Vote-Share Contracts and Democracy*

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Abstract

We develop a political agency model with unknown ability of candidates for public office and moral hazard in policy-making. We introduce vote-share contracts which contain a vote-share threshold that incumbents must reach in order to be reelected. Vote-share contracts improve the average ability level of re-elected politicians and also increase effort. We show that the socially optimal vote-share threshold for incumbents is larger than one half. Competing candidates offer vote-share contracts with socially optimal thresholds. We discuss several extensions of the model and applications of the basic principle.

Keywords: elections, political contracts, vote-share thresholds.

JEL Classification: D7; D82; H4

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1 Introduction

In this paper we introduce vote-share contracts which work as follows: Candidates competing for public office can stipulate a vote-share threshold equal to or above one-half, which they need to reach in order to be re-elected. If the incumbent does not obtain enough votes to reach the vote-share threshold, either his challenger is elected, or a run-off ballot between two new candidates takes place. The commitment of a candidate to a vote-share threshold is called a vote-share contract.

We illustrate the working of vote-share contracts in a simple two-period model. At the start of each period, two candidates compete for office. In each period, the office-holder can undertake a public project whose output is determined by the policy-maker's effort and his ability. Effort and ability are not observable by voters. In each period, the office-holder also chooses an ideological policy, or a redistribution policy that affects each voter differently.

Vote-share thresholds for incumbents have two effects. First, a higher threshold stimulates greater effort, as the marginal gain from higher effort increases – in terms of improved reelection prospects. This is socially desirable. Second, a higher vote-share threshold raises the lowest-possible ability of those of the incumbents that are reelected, as only such incumbents will be able to garner enough votes for the purpose. This is socially desirable as long as incumbents with above-average ability are reelected. If the threshold is too high, even incumbents with above-average qualities will be deselected, which is socially undesirable. A socially optimal vote-share threshold for incumbents balances these effects. We show that the socially optimal vote-share threshold for incumbents is typically larger than one half.

A socially optimal vote-share threshold can be set by the public. More interestingly, we allow that candidates compete with vote-share contracts. We show that the majority of voters will elect the candidate who commits to a vote-share threshold that is closer to the socially optimal threshold. As a result, both candidates will commit to the

socially optimal vote-share threshold.

We discuss several extensions of the model, alternative voting procedures and further applications of the basic principle. In particular, we suggest that increasing vote-share thresholds can also be used to constrain government debt accumulation when the roll over of new debt from year to year requires increasing vote-share thresholds.

The paper is organized as follows: In the next section we introduce the model. Section 3 discusses the benchmark case when there are only standard elections. In section 4 we introduce vote-share contracts and derive their welfare properties. In section 5 we discuss various extensions of the model and alternative election procedures. Section 6 concludes.

2 The Model

2.1 Agents

We consider a society that decides democratically to whom it should delegate policy-making. At the beginning of each of two periods, $t = 1$ and $t = 2$, voters must elect a politician. At both election dates, the same two candidates are competing for office. Candidates are denoted by k or $k' \in \{R, L\}$. Candidate R (L) is the right-wing (left-wing) candidate. There is a continuum of voters. Each individual voter is indexed by $i \in [0, 1]$.

2.2 Policies

There are two types of policy problems the policy-maker faces.

- Public Project: P

  In each period, the office holder can undertake a public project. The result is determined by the effort invested by the policy-maker and his ability. The amount

of this public project in period t is given as

$$g_t = \gamma(e_{kt} + a_k), \gamma > 0 \tag{1}$$

where e_{kt} represents the effort exerted by the policy-maker in period t and a_k represents his ability. Ability a_k is a random variable distributed uniformly on $[-A, A]$, $A > 0$. After the office-holder has exerted e_{kt}, he will know how able he is. This will remain private information. Voters will observe g_t. The citizens derive utility from the public project according to the instantaneous utility function $U^P(g_t) = g_t$.

- Ideological (or Redistribution) Policy: I

  In each period, the policy-maker decides on an ideological policy I that affects voters differently. The choice set for I is represented by a one-dimensional policy space $[0, 1]$. We assume that voters are ordered according to their ideal points regarding I. Voter i has preferences over I according to the instantaneous utility function

$$U_i^I(i_{kt}) = -(i_{kt} - i)^2, \tag{2}$$

  where i_{kt} is the platform chosen by the policy-maker on I and i is the ideal point of voter i.

2.3 Utilities

In this section we describe the utilities of voters and candidates. The discount factor of voters and politicians is denoted by β with $0 < \beta \leq 1$.

The expected utility of voter i evaluated at the beginning of $t = 1$ is given by the discounted sum of the benefits from the public project and from the ideological policy. We distinguish two cases.

(i) If the same politician k is in office in both periods, lifetime utility is given by

$$V_i = g_1 + U_i^I(i_{k1}) + \beta[g_2 + U_i^I(i_{k2})]. \tag{3}$$

(ii) If politician k is in office in period $t = 1$ and politician k' ($k' \neq k$) holds office in period $t = 2$, lifetime utility is given by

$$V_i = g_1 + U_i^I(i_{k1}) + \beta[g_2 + U_i^I(i_{k'2})]. \tag{4}$$

The candidates derive utility from two sources.

- Office holding

  A policy-maker derives private benefits b from holding office, including monetary and non-monetary benefits such as power and enhanced career prospects. He incurs costs of $C(e_{kt}) = ce_{kt}^2$ ($c > 0$) from exerting effort.

- Benefits from policies

  We assume that candidate L is a left-wing candidate, i.e. his most preferred point, denoted by μ_L with regard to policy I, satisfies $\mu_L < \frac{1}{2}$. Similarly, candidate R is a right-wing candidate with an ideal point $\mu_R > \frac{1}{2}$. To simplify the exposition, we assume that $\frac{1}{2} - \mu_L = \mu_R - \frac{1}{2}$. Hence the candidates' ideal points are symmetrically distributed around the median's ideal point of $\frac{1}{2}$. Moreover, the candidates derive the same benefits from public projects as voters.

To describe the overall utility of politicians, we have to distinguish four cases. For example, politician R's lifetime utility, denoted by V_R, can be computed as follows:

(i) If R is in office over both periods:

$$V_R = b - (i_{R1} - \mu_R)^2 - ce_{R1}^2 + g_1 + \beta[b - (i_{R2} - \mu_R)^2 - ce_{R2}^2 + g_2].$$

(ii) If R is in office in $t = 1$ only:

$$V_R = b - (i_{R1} - \mu_R)^2 - ce_{R1}^2 + g_1 + \beta[-(i_{L2} - \mu_R)^2 + g_2].$$

(iii) If R is in office in $t = 2$ only:

$$V_R = -(i_{L1} - \mu_R)^2 + g_1 + \beta[b - (i_{R2} - \mu_R)^2 - ce_{R2}^2 + g_2].$$

(iv) If R never is in office:

$$V_R = -(i_{L1} - \mu_R)^2 + g_1 + \beta[-(i_{L2} - \mu_R)^2 + g_2].$$

2.4 Parameter Assumptions

We assume that b is sufficiently large, so that candidates will prefer to be in office under any of the circumstances we consider. To simplify the exposition, we assume $\beta = 1$. The extension to $\beta < 1$ is straightforward and the qualitative effects remain the same for β sufficiently close to one.

2.5 The Overall Game

We summarize the overall game in the following figure:

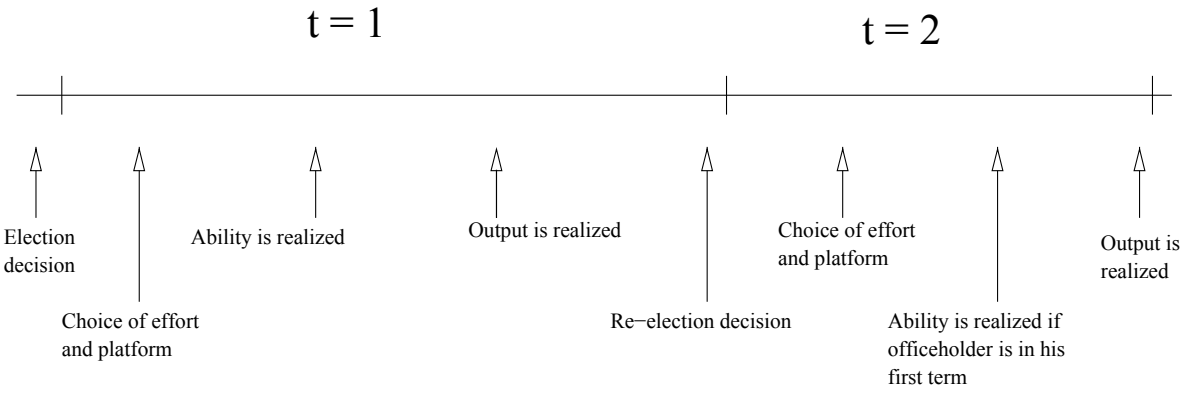

Figure 1: Time-line with standard elections

2.6 Assumptions and Equilibrium Concept

We assume that politicians cannot commit themselves to a policy platform. Voters observe the policy maker's choice with regard to policy I. Moreover, we assume that voters observe only output g_1 and not its composition between effort and ability.[1]

[1]This assumption follows Alesina and Tabellini (2007).

Output g_1 is not contractible so it cannot be used to generate rewards for politicians beyond elections. Moreover, citizens are assumed to vote sincerely, i.e. they vote for the candidate from whom they expect a higher utility.[2] We are looking for perfect Bayesian Nash equilibria for the game under these assumptions.

3 Elections Alone

We first examine the standard case where elections are held before the first and second term start. The candidate with the higher share of votes will be elected. If both candidates obtain the same share of votes, the probability of each candidate to win in the first period is 0.5. In the second period, we consider the tie-breaking rule determining that in this case, the incumbent will be elected.

3.1 The Second Period

As candidates cannot commit to policy platforms, a policy-maker will choose his most preferred platform in the second period. The expected amount of the public project depends on whether the policy-maker is in his first term and does not know his ability, or whether he is in his second term and has observed his ability in period 1. For the analysis of the second period, we momentarily assume that the ability of the office holder in the first term will be perfectly inferred by all agents at the end of the first term. This will be proven in subsection 3.2. In the Appendix, we show,

Proposition 1

Suppose that candidate k is elected at date $t = 2$. Then

(i) he will choose $i_{k2} = \mu_k$ for policy I;

(ii) irrespective of whether k is in his first or second term, he will choose $e^*_{k2} = \frac{\gamma}{2c}$;

[2]Obviously, with a continuum of voters, the individual voter has no influence on the outcome of an election. The optimality of sincere voting can be justified for a model variant with a large but finite number of voters or when the act of voting generates benefits.

(iii) the expected utility of a policy maker at the beginning of period 2 *is given by*

α) first-term policy maker: $V^*_{k2} = b + \frac{\gamma^2}{4c}$

β) second-term policy maker: $V^*_{k2} = b + \frac{\gamma^2}{4c} + \gamma a_k$.

(iv) The expected utility of the politician $k' \neq k$ *who has lost the second election is given by*

α) $V^D_{k'2} = \gamma\left(\frac{\gamma}{2c}\right) + \gamma a_k - (\mu_R - \mu_L)^2$ *if* k *has been in office in the first period*

β) $V^D_{k'2} = \gamma\left(\frac{\gamma}{2c}\right) - (\mu_R - \mu_L)^2$ *if* k' *has been in office in the first period.*

3.2 The First Period

We now look at the equilibria in the first period. As the candidates' ideal points are distributed symmetrically around the median voter's ideal point, the probability of each candidate winning is one half. Once in office, the candidate has to choose e_{k1} and i_{k1}. Without loss of generality, we assume that candidate R has been elected. We first make two simple observations that will hold in every equilibrium with pure strategies.

Fact 1

Suppose that candidate R *is elected at date* $t = 1$. *Then*

(i) he will choose $i_{R1} = \mu_R$;

(ii) voters will perfectly infer the ability of the policy-maker at the end of period 1.

The first fact is obvious, as voters know that policy-makers will choose their bliss points in the last period. So politician R will not gain more votes in the second election by choosing a different platform than μ_R in period 1. The second fact follows from the informational structure of the game. As candidates will observe their ability after they have exerted effort, in any pure strategy equilibrium, exactly one level of effort will be chosen and expected by the voters. Any deviation of g_1 from the expected effort multiplied by γ will be interpreted correctly as variation in ability.[3]

[3]Formally, $a_R = \frac{g_1 - \gamma\hat{e}_1}{\gamma}$, where $\hat{e}_1$ is the effort level expected by the electorate.

Now we derive the optimal choice of effort by the office holder in the first period. For this purpose, a few preliminary steps are necessary. Let $\hat{e}_1$ denote the public's expectations about the incumbent's effort level in the first period. Moreoever, let $p(e_{R1}, \hat{e}_1)$ denote the probability with which office holder R will be re-elected and $\widetilde{a}_R(e_{R1}, \hat{e}_1)$ denote candidate R's expected level of ability conditional on the fact that he is re-elected. In the Appendix, we show

Fact 2

$$p(e_{R1}, \hat{e}_1) = \frac{1}{2}\left(1 + \frac{1}{A}(e_{R1} - \hat{e}_1)\right), \tag{5}$$

$$\widetilde{a}_R(e_{R1}, \hat{e}_1) = \frac{A + \hat{e}_1 - e_{R1}}{2}. \tag{6}$$

Note that the probability of R's being re-elected, which is given by $p(e_{R1}, \hat{e}_1)$, increases in e_{R1}. In terms of given expectations about his effort $\hat{e}_1$, the office holder can improve the public's estimate of his ability by exerting more effort. A more favorable evaluation of his ability increases the incentives of voters to vote for him. Similarly, we can explain why the expected level of R's ability contingent on the fact of his being re-elected decreases with e_{R1}. Increases in e_{R1} imply that R will be re-elected even if he displays lower levels of ability. As a consequence, $\widetilde{a}_R(e_{R1}, \hat{e}_1)$ is lower.

Now the incumbent's optimization problem can be stated in the following way:

$$\begin{aligned}\max_{e_{R1} \geq 0} \Bigg\{ & b + \gamma e_{R1} - c e_{R1}^2 + p(e_{R1}, \hat{e}_1)\left(b + \gamma\left(\frac{\gamma}{2c} + \widetilde{a}_R(e_{R1}, \hat{e}_1)\right) - \frac{\gamma^2}{4c}\right) \\ & + (1 - p(e_{R1}, \hat{e}_1))\left(\frac{\gamma^2}{2c} - (\mu_R - \mu_L)^2\right)\Bigg\}\end{aligned} \tag{7}$$

Here, we have used the facts that candidate R is re-elected with probability $p(e_{R1}, \hat{e}_1)$ and dismissed with probability $1 - p(e_{R1}, \hat{e}_1)$.

We are now in a position to calculate the effort level chosen by candidate R in the first period. In the Appendix we show

Proposition 2

(i) The policy-maker R chooses $e^*_{R1} = \frac{1}{2c}\left\{\gamma + \frac{1}{2A}[b - \frac{\gamma^2}{4c} + (\mu_R - \mu_L)^2]\right\}$.

(ii) The probability of R being re-elected is given by

$$p(e^*_{R1}, e^*_{R1}) = \frac{1}{2}. \tag{8}$$

(iii) The average ability level of a re-elected candidate corresponds to

$$\widetilde{a}_R(e^*_{R1}, e^*_{R1}) = \frac{A}{2}. \tag{9}$$

The equilibrium effort e^*_{R1} depends on the parameters in an intuitive way. The larger the utility loss of the incumbent if he is deselected, i.e. the larger $(\mu_R - \mu_L)^2$ and b, the higher the effort the politician is willing to invest. The higher A, the lower the marginal gain in re-election chances when R marginally increases effort. Accordingly, greater uncertainty regarding quality, i.e. a large value of A, will depress effort. The impact of γ is more subtle. On the one hand, higher γ increases the marginal value of higher effort today and the value of office tomorrow, which both motivate R to invest more effort. On the other hand, higher γ increases the utility in period 2 when the opponent is in office and increases the losses if the incumbent is re-elected with lower ability than average. These two effects reduce the effort choice of R.

4 Vote-Share Contracts

4.1 Vote-Shares as Political Contracts

In this section, we allow both candidates to offer vote-share contracts by stipulating a vote-share threshold s_k with $\frac{1}{2} \leq s_k \leq 1$. Throughout the section, we assume that $\frac{2\mu_R - 1}{2A\gamma} < \frac{1}{2}$, which ensures interior solutions.[4] The interpretation is as follows: If politician k takes office in $t = 1$, he must win a share of votes at least equal to s_k at

[4]Corner solutions are an important variant of our model. If $\frac{2\mu_R - 1}{2A\gamma} > \frac{1}{2}$, the incumbent may have an incentive to renounce exerting high effort, since reelection chances are too low or zero when vote-share thresholds are high.

the next election date if he wants to retain office. Otherwise, the challenger will take office. Hence, the incumbent faces a self-imposed vote threshold in the election at the end of period 1.

The vote-share threshold is a particular type of political contract. Generally, political contracts are verifiable election promises, associated with rewards or sanctions depending on whether promises are kept or not. They describe what a politician is willing to offer to society. Political contracts have to be approved by an independent body.

The timing of the extended game is summarized in the following figure:

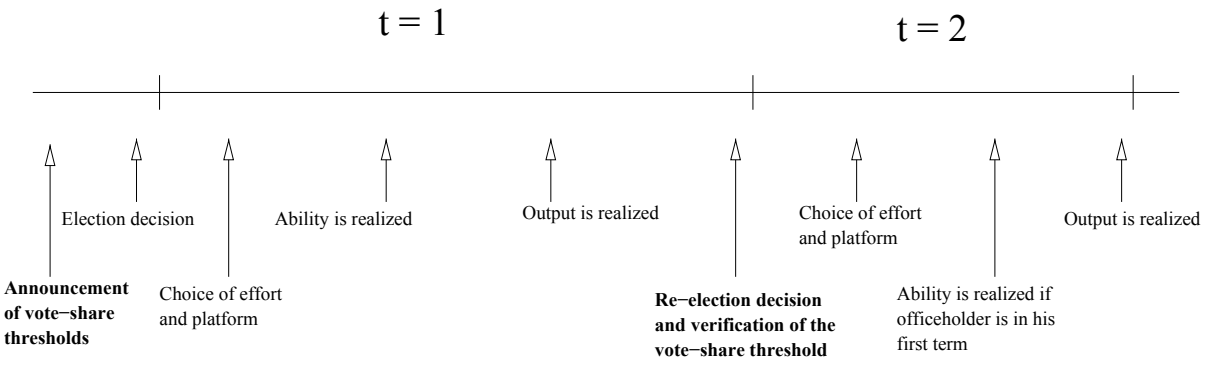

Figure 2: Time-line with elections and vote-share contracts

4.2 The Second and First Period

For the first step of the analysis, we assume that a candidate k, say R, has been elected with a vote-share threshold $s_R \geq \frac{1}{2}$.

In the second period, the choice regarding P and I by R (if he remains in office), or by L (if he enters office) will remain the same as in Proposition 1. However, the election probabilities of R and L will change in period 2, which will be examined next.

In the Appendix, we show that equations (5) and (6) have to be modified in the following way:

Fact 3

$$p(e_{R1}, \hat{e}_1) = \frac{1}{2}\left(1 + \frac{1}{A}\left(e_{R1} - \hat{e}_1 - \frac{1}{\gamma}(2\mu_R - 1)(2s_R - 1)\right)\right), \tag{10}$$

$$\widetilde{a}_R(e_{R1}, \hat{e}_1) = \frac{A + \hat{e}_1 + \frac{1}{\gamma}(2\mu_R - 1)(2s_R - 1) - e_{R1}}{2}. \tag{11}$$

It is straightforward to see that these equations correspond to equations (5) and (6) for $s_R = \frac{1}{2}$.

The optimal choice of e_{R1} is the solution to the optimization problem (7), together with equations (10) and (11). Equilibrium values with vote-shares are labelled by V. In the Appendix, we show

Proposition 3

(i) $e^{*V}_{R1} = \frac{1}{2c}\left\{\gamma + \frac{1}{2A}\left[b - \frac{\gamma 2}{4c} + (2\mu_R - 1)(2s_R - 1) + (\mu_R - \mu_L)^2\right]\right\}$

(ii) The probability of R being re-elected is given by

$$p^V(e^{*V}_{R1}, e^{*V}_{R1}) = \frac{1}{2} - \frac{(2\mu_R - 1)(2s_R - 1)}{2A\gamma}. \tag{12}$$

(iii) The average ability level of a re-elected candidate corresponds to

$$\widetilde{a}^V_R(e^{*V}_{R1}, e^{*V}_{R1}) = \frac{A + \frac{1}{\gamma}(2\mu_R - 1)(2s_R - 1)}{2}. \tag{13}$$

We observe that the equilibrium effort level and the average ability level of a re-elected candidate, given by $\widetilde{a}^V_R(e^{*V}_{R1}, e^{*V}_{R1})$, are increasing in s_R. This shows that vote-share thresholds for incumbents have two effects. First, a higher vote-share threshold stimulates effort, as it raises the marginal gain in reelection chances which can be reaped with higher effort. Second, a higher vote-share threshold raises the lowest-possible ability of the incumbents that are reelected, as only those incumbents will be able to garner enough votes for the purpose. This is socially desirable as long as incumbents with above-average ability are reelected. If the threshold is too high, even incumbents with above-average qualities will be deselected, which is socially undesirable. A socially

optimal vote-share threshold for incumbents balances these effects, and the socially optimal vote-share threshold for incumbents is typically larger than one half, which we will show next.

4.3 Competition for Vote-Share Contracts and Welfare

Finally, we consider the initial stage when both candidates compete for office with vote-share contracts. We call a vote-share threshold ex ante optimal if it maximizes expected aggregated utility.[5] For that purpose, we define the optimal vote-share from the perspective of the median voter. This vote-share is denoted by s^* and is the solution of the following problem.[6]

$$\max_{\frac{1}{2}\leq s_R\leq 1}\left\{\gamma e_{R1}^{*V}+\left(p^V(e_{R1}^{*V},e_{R1}^{*V})\right)\gamma\tilde{a}_R^V(e_{R1}^{*V},e_{R1}^{*V})\right\} \tag{14}$$

We obtain

Fact 4

$$s^*=\min\left\{\frac{1}{2}+\frac{\gamma^2}{4c(2\mu_R-1)};1\right\}. \tag{15}$$

The fact is proven in the Appendix.[7] We are now ready to state our main theorem.

Theorem 1

(i) In the first campaign, both candidates R and L offer s^*. Each candidate wins the election with probability 0.5.

(ii) $s^*>\frac{1}{2}$

(iii) s^* is the ex ante optimal vote-share.

[5]Precisely, an optimal vote-share threshold maximizes aggregate utility when voters can impose vote-share thresholds and use elections to select a candidate.

[6]Note that the expected ability of a new candidate is zero.

[7]The vote-share threshold s^* is larger than $\frac{1}{2}$, which is the vote-share threshold ensuring that the incumbent will be re-elected if and only if his ability is equal to or greater than zero. The median voter trades off higher effort versus lower re-election probability of incumbents with high ability.

Proof of Theorem 1

We first observe that the re-election probability of an incumbent offering s^* is larger than zero, as $p^V(e^{*V}_{R1}, e^{*V}_{R1}) > 0$ according to our assumption $\frac{2\mu_R - 1}{2A\gamma} < \frac{1}{2}$. Hence, according to our general assumption that b is sufficiently large, the incumbent has no incentive to exert lower effort, thereby losing his chances of getting re-elected. If a candidate deviates from s^* (higher or lower vote-shares), he will not be elected, as the median voter is better off with the candidate offering s^*. Hence, deviation is not profitable. Uniqueness of the equilibrium choice s^* follows from the same considerations. If a candidate chooses a share $s_k \neq s^*$, the other candidate k' can win the election with certainty by choosing a vote-share threshold marginally closer to s^*. The second point is obvious. For the third point, we observe that any other vote-share threshold lowers the expected utility derived from public projects, as citizens are homogeneous with respect to public project provision. Due to the symmetry of ideal points of candidates and voters, aggregate utility from the ideological project does not depend on whether the left- or right-wing candidate is elected. This proves the Theorem.

■

The consequence of the Theorem is that vote-share contracts lead to higher welfare than standard elections. Vote-share contracts induce higher efforts and raise the ability of re-elected incumbents.

A final remark is in order. The utility of the politicians in office is negligible in our model, as we have a continuum of voters. Here, their utility does not affect welfare considerations. In a finite version of our model, the utility of the politician and the cost of exerting effort will affect the welfare optimizing vote-share threshold. As a result, the welfare-optimal vote-share in a finite version of our model tends to be slightly lower.

5 Extensions and Ramifications

We have illustrated the working of vote-share contracts in a simple model. Numerous extensions can and should be pursued to address the robustness and validity of the argument for using vote-threshold contracts in a broader context.

5.1 Incumbency Advantages

In particular, one could incorporate various sources of incumbency advantages into our model. For this purpose, it is useful to start with a brief overview of possible sources of incumbency advantages.

At least three explanations have been advanced for the existence of incumbency advantages. First, the incumbent may be perceived as a safer bet than his challengers as developed in the original papers by Bernhardt and Ingberman (1985) and Anderson and Glomm (1992). For example, the incumbent may have gained a communication advantage over his challengers. Second, incumbents may have, on average, higher qualities than challengers. The reason is two-fold: candidates who have won in the past are of higher quality[8] and challengers may be deterred from running against them (Jacobson and Kernell (1983), Cox and Katz (1996), Stone, Maisel and Maestas (2004), and Gordon, Huber and Landa (2007)). Third, the incumbent may be able to increase his re-election prospects by the provision of constituency service (Cain, Ferejohn and Fiorina (1987)) or (socially) costly actions like government expenditures or war (Rogoff and Sibert (1988), Alesina and Cukierman (1990), Hess and Orphanides (1995, 2001), and Cukierman and Tommasi (1998)).[9]

We next explore three different types of incumbency advantages and how they impact

[8]See Samuelson (1984), Londregan and Romer (1993), Banks and Sundaram (1998), Zaller (1998), Ashworth (2005), and Diermeier, Keane and Merlo (2005).

[9]Other explanations of incumbency advantage are based on the incumbents' voting behavior and face-recognition (Ansolabehere, Snyder an Stewart (2000) and Prior (2006)). Finally, challengers may have less access to campaign funds (Gerber (1988)). Whether these explanations can themselves be explained by a quality-based incumbency advantage is addressed in Ashworth and Bueno de Mesquita (2008). Given the existence of large incumbency advantages, Buchler (2007) challenges the assumption that competitive elections are a priori socially desirable.

on the results in section 4.

Communication Advantage

Suppose that candidates can commit to a specific platform regarding ideological policy during campaigns. The final position a candidate will adopt when he is in office differs, however, by some random disturbance. Suppose a candidate can achieve a communication advantage when he is in office, e.g. uncertainty (variance) about implemented policies is usually lower for incumbents than it is for challengers as discussed above. Such an incumbent will move towards his own preferred position in the next election. Vote-share contracts can draw the platform choice of the incumbent towards the center, and by using the approach set out in Gersbach (1992), one can show that it is welfare-improving from a utilitarian perspective.[10]

Learning by Doing

Another fruitful extension is learning by doing. Suppose the politician in office experiences learning effects during the first term in office. Then, his marginal effort costs may decline for the second term. The incumbent will thus have an election probability higher than one-half. The source of the incumbency advantage is socially desirable ex ante. As competing candidates will choose welfare-optimal vote-share thresholds, the positive welfare effect of vote-share thresholds continues to hold.[11]

Output-Shift Policy

We next outline an extension that allows politicians to take costly social actions to improve their reelection prospects. Specifically, suppose we allow that the incumbent can decide whether or not to shift the realization of a specific part of the output from one period to the next. If he is still in office in the next period, he can realize a part of the shifted output. However, a new office holder cannot reap the benefits of the effort

[10]The situation is more complicated, but qualitatively the same, if two new candidates with different communication skills compete for office on the basis of vote-share contracts.

[11]Details are available upon request.

invested by the preceding policy-maker. This makes deselection costly and induces voters to reelect an incumbent even if his ability is lower than the expected ability of the challenger (for details, see Gersbach (2007)).

Output shifts are possible on policies that require policy-specific efforts by the policy-maker, and enable him to determine the time at which the output is realized. Examples are international treaties, foreign policy or new regulatory frameworks for specific industries such as the health care system. Such policies require policy-specific human capital that is lost at least partially when a new government comes into office. Moreover, the timing for the realization of the benefits from such policies lies in the hands of the policy-maker. The option to shift output across time is a simple device generating an incumbency advantage that is, however, socially detrimental.

As shown in Gersbach (2007), in such circumstances, vote-share contracts have additional benefits beyond those identified in this paper, as they cause the deselection of incumbents with below average ability and reduce socially costly output shifts.

5.2 Ramifications and Applications

Alternative Election Procedures

Two alternative election procedures involving vote-share contracts can be considered. First, an election procedure would be a separate election between a new right-wing candidate and candidate L if the incumbent R does not win at least the self-imposed share of votes s_R. Such a procedure ensures that politicians are only elected if they receive at least 50% of the votes. Second, instead of the candidates, society may impose a term-dependent vote share or reelection threshold. Both variants of the model yield the same (latter version) or qualitatively similar results (former version). The result is obvious for the latter version. The public will set the threshold s^*, as any other threshold will lower the utility of all voters, given the election of one of the candidates. Details on the former version are available upon request.

Repeated Competition with Vote-share Contracts

A useful extension of the model is to consider a larger time horizon or a version of the model with an infinite horizon, where candidates for public office compete in each term on the basis of vote-share contracts. In such a framework, the election hurdle will typically increase with the number of terms an incumbent stays in office. We conjecture that vote-share contracts are also welfare-improving in this type of dynamic versions of our model.

Constraining Government Debt Accumulation

Increasing vote-share thresholds can also be used to constrain government debt accumulation. Suppose the government wants to issue debt beyond normal rules. A standard rule is e.g. to constrain public debt financing by government net investment. Possible exceptions are recessions or natural disasters. We suggest using the following correction mechanism when governments have issued debt beyond normal rules: The government can roll over the exceptional debt from year to year, but for this it needs the support of the parliament. The required vote-share threshold is increasing over time, which makes rolling over debt more and more difficult. Such a rule allows the legislature to determine the timing of fiscal consolidation and also ensures that exceptional debt will eventually be repaid if the limit of the vote-share threshold schedule is set close to the unanimity rule. Moreover, if the same vote-share threshold needs to be applied to situations when the government wants to issue new exceptional debt although past exceptional debt has not yet been repaid, accumulation of exceptional debt is also excluded.

6 Conclusion

We have introduced vote-share contracts, which would improve the functioning of a liberal democracy. Of course, institutional changes may trigger feedback and consequences that are unintended and unknown yet, both when the change is proposed and when it actually happens. Nevertheless, vote-share contracts are a new institution that liberal democracies would be well-advised to explore.

Appendix

Proof of Proposition 1

The first point is obvious. Suppose next that in $t = 2$, the politician is in his first term. Accordingly, he does not know his ability yet. His problem is given by

$$\max_{e_{k2}} \{\mathbb{E}[\gamma(e_{k2} + a_k)] - ce_{k2}^2\}.$$

The solution is given by $e_{k2} = \frac{\gamma}{2c}$. Suppose that the politician is in his second term and has observed his ability in the first period. His problem is given by

$$\max_{e_{k2}} \{\gamma(e_{k2} + a_k) - ce_{k2}^2\},$$

which yields the same solution. The expected utility for the first-term office holder from the public project is given by $\gamma\left(\frac{\gamma}{2c}\right) - c\left(\frac{\gamma}{2c}\right)^2 = \frac{\gamma^2}{4c}$. For an office holder in his second term, the corresponding utility is

$$\gamma\left(\frac{\gamma}{2c} + a_k\right) - c\left(\frac{\gamma}{2c}\right)^2 = \frac{\gamma^2}{4c} + \gamma a_k.$$

■

Proof of Fact 2

In the following we consider the re-election decision of the median voter $i = \frac{1}{2}$. It is optimal for the median voter to re-elect R if this implies that the median voter's utility in the second period is higher. Formally, this can be stated as

$$\gamma\left(e_2^* + (a_R + e_{R1} - \hat{e}_1)\right) \geq \gamma e_2^*, \tag{16}$$

$$\gamma\left(a_R + e_{R1} - \hat{e}_1\right) \geq 0, \tag{17}$$

$$a_R \geq -e_{R1} + \hat{e}_1, \tag{18}$$

where we have applied the observation that upon observing g_1, the median voter expects the ability level of R to be $\frac{g_1}{\gamma} - \hat{e}_1 = a_R + e_{R1} - \hat{e}_1$ with $e_2^* = e_{R2}^* = e_{L2}^* = \frac{\gamma}{2c}$. The above

condition states that R is re-elected if his ability level is equal or above the critical level $-e_{R1} + \hat{e}_1$.[12]

If $a_R \geq -e_{R1} + \hat{e}_1$, then R is re-elected. Applying the fact that a_R is uniformly distributed on $[-A; +A]$, we conclude that the probability of a_R being higher than $-e_{R1} + \hat{e}_1$ amounts to $p(e_{R1}, \hat{e}_1) = \frac{A+(e_{R1}-\hat{e}_1)}{2A}$.

It remains to derive the expression for $\widetilde{a}_R(e_{R1}, \hat{e}_1)$ stated in the text. Recall that this variable denotes the ability level of R, conditional on the fact that he is re-elected. We have already shown that R is re-elected if and only if $a_R \geq -e_{R1} + \hat{e}_1$. The arithmetical average of $-e_{R1} + \hat{e}_1$ and A yields the desired expression, i.e. $\widetilde{a}_R(e_{R1}, \hat{e}_1) = \frac{A+\hat{e}_1-e_{R1}}{2}$.

■

Proof of Proposition 2

Together with equations (5) and (6), the maximization problem (7) yields the following first-order condition:

$$\begin{aligned} \gamma - 2ce_{R1} + \frac{1}{2A}\left(b + \frac{\gamma^2}{4c} + \frac{\gamma\left(A + \hat{e}_1 - e_{R1}\right)}{2}\right) & \\ -\frac{\gamma}{2}\left(\frac{e_{R1} - \hat{e}_1}{2A} + \frac{1}{2}\right) - \frac{1}{2A}\left(\frac{\gamma^2}{2c} - (\mu_R - \mu_L)^2\right) &= 0. \end{aligned}$$

In equilibrium, $\hat{e}_1 = e_{R1}$ will hold, so the equilibrium effort e^*_{R1} is given by

$$2ce^*_{R1} = \gamma\left(1 + \frac{1}{4} - \frac{1}{4}\right) + \frac{b}{2A} - \frac{\gamma^2}{8Ac} + \frac{1}{2A}(\mu_R - \mu_L)^2$$

or

$$e^*_{R1} = \frac{1}{2c}\left\{\gamma + \frac{1}{2A}[b - \frac{\gamma^2}{4c} + (\mu_R - \mu_L)^2]\right\}.$$

■

Proof of Fact 3

The derivation of (10) and (11) is very similar to the derivation of (5) and (6). However,

[12]For simplicity, we use the tie-breaking rule that the incumbent is re-elected if he receives exactly half of the votes.

with $s_R > \frac{1}{2}$, candidate R is re-elected only if voter $i = 1 - s_R$ prefers to vote for R, which implies that all voters with $i > 1 - s_R$ also prefer R to L.[13] This leads to the following condition:

$$\gamma\left(e_2^{*V} + (a_R + e_{R1} - \hat{e}_1)\right) - (\mu_R - (1 - s_R))^2 \geq \gamma e_2^{*V} - (\mu_L - (1 - s_R))^2. \qquad (19)$$

Using $\mu_L = 1 - \mu_R$, this can be rewritten as

$$a_R \geq -e_{R1} + \hat{e}_1 + \frac{1}{\gamma}(2\mu_R - 1)(2s_R - 1). \qquad (20)$$

The right-hand side of this inequality gives the minimum ability that R must have in order to be re-elected. The higher the fraction s_R, the higher this minimum ability.

With this condition it is straightforward to show that (5) and (6) generalize to (10) and (11).

■

Proof of Proposition 3

The problem of the incumbent is the same as in Proposition 2, except that we have to use equations (10) and (11) rather than (5) and (6). Then, the first-order condition of the maximization problem (7) is given by

$$\begin{aligned}\gamma - 2ce_{R1} + \frac{1}{2A}\left(b + \frac{\gamma^2}{4c} + \frac{\gamma\left(A + \frac{1}{\gamma}(2\mu_R - 1)(2s_R - 1) + \hat{e_1} - e_{R1}\right)}{2}\right) \\ -\frac{\gamma}{2}\left(\frac{A - \frac{1}{\gamma}(2\mu_R - 1)(2s_R - 1) + e_{R1} - \hat{e_1}}{2A}\right) \\ -\frac{1}{2A}\left(\frac{\gamma^2}{2c} - (\mu_R - \mu_L)^2\right) \;=\; 0.\end{aligned}$$

In equilibrium, $\hat{e}_1 = e_{R1}$ must hold, so the equilibrium effort e_{R1}^{*V} is given as

$$e_{R1}^{*V} = \frac{1}{2c}\Big\{\gamma + \frac{1}{2A}\left[b - \frac{\gamma^2}{4c} + (2\mu_R - 1)(2s_R - 1) + (\mu_R - \mu_L)^2\right]\Big\}.$$

■

[13] We use the tie-breaking rule that the incumbent is re-elected if he receives exactly s_R votes.

Proof of Fact 4

Together with equations (12) and (13) the maximization problem (14) yields the following first-order condition:

$$\frac{(2\mu_R-1)\gamma}{2Ac}-\frac{(2\mu_R-1)}{A\gamma}\Big(\frac{A\gamma+(2\mu_R-1)(2s_R-1)}{2}\Big)$$
$$+(2\mu_R-1)\Big(\frac{1}{2}-\frac{(2\mu_R-1)(2s_R-1)}{2A\gamma}\Big)=0.$$

Solving for s_R yields $s^*=\frac{1}{2}+\frac{\gamma^2}{4c(2\mu_R-1)}$.

■

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