. A longer term of office can incentivize investment when the conditions are such that there will not be investment with shorter terms.

In the end we must again stress the limitations of this model and other political agency models. By limiting the function of elections to incentivizing effort and selection of more competent politicians we have seen that we are not capturing important aspects of voting.

9. References

Aidt, T. S., & Dutta, J. (2007). Policy myopia and economic growth. *European Journal of Political Economy*, *23*(3), 734-753.

Alesina, A & Tabellini,G. (1990). A Positive Theory of Fiscal Deficits and Government Debt. *Review of Economic Studies*,57.403-414.

Alesina, A. & Tabellini,G. (2007) Bureaucrats or Politicians? *American Economic Review*. 97.169-179

Alt, J., Mesquita, E., & Rose, S. (2011). Disentangling Accountability and Competence in Elections: Evidence from U.S. Term Limits. *The Journal of Politics*, 171-186.

Arrow, K. (1951). *Social choice and individual values*. New York: John Wiley & Sons.

Ashworth,S.(2005). Reputational Dynamics and Political Careers. *The Journal of Law,Economics and Organization.* 441-466

Ashworth, S., & Mesquita, E. B. D. (2006). Delivering the goods: Legislative particularism in different electoral and institutional settings. *Journal of Politics*,*68*(1), 168-179.

Ashworth,S.(2012). Electoral Accountability: Recent Theoretical and Empirical Work. *Annual Review of Political Science*,183-201.

Banzhaf, H. S., & Walsh, R. P. (2008). Do people vote with their feet? An empirical test of Tiebout's mechanism. *The American Economic Review*, 843-863.

Barro, R. (1973). The control of politicians: An economic model. *Public Choice*, 19-42.

Berganza, J. C. (2000). Two roles for elections: Disciplining the incumbent and selecting a competent candidate. *Public Choice*, *105*(1-2), 165-194.

Besley, T., & Case, A. (1993). *Does electoral accountability affect economic policy choices? Evidence from gubernatorial term limits* (No. w4575). National Bureau of Economic Research.

Besley, T. (2004). Joseph Schumpeter lecture: paying politicians: theory and evidence. *Journal of the European Economic Association*, 193-215.

Besley, T. (2006). *Principled agents? the political economy of good government*. Oxford: Oxford University Press.

Besley, T., & Prat, A. (2006). Handcuffs for the Grabbing Hand? Media Capture and Government Accountability. *American Economic Review*, 720-736.

Black, D. (1948). On the rationale of group decision-making. *The Journal of Political Economy*, 23-34.

Blais, A., & Young, R. (1999). Why do people vote? An experiment in rationality. *Public Choice*, *99*(1-2), 39-55

Bonfiglioli, A., & Gancia, G. (2013). Uncertainty, electoral incentives and political myopia. *The Economic Journal*, *123*(568), 373-400.

Canes-Wrone,B., Herron,M.C. & Shoots,K.W.(2001) Leadership and Pandering: A Theory of Executive Policy Making. *American Journal of Political Science*. 532-550

Caplan, B. (2011). *The myth of the rational voter: Why democracies choose bad policies*. Princeton University Press.

Cho, I. K., & Kreps, D. M. (1987). Signaling games and stable equilibria. *The Quarterly Journal of Economics*, 179-221.

Church, C. H., & Vatter, A. (2009). Opposition in consensual Switzerland: A short but significant experiment. *Government and Opposition*, *44*(4), 412-437.

Dal Bo, E. & Rossi,M.(2008). Term Length and Political Performance. *NBER Working Paper*. 14511.

Dal Bo, E. & Rossi,M (2011). Term Length and the Effort of Politicians. *The Review of Economic Studies*, 1237-1263.

Daley, B., & Snowberg, E. (2009). Even if it is not bribery: the case for campaign finance reform. *Journal of Law, Economics, and Organization*.

Dewan, T., & Squintani, F. (2012). The role of party factions: an information aggregation approach. *Manusript available online at http://personal. lse. ac. uk/DEWANta*.

Dowding, K (2006). Can Populism Be Defended? *Government and opposition.* 3. 327-346

Downs, A. (1957). An economic theory of political action in a democracy. *The journal of political economy*, 135-150

Erikson, R. S. (1981). Why do people vote? Because they are registered.*American Politics Research*, *9*(3), 259-276.

Fearon,J.(1999) Electoral accountability and the control of politicians: selecting good types versus sanctioning poor performance. In Przeworski , Stokes and Manin (eds).*Democracy, Accountability and Representation*. Cambridge University Press.

Ferejohn, J. (1986). Incumbent performance and electoral control. *Public Choice*, 5-25.

Ferraz, C. & Finan,F. (2011) Electoral Accountability and Corruption: Evidence from the Audits of Local Governments. *American Economic Review*. 1274-1311

Gagliarducci, S., & Nannicini, T. (2013). Do Better Paid Politicians Perform Better? *Journal of the European Economic Association*,369-398.

Galasso, V., & Nannicini, T. (2011). Competing on Good Politicians. *American Political Science Review*, 79-99.

Gibbard,A.(1973). Manipulation of voting schemes: a general result. *Econometrica*,587-601

Hamilton, A., & Madison, J. (1788[1972]) *The federalist* ((3. print.). ed.). Cambridge, Mass.: Belknap Pr. of Harvard Univ. Pr.

Holmström,B.(1982) Moral Hazard in Teams. *Bell Journal of Economics and Management Science*. 74-91

Holmström, B., & Milgrom, P. (1991). Multitask principal-agent analyses: Incentive contracts, asset ownership, and job design. *Journal of Law, Economics, & Organization*, 24-52.

Holmström,B.(1999) Managerial Incentive Problems: A Dynamic Perspective. *Review of Economic Studies*. 169-182

Lee,D. (2008) Randomized Experiments from Non-Random Selection in U.S. House Elections. *Journal of Econometrics*. 675-697

Lohmann, S. (1998). An information rationale for the power of special interests. *American Political Science Review, 92*(04), 809-827.

Mackie, G. (2003). *Democracy defended.* Cambridge, UK: Cambridge University Press.

McKelvey,R. (1976) "Intransitivities in Multidimensional Voting Models and Some Implications for Agenda Control". *Journal of Economic Theory* 12, 472-482.

Meltzer, A. H., & Richard, S. F. (1981). A rational theory of the size of government. *The Journal of Political Economy*, 914-927

Nordhaus, W. (1975). The Political Business Cycle. *Review of Economic Studies*, 42. 169-182.

Perotti, R. (1996). Growth, income distribution, and democracy: what the data say. *Journal of Economic growth*, *1*(2), 149-187.

Persson, T. & Svensson,L (1989). Why a Stubborn Conservative Would Run a Deficit: Policy With Time Inconsistency Preferences. *Quarterly Journal of Economics*,325-345

Persson, T., & Tabellini, G. (1999). Political economics and macroeconomic policy. *Handbook of macroeconomics*, *1*, 1397-1482.

Persson, T., & Tabellini, G. E. (2002). *Political economics: explaining economic policy*. MIT press.

Riker,W.(1982). *Liberalism against Populism*. W.H.Freeman

Rousseau, J. (1762[1950]) *The social contract: And discourses* (New American ed.). New York: E.P. Dutton and Company.

Satterthwaite, M. (1975) "Strategy-proofness and Arrow's Conditions: Existence and Correspondence Theorems for Voting Procedures and Social Welfare Functions". *Journal of Economic Theory. 187-207*

Schultz, C. (2008). Information, polarization and term length in democracy. *Journal of Public Economics*, *92*(5), 1078-1091.

Smart, M., & Sturm, D. M. (2013). Term limits and electoral accountability. *Journal of Public Economics*, *107*, 93-102.

Wolfers, J. (2002). *Are voters rational?: Evidence from gubernatorial elections*. Graduate School of Business, Stanford University.