STRATEGIC DELEGATION AND VOTING RULES*

Bård Harstad†

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Abstract

Principals, such as voters or districts, typically benefit by strategically delegating their bargaining and voting power to representatives different from themselves. There are conflicting views in the literature, however, of whether such a delegate should be "conservative" (status quo biased) or instead "progressive" relative to his electorate. I show how the answer depends on the political system in general and the majority requirement in particular. A larger majority requirement leads to "conservative" delegation and hence a status-quo bias, but optimal delegation is always achieved by the appropriate voting rule. The model is simple and can be employed, for example, to compare decentralization and centralization.

Key words: Strategic delegation, collective decisions, voting rules, decentralization versus centralization

JEL Classification: D71, D72, F53, H11

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† MEDS, Kellogg School of Management, Northwestern University, 2001 Sheridan Rd., Evanston, IL 60208. E-mail: harstad@northwestern.edu.

1. Introduction

Political decisions are made by delegates, not the citizens themselves. In most legislatures, every district is represented by a delegate who, on its behalf, negotiates and votes on whether certain policies should be approved. Each district may have an incentive to strategically elect a representative that is biased one way or the other. What determines the incentives to delegate strategically? Do they depend on the political system? Can institutions be designed to ensure "optimal" delegation?

Strategic delegation may be costly from a social point of view: If the delegates are "conservative" (status quo biased), they tend not to implement projects even if they are socially optimal. If, instead, the delegates are "progressive" (public-good lovers), they implement projects even if these are too costly. Strategic delegation may thus separate voters' preferences from those of the politicians, leading to a "democratic deficit", a characteristic often attributed to the European Union (EU), for example. It is thus highly important to understand when and how voters strategically appoint representatives.

Unfortunately, there are contradictions in the literature on delegation. Starting with Schelling (1956), a large bargaining literature shows how principals delegate to status quo biased agents to gain "bargaining power". Such agents are less desperate in reaching an agreement and, therefore, able to negotiate a better deal.

On the other hand, a more recent literature in political economy argues that "voters attempt to increase the probability that their district is included in the winning coalition by choosing a representative who values public spending more" (Chari, Jones and Marimon, 1997, p. 959). The majority coalition will typically consist of the winners, i.e., the representatives who are least costly to please (as in Ferejohn, Fiorina and McKelvey, 1987). And, being a member of the majority coalition is important, since this shares the surplus and expropriates the minority whose votes it does not need. To increase the "political power" (the probability of being a member of the majority coalition), districts should therefore delegate progressively – not conservatively.

This paper illuminates this contradiction by presenting a model that captures both the incentives to delegate conservatively (to gain bargaining power) and progressively (to gain political power). In equilibrium, the direction of delegation depends on which concern is stronger and this, it turns out, depends on the political system. In particular, if the majority requirement is large, being a member of the majority coalition is not very beneficial, since it will have to compensate most of the losers. Bargaining power is then more important, and the principals delegate conservatively, just as predicted by Schelling. If the majority rule is small, however, the majority coalition expropriates a large minority, and divides the revenues on just a few majority members. Political power is then very beneficial, and districts delegate progressively, as argued by Chari, Jones and Marimon.

The strategic choice of delegate depends on several other parameters, as well. Some of these are details of the legislative game, such as the minority protection, the agenda-setting power, the majority coalition's discipline and its stability. The characteristics of the policy are also important, such as the heterogeneity, the expected value of the collective project, and its variance. But in each case, the first-best can be achieved by carefully selecting the majority requirement. The voting rule should thus vary across policy areas and political systems. The model is also used to compare decentralization and centralization.

To return to the initial questions, strategic delegation does indeed depend on the political system in general - and the voting rule in particular. This is important for understanding empirical observations, since voting rules do differ across both countries and political chambers within the same country.[1] The observation might also be important for the EU, applying various rules for different decisions and political chambers. The predictions of the model are arguably consistent with some puzzling aspects of the EU: A common view is that the delegates in the Council are more status-quo biased than those in the Commission and the Parliament.[2] This is exactly what the theory would predict, since the Council typically requires unanimity or super-majorities, while the Commission

[1] In the US, the majority requirement is effectively larger in the Senate than in the House, because of the possibility to filibuster. In Europe, the effective majority requirement varies across countries because of different explicit voting rules, but also because the number of parties, chambers and quorum requirements differ widely (Döring, 1995).

[2] "For some commentators and practitioners, the Council is the blockage to European political integration, always looking to put obstacles in the way of bright ideas from the Commission or the EP" (Hayes-Renshaw and Wallace, 1997, p. 2). Also for environmental policies, Weale (2002, p. 210) observes that "the Parliament has the general reputation of having a policy position that is more pro-environmental than the Council of Ministers".

and the Parliament take decisions according to the simple majority rule. Furthermore, the theory predicts that if the president becomes more powerful, the majority requirement should decrease. These two features are, indeed, combined by the new European "constitution".

After a further discussion of the literature, the following section presents the simplest version of the model. Solving the game by backward induction, Section 4 shows how the districts have incentives to either delegate conservatively or progressively, depending on the policy and the political system. The optimal majority rule balances the strategic concerns, and induces a first-best selection of projects. Section 5 applies the model to shed light on the trade-offs between centralization and decentralization, while Section 6 generalizes the legislative game by discussing the possibility to tax, coalition discipline and stability. The final section concludes. Proofs are in Appendix.

2. Related Literature

As noticed above, there is a controversy in the literature on delegation. Starting with Schelling (1956), a large bargaining literature shows how principals delegate to status quo biased agents to gain "bargaining power". Schelling's argument is formalized by Jones (1989) and Segendorff (2003) in two-player games. Milesi-Ferretti, Perotti and Rostagno (2002) compare majoritarian and proportional systems where three districts delegate to gain bargaining power. With one-dimensional policies, single-peaked preferences and without side payments, Klumpp (2007) shows that voters may delegate to status-quo biased representatives to make their acceptance sets smaller. An n-person bargaining game is studied by Brückner (2003); he finds that the bias may be mitigated by relaxing the unanimity requirement. Besley and Coate (2003) study strategic delegation in a context where two districts maximize joint utility. In a similar model, Dur and Roelfsma (2005) show that the direction of delegation may go either way, depending on the cost-sharing rules.

Much of the political economy literature goes the other direction, however, arguing that voters may want to delegate to ("progressive") public good lovers since these are likely to be included in the winning coalition (Chari, Jones and Marimon, 1997, Ferejohn, Fiorina and McKelvey, 1987). Austen-Smith and Banks (1988) and Baron and Diermeier (2001) show how voters consider the induced coalition-formation when electing representatives, although bargaining power is not considered. The trade-off between bargaining power and political power is apparent in the seminal contribution of Baron and Ferejohn (1989): In numerical examples, they show that a high probability of being recognized as the next agenda-setter makes the legislator less attractive as a coalition-partner. However, the trade-off is not explicitly discussed and they do not study strategic delegation.

The emphasis on voting rules ties the paper to a large literature going back to Rousseau (1762), Condorcet (1785), Wicksell (1896), Buchanan and Tullock (1962) and, more recently, Aghion and Bolton (2003).[3] Wicksell, in particular, argued that unanimity were the appropriate requirement, since otherwise the majority would expropriate the minority.[4] Without delegation, Wicksell would be right in my model. However, every district delegates conservatively if the majority requirement is large, and reluctant representatives implement too few project. Taking this effect into account, the optimal majority requirement should be smaller.

In the model, each district trades off an incentive to gain bargaining power and the desire to be included in the majority coalition. This trade-off is similar to that in Harstad (2005), and the legislative games are quite similar in the two papers. However, Harstad (2005) ignores the upper boundary on taxes, and the analysis requires there to be transaction costs related to the transfers. More substantially, Harstad (2005) studies optimal incentives to prepare for a collective project, ignoring the incentives to delegate strategically, emphasized in this paper.

[3]See also Messner and Polborn (2004), who show how voters may prefer a super-majority rule as a way of delegating the pivotal role in the future, and Barbera and Jackson (2006), who explain how heterogeneity within countries determines their optimal voting weights. Unlike Barbera and Jackson (2006), I am treating a country and its median voter as being the same, thus ignoring heterogeneity within countries. However, such heterogeneity would in any case not be important when side payments are available, as I assume.

[4]Buchanan and Tullock (1962) argued that unanimity would imply too high "decision-making costs" and Aghion and Bolton (2003) suggested that the "winners" of a project may not have deep enough pockets to compensate the "losers". The present paper does not include any of these features, giving Wicksell right - where it not for strategic delegation.

3. The Model

3.1. Players and Preferences

Let I represent the set of principals, for example the districts' median voters. The districts must agree to a policy, specifying whether a binary public project is to be implemented and, in any case, a set of transfers. Each district $i \in I$ (or its median voter, "she") selects a delegate i_d ("he"), characterized by his observable type $d_i \in \Re$. If $d_i > 0$, i's delegate is "progressive" and generally has a higher value of the project than i herself. If $d_i < 0$, i's delegate is a status quo biased "conservative" who is less in favor of the project than i herself. Formally, i_d's value of the project is given by

$$v_i^d = v_i + d_i,$$

where v_i is i's own value of the project (net of the cost). If the project is accompanied by a district-specific tax or transfer, t_i, the utilities of i and her representative becomes:

$$\begin{aligned} u_i &= v_i - t_i, \\ u_i^d &= v_i + d_i - t_i. \end{aligned}$$

There is no need for asymmetric information in the model. However, the delegates may represent their districts for many projects and for a long time. Thus, at the delegation stage, there is uncertainty regarding the project that is going to be available, and the benefits are not yet known. In other words, after the delegation stage, the project's value is realized:

$$v_i = v_i^0 + \epsilon_i - \theta.$$

ϵ_i and θ represent some random local and global preference shocks, respectively. It is not important whether i and her delegate are affected by the very same individual shock. The analysis below only uses the combined equation $v_i^d = v_i^0 + d_i + \epsilon_i - \theta$, so it is possible to interpret ϵ_i as the individual shock to i_d's value, or the uncertainty regarding i_d's preference.

The distribution of the initial values, v_i^0, can be arbitrary. But to arrive at explicit solutions, let the ϵ_is be independently drawn from a uniform distribution with mean zero and density $1/h$:

$$\epsilon_i \text{ iid } \backsim U\left[-\frac{h}{2}, \frac{h}{2}\right].$$

If I is finite, the distribution of the ϵ_is can take many forms, thus making the analysis quite complex. To simplify substantially, I will assume that there is a large number of districts, such that I can be approximated by a continuum, $I \equiv [0, 1]$, Then, the distribution of the ϵ_is is deterministic and uniform on $[-h/2, h/2]$. Consequently, h measures the heterogeneity in preferences across the delegates if $(v_i^0 + d_i)$ should happen to be the same for all districts. I will order the delegates by decreasing value, such that $i_d < j_d$ if $v_i^d > v_j^d$. Variables without subscript denote the average, such that v^0 is the average (and the sum) of the v_i^0s.

Parameter θ captures the uncertainty in the aggregate cost of the project. θ can be negative, of course, since the v_i^0s already internalize the expected cost of the project. Let also θ be uniformly distributed, with σ measuring the variance in the aggregate shock (the variance of θ is $\sigma^3/12$):

$$\theta \sim U\left[-\frac{\sigma}{2}, \frac{\sigma}{2}\right].$$

In the analysis, I refer to a one-dimensional policy space ($v_i \in \Re^k, k = 1$). But nothing prevents the model from capturing several dimensions ($k > 1$) if a district can choose a vector $d_i = (d_{i1}, ..., d_{ik})$, and if each dimension (or policy area) is voted over separately. This way, the model describes decision-making and strategic delegation on one dimension, and similar results hold independently for the other dimensions.[5]

3.2. The Legislative Game

After the representatives are appointed and the shocks realized, the legislative game begins. Then, a majority coalition is formed and the coalition members negotiate a proposal. A clear separation of these two stages makes the mechanism of the model more transparent and easier to study.

First, the majority coalition is formed. Following the prediction of Riker (1962), a formateur (a political entrepreneur, president or initiator), randomly drawn among the

[5] With multiple dimensions, the model actually requires a majority coalition to form whenever a new dimension is voted over. If this is costly or cannot be done, Section 5.1 shows that the results still hold, qualitatively.

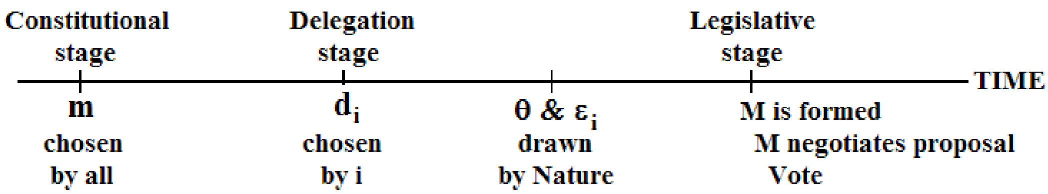

Figure 3.1: *The timing of the game*

delegates, selects a *minimum winning coalition* $M \subset I_d$ of mass $|M| = m$ to form the majority, where I_d is the set of delegates and $m \in (0, 1)$ is the majority requirement. In equilibrium, the formateur will simply select the unique core of the game at this stage.

Second, the representatives in M negotiate a policy proposal. The formateur makes the first offer, but if a proposal is rejected, every coalition member has the same chance of being recognized as the next proposer. Let $\delta \in (0, 1)$ represent the common discount factor between offers. Each proposal specifies whether the project should be implemented and, in either case, how to distribute the transfers, with the constraint that the transfers must sum to zero and $t_i \leq T$. T can be interpreted as some minority protection or as the tax paid by *every* district, if t_i measures the *net pay* from district i after the tax revenues are redistributed.[6]

After a proposal has been accepted by all the members of the majority coalition, the proposal is submitted to the floor for a vote, and it is implemented if it is accepted by the required majority, m. If the proposal is not accepted, or if the majority members never agree, then the project is not implemented and no-one is taxed (or, equivalently, the tax revenues T are repaid uniformly).

The following section derives the stationary equilibrium of this bargaining game, precluding weakly dominated strategies at the voting stage. Section 6 generalizes the game by allowing (i) $|M| \neq m$, (ii) M to be exogenous or randomly drawn, and (iii) transfers to be impossible unless the project is implemented.

[6]The reason why only coalition members can make proposals might be that they have committed to reject all other proposals, in line with Baron's (1989) notion of "coalition discipline".

4. Decisions, Delegation and Voting Rules

This section derives the unique subgame-perfect equilibrium of the game. Solving the game by backward induction, I start by discussing the outcome of the legislative game, taking the delegates' identities as given.

4.1. The Legislative Outcome

I start by describing the outcome of the legislative game, before discussing and explaining its intuition.[7]

Proposition 1. *Suppose* $\int_{i\in M} v_i^d di \geq 0$ *for some* $M \subset I_d$ s.t. $|M| = m$. *Then, the formatour:*

(i) *selects a majority coalition of the delegates with the highest value of the project,* $M = \{i_d | v_i^d \geq v_m\}$*, where* v_m *is the (1-*m*)-fractile of the* v_i^ds,

(ii) *proposes to implement the project, and*

(iii) *proposes the following transfers:*

$$\begin{aligned} t_i &= T \forall i \in I_d \backslash M, \\ t_i &= v_i^d - \frac{\delta}{m}\left[(1-m)T + \int_{i\in M} v_i^d di\right] \forall i \in M. \end{aligned}$$

(iv) *This proposal is accepted by the majority coalition and in the final vote.*

In Proposition 1, part (iii) first states that all minority representatives are fully taxed and given nothing. This is not surprising, since the majority does not need their approval. These tax revenues, plus the entire surplus of the project, are shared by the majority coalition. The second part of (iii) states that a representative favoring the project more, is taxed more. Intuitively, a delegate's eagerness reduces his bargaining power, and he is hold up by the other coalition members (and the formatour) unless he gives in by transferring some of his benefits to them. The equilibrium transfer implies that a representative $i_d \in M$ receives the utility:

$$u_i^d = \frac{\delta}{m}\left[\int_{j\in M} v_j^d dj + (1-m)T\right],$$

[7] When integrating over the set of individuals, the integrands are assumed to be piecewise continuous in i. This condition is fulfilled in equilibrium.

independent of v_i^d. Thus, every majority member receives a fraction of the coalition's total value of the project and the taxes expropriated by the minority. This fraction is δ, what is left after the formateur has expropriated his agenda-setting power, divided by the mass of majority members.

Part (i) follows quite naturally. Since representatives valuing the project more can be taxed more, every formateur prefers to form a coalition with the members that have the highest value of the project.[8] These members do not need (much) compensation for supporting the project - instead they are ready to compensate others. This result is similar to the prediction of a "least costly" minimum winning coalition (Ferejohn, Fiorina and McKelvey, 1987).

Proposition 1 states that the project is always implemented if the majority coalition's aggregate value of the project is positive. Since the delegates in M make the actual decision, they implement it whenever it is in *their* interest. And, since M consist of the delegates that have the most to benefit from the project, the project is implemented too often, relative to what is optimal for the delegates overall. Only if m is large will the majority coalition include most of the delegates, such that the decision takes almost everyone's value into account. If the delegates and their principals have the same preferences, unanimity is therefore optimal in this model.

Corollary 1. *Suppose $d_i = 0 \forall i \in I_d$. The selection of project is first-best if and only if $m \to 1$ or $m = 1$.*

This result confirms the intuition of Wicksell (1896): If there is no strategic delegation, such that the principals are themselves making the collective decision, then unanimity is the only rule that selects the project if and only if this is optimal. For any smaller majority requirement, the majority will not internalize the cost to the minority, and the project is implemented too often.[9]

[8] The randomly drawn formateur may have a low value of the project and still be a member of the coalition, but his size is negligible.

[9] This contrasts much of the literature. Buchanan and Tullock (1962) point to "decision-making costs" when the majority requirement is large; Aghion and Bolton (2003) assume that the winners of a project may not have deep enough pockets to compensate the losers; while in Harstad (2005) there is no constraint on t_i, but instead the minority members' participation constraint may bind. The latter assumption enables the majority coalition to always expropriate the entire value of the project, and the

If the project is too costly, such that $\int_{i\in M} v_i^d di < 0$ for every possible M, the project is not implemented and the majority's surplus $T(1-m)$ is independent of the majority coalition's composition. Suppose, then, that the formatour randomly selects coalition members, giving everyone an expected utility of zero.

4.2. Strategic Delegation

At the delegation stage, district i delegates by selecting d_i. There are two reasons why i may delegate strategically by choosing $d_i \neq 0$.

On the one hand, a low d_i reduces the transfers to be paid by district i, if i_d happens to be in the majority coalition. The reason for this is that a conservative delegate (small v_i^d) raises i's *bargaining power* (bp), since such a delegate is less eager to see the project implemented. This reduces the transfer i has to pay in equilibrium. From Proposition 1:

$$t_i = v_i + d_i - \frac{\delta}{m}\left(T(1-m) + \int_{i\in M} v_i^d di\right) \text{ if } i \in M. \tag{bp}$$

On the other hand, a high d_i makes it more likely that i_d becomes a member of the majority coalition, since this coalition consists of the most enthusiastic representatives. There will be some threshold v_m (the (1-m)-fractile of the v_i^ds) such that all representatives valuing the project more than v_m become coalition members, while those valuing the project less become minority members. Thus, a large d_i may increase district i's *political power* (pp). If we, for a moment, take v_m as given, then i's representative becomes a majority member if i's district-specific shock is such that:

$$v_i^d \geq v_m \Rightarrow \epsilon_i \geq \widehat{\epsilon}_i \equiv \theta + v_m - v_i^0 - d_i. \tag{pp}$$

The two forces work in opposite directions. To increase the bargaining power, it is tempting to delegate conservatively, since such a delegate would be better able to receive compensation from the others. To increase the political power, however, it is wiser to delegate progressively. The choice of delegate must balance these concerns. Formally, i's

selection is then optimal for every m. This approach, however, requires some transaction costs associated with the transfers.

problem is:

$$\max_{d_i} \int_{-\sigma/2}^{\widehat{\theta}} \left(\int_{-h/2}^{\widehat{\epsilon}_i} (v_i - T)\frac{d\epsilon_i}{h} + \int_{\widehat{\epsilon}_i}^{h/2} (v_i - t_i)\frac{d\epsilon_i}{h} \right) \frac{d\theta}{\sigma} \text{ s.t. (bp) and (pp),} \tag{4.1}$$

where $\widehat{\theta}$ is the highest θ at which the project is implemented. Solving this problem gives:

Proposition 2.

(i) *District i delegates conservatively ($d_i < 0$) if v_i^0 is large while v^0* and *d are small: The equilibrium d_i is given by* (4.2).

(ii) *All districts delegate conservatively if m, h, v^0 and σ are large, while T and δ are small: The equilibrium d is given by* (4.3).

(iii) *The project is implemented if and only if $\theta \leq \widehat{\theta}$, given by* (4.4).

$$\begin{aligned} d_i + v_i^0 &= \left(d + v^0\right) \frac{1+\delta}{2} + T\left(1 + \frac{\delta}{m} - \delta\right) - \frac{h}{4}\left[1 - \delta + m\left(1+\delta\right)\right] - \frac{\sigma}{4}\left(1-\delta\right) && (4.2) \\ d(m) &= -v^0 + 2T\left(\frac{1+\delta/m-\delta}{1-\delta}\right) - \frac{h}{2}\left[1 + m\left(\frac{1+\delta}{1-\delta}\right)\right] - \frac{\sigma}{2} && (4.3) \\ \widehat{\theta} &= 2T\left(\frac{1+\delta/m-\delta}{1-\delta}\right) - \frac{hm}{1-\delta} - \frac{\sigma}{2} && (4.4) \end{aligned}$$

The equilibrium d_i depends on the value of political power, and this drives the comparative static of Proposition 2.

Part (i) states that district i delegates conservatively if its initial value of the project is large. In this case, i_d is quite likely to be included in the majority coalition and, instead of increasing this probability, it is relatively more important to delegate strategically, anticipated the bargaining game. This is best done by appointing a reluctant representative. If the other districts, on average, are represented by delegates valuing the project a lot (d large), then i would also like to raise her d_i. The reason is that when the other representatives are enthusiastic about the project, it is important to be a member of the majority coalition that shares all these values, and this probability increases in d_i.

Part (ii) states several comparative statics that hold for d_i as well as for d. Most importantly, if m increases, all districts delegate less progressively (or more conservatively). For m large, it is not *that* important to become a member of the majority coalition, for two reasons: the minority $(1 - m)$ which the majority can expropriate is then small and the total surplus is shared among more majority members. Thus, the gains from political power decrease in m, as does the incentive to delegate progressively. The larger is the majority rule, the less progressively, or the more conservatively, does i delegate.[10]

Since $v_i^0 + d_i$ is, in equilibrium, the same for all districts, h measures the heterogeneity in preferences at the legislative stage. If h is large, the probability that i_d becomes a majority member increases just a little, when d_i increases. Delegating progressively is then not a very effective way of gaining political power, and it is better to delegate conservatively to gain bargaining power instead.

If T is large, it is very important to become a member of the majority coalition, since the minority is taxed by a lot. Thus, the larger is T, the more progressively the districts delegate.

However, if δ is small, the formatour has a lot of agenda-setting power, and he leaves less surplus for the majority coalition. This makes it less beneficial to be a member of the majority coalition, and the equilibrium d_i decreases in order to gain bargaining power.

If v^0 and σ, the aggregate uncertainty, are large, then the expected net value of the project is large - conditional on it being worthwhile to implement. Thus, the project becomes more beneficial, and this larger benefit is enjoyed whether or not i_d should become a majority member. If he does, however, the formatour is expropriating some of the larger benefit by increasing t_i. This cannot be done when the tax is already at its maximum. Hence, when v^0 or σ increases, being a majority member becomes relatively less important, and the d_is decrease.

4.3. The Optimal Voting Rule

The previous proposition points to a status-quo bias when m is large. This is *not* so because too few projects are implemented from the delegates' point of view: Corollary 1 states that the selection is *optimal* from the delegates point of view if $m \to 1$. However, if m is large, all districts delegate conservatively, and reluctant delegates are less willing

[10] There is a third reason for this: The benefit of delegating conservatively is large if i_d is very likely to become a majority member (because only then can his bargaining power be exploited), and this probability increases in m.

to implement projects.

The selection of project thus depends on the majority requirement for two reasons. On the one hand, for d given, the majority coalition implements more projects if m is small since it can then ignore a larger majority, possibly hurt by the project. In isolation, this argument implies that the agents implement too many projects, relative to what is optimal from the agents' point of view (as argued by Wicksell, 1896). On the other hand, if m increases, all districts delegate to conservative representatives, and these are *less* willing to implement the public project, compared to what is optimal from the *principals*' point of view. By carefully selecting m, these two effects cancel. This implies two things.

First, if the parameters change such that one effect dominates the other, m must adjust accordingly. A larger T, for example, increases the incentive to delegate progressively and, to restore an optimal selection of project, m must increase. For similar reasons, m should increase in δ but decrease in h, v^0 and σ.

Second, since *too many* projects are *always* implemented from the representatives' point of view when $m < 1$, the selection of projects can be first-best for $m < 1$ only if the principals have higher valuations of the project that their agents. Hence, $d < 0$ at the optimal m.

Proposition 3.

(i) *The optimal majority requirement m^*, satisfying (4.5), increases in T and δ but decreases in h, v^0 and σ.*

(ii) *At $m = m^*$, $d < 0$.*[11]

$$2T\left(1+\delta/m^*-\delta\right)-hm^*=\left(v^0+\frac{\sigma}{2}\right)(1-\delta) \tag{4.5}$$

The proof follows simply by equalizing $\widehat{\theta}$ in (4.4) to the optimal threshold for θ, which is v^0.

By interpreting δ and T, as well as m, as institutional variables, there is a plane of combinations that induces the first-best selection of project. One can allow m to

[11] Equation (4.5) is valid only if it holds for $m^* \in (0,1)$, requiring that

$$2T-h<\left(v^0+\frac{\sigma}{2}\right)(1-\delta).$$

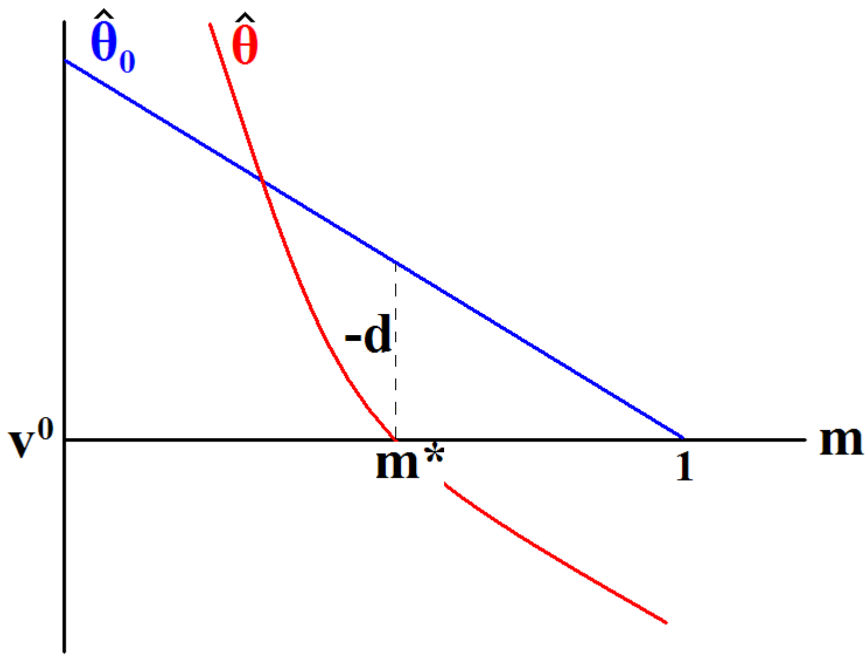

Figure 4.1: *The equilibrium threshold $\widehat{\theta}$ is compared to the threshold without delegation, $\widehat{\theta}_0$. In the latter case, $m = 1$ would be optimal, but $\widehat{\theta} = \widehat{\theta}_0 + d$, and d decreases in m.*

increase, for example, if T simultaneously decreases. Thus, the two means of protecting the minority ($m \uparrow$ or $T \downarrow$) are substitutes. More power to the formatour ($\delta \downarrow$) reduces the value of being in the majority coalition, and m should decrease to compensate for this. Finally, δ and T are substitutes: If the formatour gets less power ($\delta \uparrow$), districts delegate progressively and too many projects are implemented, unless T decreases (or m increases).[12]

5. Centralization or Decentralization?

In is often difficult to change the institutional rules such as to maximize total welfare. For example, most legislatures rely extensively on the simple majority rule, even though this is unlikely to be optimal in the theory above. If the legislature uses a voting rule

[12] The effect of the project's value (v^0) is the opposite of its effect in Harstad (2005). There, the majority coalition expropriates the entire value of the project while here, the minority cannot be taxed more than T and the formateur captures $(1 - \delta)$ of M's surplus. Thus, a larger v^0 increases the benefit of being in the majority coalition in Harstad (2005), while it reduces this benefit in the present model.

$m \neq m^*$, one can easily calculate the social loss, L^m, compared to the first-best:[13]

$$L^m = \frac{1}{2\sigma}\left(\widehat{\theta} - v^0\right)^2 = \frac{1}{2\sigma}\left[2T\left(\frac{1+\delta/m-\delta}{1-\delta}\right) - \frac{hm}{1-\delta} - \frac{\sigma}{2} - v^0\right]^2. \tag{5.1}$$

Instead of modifying m, T or δ, an alternative approach is to take these institutional parameters as given, and instead look for the appropriate level of government. Referring to the above regime as "majority rule", this section makes comparisons to both further "centralization" and "decentralization". The final subsection makes a three-way comparison, and illustrates the results in a diagram.[14]

5.1. Decentralization

By "decentralization", I refer to a context where the local governments have the authority, such that (i) no district can be forced to participate, and (ii) the representatives are domestic politicians, not only representatives in a national legislature. The first feature implies that unanimity is required when decentralized districts consider to implement a collective project.[15] The second feature suggests that it may not be costless for a district to delegate "strategically" under decentralization, since such a politician has domestic power as well. This is the case for the European Council, for example, where the representatives are, first of all, ministers (or heads of states) in their home countries.

If district i elects a minister that is biased towards liberalization in agriculture, for example, then he might be so for local decisions as well as for international projects. This creates distortions when the representative has local power. Suppose district i's value of

[13] This can be seen, since if the threshold is $\widehat{\theta} \neq v^0$, to optimal threshold, the social loss is

$$\int_{-\sigma/v}^{v_0} \left(v^0 - \theta\right) \frac{d\theta}{\sigma} - \int_{-\sigma/v}^{\widehat{\theta}} \left(v^0 - \theta\right) \frac{d\theta}{\sigma} = \frac{\left(\widehat{\theta} - v^0\right)^2}{2\sigma}.$$

[14] Besley and Coate (2003) also study delegation when comparing decentralization and centralization, and their "non-cooperative centralization" corresponds to my own definition of centralization. But instead of studying decentralized cooperation or majority rule, as I do, they refer to decentralization as a situation with no bargaining at all and "cooperative centralization" as a situation where the legislature maximizes the delegates' total utilities.

[15] Throughout the paper, I ignore the possibility that a sub-group of districts could implement the project without requiring everyone to do so. Relaxing this assumption leads to a much richer model, left for future research.

a typical local liberalization project is given by some parameter θ_i,

$$\theta_i \sim U\left[a_i - \frac{\sigma_i}{2}, a_i + \frac{\sigma_i}{2}\right],$$

and that i's representative is decisive on a number of n_i such issues. The cost of selecting a delegate with the bias d_i (such that his value of the project is $\theta_i + d_i$) is then[16]

$$c_i d_i^2/2, \text{where } c_i = n_i/\sigma_i.$$

Delegating to a very progressive minister ($d_i > 0$) is costly since he will liberalize too much also locally. Delegating to a conservative ($d_i < 0$) is costly because he will liberalize too little. These costs are higher the more domestic decisions (n_i) the minister is making.

Note that these costs of delegation will *not* be present under majority rule or centralization, if the representatives then are different from the local decision-makers. In those regimes, the voters elect unbiased local representatives, since they will not be engaged in the inter-regional negotiations.

Since unanimity is required, everyone is a member of the majority coalition, and there is no point of delegating progressively. To increase the bargaining power, therefore, d_i is going to be negative in equilibrium. And, d_i will be more negative if the cost of delegation, c_i, is small and if the project is very likely to be implemented ($v^0+d+\sigma/2$ large), since then it is more likely that costly delegation will pay off. Thus, the project will be implemented too seldom in equilibrium, and the social loss is particularly large if $v^0 + \sigma/2$ is large, while the c_is are small.[17]

To let δ be a characteristic of majority rule, assume now that the discount factor approaches one, such that no district has agenda-setting power under decentralization.

[16] To see this, notice that the delegate implements a local project if $\theta_i + d_i \geq 0$. District i's expected utility of the local policies becomes:

$$n_i \int_{-d_i}^{a_i+\sigma_i/2} \theta_i \frac{d\theta_i}{\sigma_i} = \kappa - \frac{c_i}{2} d_i^2, \text{ where } c_i \equiv \frac{n_i}{\sigma_i}$$

and $\kappa \equiv n_i \left(a_i + \sigma_i/2\right)^2 / 2\sigma_i$ is a constant.

[17] Without local costs of delegation, Harstad (2008) shows that strategic delegation is still bounded, since that model assumes $n < \infty$ districts. Then, each district will be careful when delegating, taking into account the possibility that their representative may be pivotal and prevent the model from being implemented. The model is used to evaluate the benefits of side transfers.

Proposition 4. *Under decentralization,*

(i) *more conservative representatives pay less transfers (5.2),*

(ii) *district i delegates more conservatively if c_i is small while d is large (5.3),*

(iii) *all districts delegate conservatively (5.4), and more so if the c_is are small while v^0 and σ are large,*

(iv) *projects are implemented too seldom, particularly if the c_is are small while σ is large, and the social loss is given by L^D (5.5).*

$$
\begin{aligned}
t_i &= \left(d_i + v_i^0\right) - \left(d + v^0\right) + \epsilon_i && (5.2)\\
d_i &= -\frac{v^0 + d + \sigma/2}{c_i} && (5.3)\\
d &= -\frac{v^0 + \sigma/2}{\widetilde{c} + 1} < 0 && (5.4)\\
L^D &= \left(\frac{1}{2\sigma} + \frac{\widetilde{c}}{2}\right)\left(\frac{v^0 + \sigma/2}{\widetilde{c} + 1}\right)^2, \text{ where} && (5.5)\\
\frac{1}{\widetilde{c}} &\equiv \int_I \frac{1}{c_i} di.
\end{aligned}
$$

Both decentralization and majority rule may be inefficient in the model above. The best choice depends on the parameters. For example, if the c_is are large, delegation is too costly under decentralization, and the representatives are almost identical to their principals. Then, decentralization fares very well, and unanimity is in fact first-best. This result complements Corollary 1 by confirming the intuition of Wicksell (1896):

Corollary 2. *If $c_i \to \infty \forall i \in I$, decentralization (requiring $m = 1$) becomes first-best.*

It is worthwhile to further compare L^D and L^m. If T and δ are large, while h, v^0, and σ are small, the optimal voting rule m^* is going to be large and probably larger than m, when m is fixed. The social loss under majority rule, L^m, is then large, and decentralization is better.

Proposition 5. *Decentralization is better than majority rule ($L^D < L^m$) if (5.6) holds. This is the case, for example, for T large, δ large, c_i* large, *h small, v^0 small and σ small.*

$$
(1 + \widetilde{c}\sigma)\left(\frac{v^0 + \sigma/2}{\widetilde{c} + 1}\right)^2 < \left(2T\left(\frac{1 + \delta/m - \delta}{1 - \delta}\right) - \frac{hm}{1 - \delta} - \frac{\sigma}{2} - v^0\right)^2. \qquad (5.6)
$$

5.2. Centralization

By "centralization', I here mean that one representative, from one of the districts, takes the decision on the behalf of everyone. Since no consent is necessary, the other districts may require to be compensated in advance for the high taxes this "president" is going to set or, equivalently, abandon the possibility to set taxes. Thus, let $T = 0$ under centralization. To be consistent, suppose this president is appointed, or elected, at the "delegation stage", i.e., before the shocks are realized. If the president is from district i, and he has the bias d_i^c, then he implements the decision if $\theta \leq \widehat{\theta}^c \equiv v_i^0 + d_i^c + \epsilon_i$, and the social loss is

$$\frac{1}{2\sigma}\left(\widehat{\theta}^c - v^0\right)^2 = \frac{1}{2\sigma}\left(v_i^0 + \epsilon_i + d_i^c - v_0\right)^2.$$

This loss depends on ϵ_i, the shock in district i. Clearly, the expectation of this loss is minimized if $v_i^0 + d_i^c = v_0$: that is, if the president has the average value of the project, at least before the shocks are realized. Assume this to be the case.[18] The loss from centralization is then:

$$L^C = \int_{-h/2}^{h/2} \frac{{\epsilon_i}^2}{2\sigma}\frac{d\epsilon_i}{h} = \frac{h^2}{24\sigma}.$$

We immediately get:

Proposition 6. *Centralization is better than majority rule ($L^C < L^m$) if (5.7) holds. This is the case, for example, for T large, δ large, h small, v^0 small, and σ small.*

$$\frac{h^2}{12} < \left[2T\left(\frac{1+\delta/m-\delta}{1-\delta}\right) - \frac{hm}{1-\delta} - \frac{\sigma}{2} - v^0\right]^2. \tag{5.7}$$

By comparing "centralization" with "decentralization", we get:

Proposition 7. *Centralization is better than decentralization ($L^C < L^D$) if (5.8) holds. This is the case for h small, v^0 large, σ large and if the c_is are small.*

$$\frac{h}{\sqrt{12}} < \left(\frac{v^0 + \sigma/2}{\widetilde{c}+1}\right)\sqrt{1+\widetilde{c}\sigma}. \tag{5.8}$$

[18] This assumption holds (i) if the distribution of the voters' v_i^0s is symmetric or (ii) with Coasian bargaining over the choice of "president" at the delegation stage. If these assumptions did *not* hold, the results would be qualitatively similar, but centralization would be less efficient than predicted above.

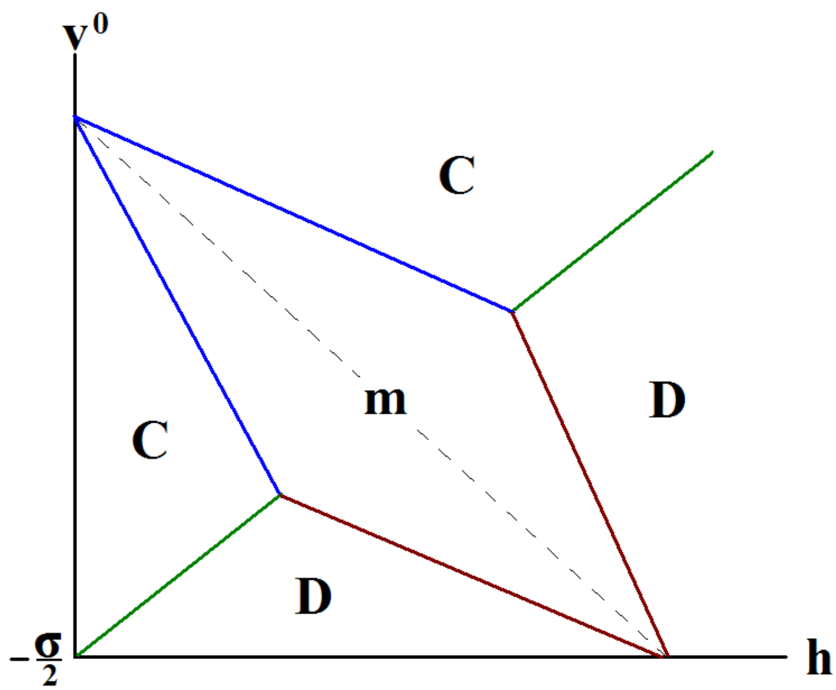

Figure 5.1: *The parameters determine whether centralization (C), decentralization (D) or majority rule (m) is best.*

5.3. The Best Regime

Sections 5.1-5.2 compare "decentralization", "centralization" and majority rule (the regime analyzed in Sections 3-4). While majority rule is first-best if $m = m^*$, the more m deviates from the optimal rule, the less efficient it is. Thus, each of (5.6) and (5.7) gives two conditions for when majority rule is best, one for $m < m^*$, and another for $m > m^*$. Together with (5.8), we get five conditions describing the best of these three regimes.

Figure 5.1 illustrates these conditions. Majority rule is best in area m, centralization is best in the areas marked with C, while decentralization is best in the areas marked with D. In fact, decentralization is first best along the first axis ($v^0 = -\sigma/2$), centralization is first best along the second axis ($h = 0$), while majority rule is first-best along the dotted line (then, $m = m^*$). Below the dotted line, $m < m^*$ and majority rule performs worse if h and v^0 are small, because then districts elect representatives that are too progressive. The opposite is the case above the dotted line: There, $m > m^*$ and majority rule performs worse if h and v^0 are large, because then districts appoint representatives that are too conservative. Compared to centralization, decentralization is naturally better if the heterogeneity is large, and it is also better if v^0 is large, since then the districts, under decentralization, delegate to very conservative representatives.[19]

6. Extensions and Generalizations

The legislative game in Sections 3-4 is simple and it can easily be extended. It builds on three strong assumptions: (i) The composition of the majority coalition M only depends on the project-values, (ii) M is exactly of size m, the majority requirement, and (iii) side transfers are always possible. These assumptions are relaxed, one by one, in the following three subsections. Each extension is discussed in isolation, although it is straightforward to combine them.[20]

6.1. Coalition Stability

In the model above, the majority coalition consists of the representatives with the highest valuation of the project. This arises as an equilibrium phenomenon and it is often simply assumed elsewhere in the literature.[21] In reality, however, there may be other reasons for

[19] To avoid strategic delegation, one may be tempted to decide upon the issue before the delegation stage and before the shocks are realized. If the districts, at this stage, commit to always do the project, no matter θ, the social loss is:

$$\int_{-\sigma/2}^{v^0} \left(v^0 - \theta\right) \frac{d\theta}{\sigma} - \int_{-\sigma/2}^{\sigma/2} \left(v^0 - \theta\right) \frac{d\theta}{\sigma} = \frac{1}{2\sigma} \left(\sigma/2 - v^0\right)^2,$$

if $\sigma/2 \geq v^0$, while it is 0 otherwise. Similarly, if the districts commit to never consider the project, the expected social loss is:

$$\int_{-\sigma/2}^{v^0} \left(v^0 - \theta\right) \frac{d\theta}{\sigma} = \frac{1}{2\sigma} \left(\sigma/2 + v^0\right)^2,$$

if $\sigma/2 \geq -v^0$, while it is 0 otherwise. Of these alternatives, it is clearly better to do the project if $v^0 > 0$. Compared to the other regimes above, it is better to decide in advance when the project is either almost for sure valuable, or almost for sure not.

[20] Another strong assumption is that the majority coalition is formed prior to the bargaining. If everyone could propose and no coalition were formed in advance, the equilibrium would be in mixed strategies, $M \subset I_d$ would be random, and so would therefore the θ-threshold. When θ is in the range of the θ-thresholds, the project is undertaken with some probability only, and the probability that $i \in M$ would depend on the random θ-threshold. For these reasons, such a model becomes too complicated to solve.

[21] See, for example, Aghion and Bolton (2003).

selecting coalition members, not only their valuation of the project.

Suppose that, with probability s, the coalition is formed independently of the v_i^ds, and every representative has then the same probability $|M| = m$ of being included in M. This may be reasonable, for example, if the policy space is multi-dimensional and deciding on one dimension (or political issue) is not worth the formation of a new coalition. Alternatively, some earlier coalition may already exist and this may be *stable* with probability s.

If s is large, it is unlikely that a progressive delegate is helpful in gaining political power, and the districts prefer instead to delegate conservatively since this, at least, increases their bargaining power. Thus, if s increases, d_i decreases, unless m decreases. In Figure 2, increasing s would imply a downward shift in the steepest curve.

At the same time, the socially optimal level of d *increases* in s. At the optimal voting rule, $d < 0$, just as before. This implies that when the coalition is random, and not only including the winners, then the project is implemented too seldom. When s increases, this occurs too often and to mitigate this inefficiency, the optimal d should increase towards zero. This can be done by reducing m.

Proposition 8. (i) *The equilibrium* d (6.1) *decreases in* s*,* (ii) *The socially optimal* d (6.2) *increases in* s *and, for both reasons,* (iii) *the optimal* m *decreases in* s*.*

$$\begin{aligned} d &= d(m) - \frac{smhq}{1-s}, \text{ where } q = \frac{v^0 + d + \sigma/2}{v^0 + d + \sigma/2 + h(1-m)/2}, && (6.1) \\ d^* &= -h(1-m)(1-s)/2. && (6.2) \end{aligned}$$

The function $d(m)$ is the same as before (equation 4.3), and q is the probability that the project is implemented if the majority coalition is independent of the v_i^ds compared to when it is not. The comparative static with respect to the other parameters turns out to be just the same as before.

A large s is, in practice, associated with less important political issues, for which it is not worth to form a new coalition. This suggests a smaller majority requirement for such issues, to prevent a too conservative delegation on these dimensions. In other words, more important issues should require a larger majority. Similarly, if majority coalitions are quite "stable" for a particular political system, then it should use smaller majority requirements to discourage districts from appointing too conservative delegates.

6.2. Coalition Discipline

So far, I have simply assumed that the majority coalition's size is equal to the majority requirement, $|M| = m$. This is in line with Riker's (1962) prediction of a "minimum winning coalition", and it naturally follows by assuming (i) that minority members can collude (then $|M| < m$ is not enough) but (ii) that they are unable to bribe majority members to reject the proposal (then $|M| > m$ is not necessary). When these assumptions are relaxed, however, the majority coalition may be smaller or larger than the majority requirement.

If assumption (i) is relaxed, such that there is no fear that the minority members should cooperate, the majority coalition can be quite small. Instead of including a fraction m of the delegates, the formateur can create a smaller coalition and simultaneously bribe some representatives in the minority to get the necessary m votes.

If assumption (ii) is relaxed, the majority coalition may fear that some of its members might be bribed to vote against the proposal at the voting stage. To ensure that the policy is finally approved, one may want to compensate some minority members to vote in favor of the project, just to be sure (Baron, 1989, Groseclose and Snyder, 1996).

Both possibilities fit the following extension of the model. Suppose that the formateur first selects a minimum-winning coalition $\underline{M} \subset I_d$ of mass $\underline{m}$, and that these members negotiate a proposal. All members of $\underline{M}$ must agree before the proposal is submitted as a take-it-or-leave-it offer to the rest. But for the proposal to pass, it must be approved by a mass $\overline{m} \geq \underline{m}$ of voters. If $\overline{m} = \underline{m}$, the model is just the same as before. Relaxing assumption (i) fits a context where $\overline{m} = m$, while relaxing (ii) fits a context where $\underline{m} = m$. A third interpretation of this model is that the policy may be negotiated by a sub-group, often a committee, in the larger parliament. The size of this committee could obviously be $\underline{m} < \overline{m}$, if $\overline{m}$ is the majority requirement in the legislature. To allow for this interpretation, I let $\underline{m}$ and $\overline{m}$ be exogenous, institutional, parameters.

Let $\overline{M}$ be the set of representatives that end up voting for the project. Thus, $\underline{M} \subset \overline{M}$

and $\left|\overline{M}\right| = \overline{m}$. In equilibrium, the minority $I_d \backslash \overline{M}$ is expropriated and taxed T, and this minority will consist of the representatives having the lowest values of the project, just as before. The representatives in $\overline{M} \backslash \underline{M}$ are taxed so much that they are just indifferent to supporting the project:[22]

$$t_i = t_i^{\overline{M}} \equiv v_i^d \text{ if } i \in \overline{M} \backslash \underline{M}. \tag{bp-I}$$

Therefore, no matter how the formateur selects $\underline{M} \subset \overline{M}$, the total surplus to be shared by $\underline{M}$ is $\left(\int_{i \in \overline{M}} v_i^d di + T(1-\overline{m})\right)$. The project is undertaken if

$$\int_{i \in \overline{M}} v_i^d di \geq 0 \Rightarrow \theta \leq \widehat{\theta},$$

and the equilibrium transfer from $i_d \in \underline{M}$ is:

$$t_i = t_i^{\underline{M}} \equiv v_i^d - \frac{\delta}{\underline{m}} \left[T(1-\overline{m}) + \int_{i \in \overline{M}} v_i^d di \right] \text{ if } i \in \underline{M}. \tag{bp-II}$$

Thus, the coalition's total surplus (inside the brackets) is the same no matter $\underline{M} \subset \overline{M}$, and the formateur is indifferent to how he selects $\underline{M} \subset \overline{M}$. If, then, the formateur randomly selects $\underline{M} \subset \overline{M}$, the *expected* utility for every $i \in \underline{M}$ is $\delta \left(T(1-\overline{m}) + \int_{i \in \overline{M}} v_i^d di\right) / \overline{m}$, and all the results above continue to hold if we just replace m by $\overline{m}$.

However, if small transaction costs are associated with the transfers, the formateur prefers $\underline{M}$ to consist of the delegates with the highest value of the project.[23] For this situation, Figure 5.1 illustrates a representative's value v_i^d and equilibrium utility u_i^d, as a function of i. The ϵ_i-thresholds for when $i \in \overline{M}$ and $i \in \underline{M}$ are defined by:

$$\overline{\epsilon}_i \equiv \theta + v_{\overline{m}} - v_i^0 - d_i, \tag{pp-I}$$

$$\underline{\epsilon}_i \equiv \theta + v_{\underline{m}} - v_i^0 - d_i. \tag{pp-II}$$

Anticipating all this, the principal's problem at the delegation stage is:

$$\max_{d_i} \int_{-\sigma/2}^{\widehat{\theta}} \left(\int_{-h/2}^{\overline{\epsilon}_i} (v_i - T) \frac{d\epsilon_i}{h} + \int_{\underline{\epsilon}_i}^{\underline{\epsilon}_i} \left(v_i - t_i^{\overline{M}}\right) \frac{d\epsilon_i}{h} + \int_{\underline{\epsilon}_i}^{h/2} \left(v_i - t_i^{\underline{M}}\right) \frac{d\epsilon_i}{h} \right) \frac{d\theta}{\sigma} \tag{6.3}$$

s.t. (bp-I),(bp-I), (pp-I) and (pp-II).

[22] I thus assume $v_i^d \leq T$.

[23] To see this in a simple case, let $v_i^d \leq v_j^d \leq \delta \left(T(1-m) + \int_{i \in M} v_i^d di\right) / \underline{m}$. If $j \in \underline{M}$ while $i \in I_d \backslash \underline{M}$, $|t_i| + |t_j| = v_i^d - v_j^d + \delta \left(T(1-m) + \int_{i \in M} v_i^d di\right) / \underline{m}$, smaller than the transfers if $i \in \underline{M}$ while $j \in I_d \backslash \underline{M}$. Thus, the first alternative would minimize linear transaction costs on transfers.

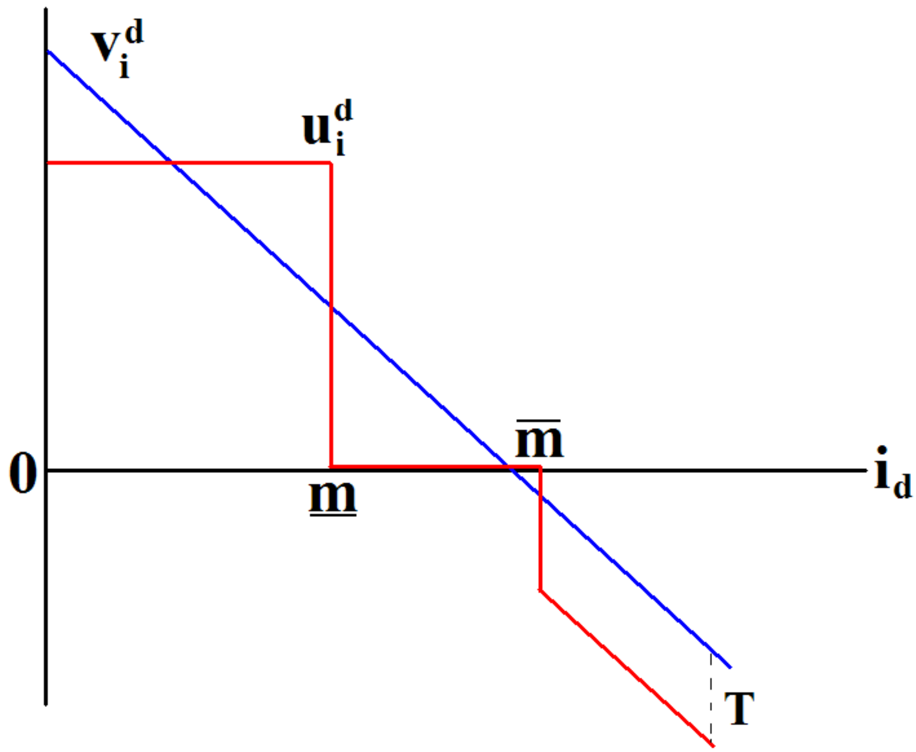

Figure 6.1: *Transfers make up for the difference between the two lines.*

The problem is solved similar to the problem in Section 4.2, and the solution is similar as well. But we get additional comparative static, of course:

Proposition 9. *Assume* $\delta\overline{m}/\underline{m} < 1$. (i) *Every* d_i *decreases in* $\underline{m}$ *as well as in* $\overline{m}$. (ii) *The selection of projects is optimal if* (6.4) *holds, implying that the optimal* $\overline{m}$ $[\underline{m}]$ *decreases in* $\underline{m}$ $[\overline{m}]$, h, v^0 *and* σ, *but increases in* T *and* δ.

$$2T\left(1+\frac{\delta}{\underline{m}}-\frac{\delta\overline{m}}{\underline{m}}\right)-h\overline{m}=\left(v^0+\frac{\sigma}{2}\right)\left(1-\frac{\delta\overline{m}}{\underline{m}}\right) \tag{6.4}$$

The intuition is the following.[24] The $\underline{M}$-members' payoff decreases in $\overline{m}$, since a larger $\overline{m}$ reduces the size of the minority which can be expropriated, as well as in $\underline{m}$, since a larger $\underline{m}$ implies that the surplus must be shared by more $\underline{M}$-members. The value of trying to become a majority member by delegating progressively decreases in both $\overline{m}$ and $\underline{m}$, and so does, therefore, d_i. Optimal delegation is achieved if the combination of $\overline{m}$ and $\underline{m}$ lead to appointments that are neither too conservative, nor too progressive.

[24] If $\delta\overline{m}/\underline{m} \geq 1$, $\partial d_i/\partial d \geq 1$ and there is no stable solution for d.

Thus, if $\underline{m}$ increases, for example, the selection of projects remains first-best if $\overline{m}$ decreases accordingly. The two majority thresholds are therefore substitutes. Each of them depends on the parameters (h, v^0, σ, T, δ) in the same way as before, and the intuition is the same, as well. Therefore, the results continue to hold, no matter the interpretation of this extension (i.e., no matter whether $m = \underline{m}$ or $m = \overline{m}$).[25]

6.3. The Possibility to Transfer and Tax

This subsection relaxes the assumption that transfers and taxes are possible whether or not the project is implemented. One interpretation of the taxes and transfers is that they could be lterations of the project being implemented: By modifying the collective project, by making exceptions and reallocations, it is often possible to transform a collective project into one that satisfies particular interests. This may be possible even if *explicit* taxes are not. With this interpretation, T may measure the extent to which it is possible to modify a project (by transferring its benefits), for a particular political issue. But with this interpretation, the "taxes" are possible only if the project is, in fact, implemented. If the project is *not* implemented, it is not possible to "tax" the minority in this way. This changes the model above. If M can tax the minority if and only if the project is implemented, it is implemented whenever

$$\theta \leq \widehat{\theta} + T(1 - m)/m,$$

where $\widehat{\theta}$ is the threshold derived above. Thus, the project is implemented more often than in the model above, since this is the only way in which the majority can expropriate the minority. The equilibrium delegation becomes

$$d = d(m) + T(1 - m)/m, \tag{6.5}$$

where $d(m)$ is the same as before. So, in this case, each district appoints a delegate that is more progressive, compared to the case above. The reason is that when the θ-threshold increases, projects are, on average, costlier, and this has the same effect as

[25] Notice that concentrating majority power (small $\underline{m}$) and agenda-setting power (small δ) have *opposite* effects on the optimal $\overline{m}$. The explanation is that while the formateur is randomly drawn, $\underline{M}$ consists of the most progressive delegates. Thus, higher agenda-setting power *reduces* the incentives to delegate progressively, while concentrated majority-power *increases* this incentive.

when v^0 decreases: d_i increases. So, in this case, the delegates are more progressive, and any set of delegates would implement the project more often. Clearly, then, the majority requirement should increase, relative to the situation above.

Proposition 10. *Assume the minority can be taxed if and only if a project is implemented. Equilibrium delegation is given by* (6.5)*, and the optimal majority requirement satisfies* (6.6).

$$2T/m^* - hm^* = \left(v^0 + \frac{\sigma}{2}\right)(1-\delta). \tag{6.6}$$

The proof is similar to those above, and thus omitted.

It is easy to see that the comparative static is just the same as before. With this interpretation, however, one may wonder whether T, the possibility to transfer project-benefits, should depend on v^0, the project's value. If $T = \alpha v^0$, $\alpha > 0$, for example, then m^* in (6.6) becomes an increasing function in v^0, not a decreasing one: when a larger v^0 increases the possibility to tax, the benefit of being in the majority coalition goes up and so does d_i, unless m^* increases.[26]

[26] A comparison could also be made to the case where transfers are unfeasible even when the project is implemented. District i would then like to see the project implemented if $v_i \geq \theta$, while it is, in equilibrium, implemented if a fraction m of the representatives votes for it. Clearly, a district would never benefit from choosing $d_i \neq 0$. If $v_i^0 = v^0 \forall i \in I$, the project would be approved if

$$v^0 - h(m - 1/2) \geq \theta.$$

The social loss, compared to the social optimum, is:

$$\int_{v_0}^{v^0+h/2-hm} (v_0 - \theta)\frac{d\theta}{\sigma} = \frac{h^2(m-1/2)^2}{2\sigma},$$

The optimal majority requirement is clearly $m = 1/2$, but otherwise this social loss can be compared to the regimes in Section 5 to determine when an m-rule without transfers is a better idea. By comparing to centralization, for example, an m-rule without transfers is better if

$$m > 1/2 + \sqrt{1/12} \approx 0.79.$$

The model in Harstad (2008) builds on this framework, studying when allowing transfers improves efficiency. In that model, however, only unanimity rule ($m = 1$) is considered, there are no individual shocks, and there is a finite number of principals.

7. Concluding Remarks

If voters elect representatives strategically, such as to gain political or bargaining power, they implement decisions that are suboptimal for the electorate as a whole. Unfortunately, there are conflicting theories on the direction of such delegation, and few studies on how it depends on institutional details. The contribution of this paper is that it shows how districts delegate conservatively or progressively, depending on the political system in general, and the majority rule in particular. If the majority requirement is large, the districts appoint more status quo biased representatives. The direction and magnitude of strategic delegation also depend on the characteristics of the relevant policy and the political system, such as the project's value, its variance, the heterogeneity, the minority protection, the agenda-setting power, the coalition's discipline and its stability. But in each case, the selection of projects is *first best* if carefully selecting the voting rule. The model is applied to compare decentralization and centralization, taking strategic delegation into account.

The European Union is a relevant example since its rules are subject to change, and since the rules vary across its chambers and policies.[27] While the Commission and the Parliament apply simple majority rules, the Council typically requires qualified majorities or unanimity. Based on this, Proposition 2 predicts that the representatives in the Council should be more protectionistic (status quo biased) than the Commission and the Parliament. This indeed seems to be the case, as discussed in the Introduction.[28]

Widely interpreted, the results make predictions beyond the relationship between delegation and voting rules. Delegation is often implemented by institutional rules, not necessarily by selecting representatives. For example, Haller and Holden (1997) suggest that groups may require a local super-majority to ratify collective projects. This, in effect, delegates the ratification decision from the median voter to a more reluctant citizen, increasing the group's bargaining power. Such delegation is, in this paper, argued to be desirable when the federal majority rule is large. Combined, the prediction is a positive

[27] For the current rules, see Hix (2005).

[28] The application to the European Council is a bit more complicated, however. Council members are, first of all, domestic politicians and selecting them strategically may be costly - just as analyzed in Section 5.1.

correlation between the majority requirements at the federal (or the international) and the local level. Thus, one set of institutions may be strategically designed in the response to another set of institutions. This opens up a large set of questions that should be investigated in future research.

8. Appendix: Proofs

Proof of Proposition 1: Let $\tau = \int_{i \in I_d} t_i di$ be the total tax revenue consumed by the proposer. First, notice that maximizing τ requires $t_i = T \forall i_d \in I_d \backslash M$. If a proposal is rejected, all $i_d \in M$ are equally likely to be the next proposer. This probability is, of course, vanishingly small, but the total tax revenue is, on the other hand, very large. In expectation, τ is distributed uniformly on all potential proposers, and they have a mass m. Thus, τ/m is the expected value of the (small but important) possibility of becoming the next proposal-maker. Let π_i represent i_d's continuation utility, conditional on *not* being the proposer. i_d is accepting a proposal if

$$\lambda v_i^d - t_i \geq \delta \left(\pi_i + \tau/m \right), \tag{8.1}$$

where $\lambda = 1$ if the project is proposed, and 0 otherwise. Thus,

$$\int_{i \in M} t_i di = \lambda \int_{i \in M} v_i^d di - \delta \int_{i \in M} \left(\pi_i + \tau/m \right) di,$$

so, to maximize τ, any proposer suggests to implement the project ($\lambda = 1$) if and only if $\int_{i \in M} v_i^d di \geq 0$. Suppose this is the case. In equilibrium, (8.1) binds and $\pi_i = v_i^d - t_i$, so:

$$\begin{aligned}
v_i^d - t_i &= \pi_i = \frac{\delta \tau}{(1-\delta) m}, \text{ where} \\
\tau &= (1-m)T + \int_{j \in M} t_j dj = (1-m)T + \int_{j \in M} \left(v_j^d - \pi_j \right) dj \\
&= (1-m)T + \int_{j \in M} v_j^d dj - \frac{\delta \tau}{(1-\delta)} \Rightarrow \\
\tau &= \frac{(1-m)T + \int_{j \in M} v_j^d dj}{1 + \delta / (1-\delta)} \text{ and} \\
t_i &= v_i^d - \frac{\delta \tau}{(1-\delta) m} = v_i^d - \delta \frac{(1-m)T + \int_{j \in M} v_j^d dj}{m}.
\end{aligned}$$

Notice that (i) follows from maximizing τ, and (iv) follows since $v_i^d - t_i \geq 0 \forall i \in M$. *QED*

Proof of Proposition 2: Notice that t_i is a function of i's shock, $t_i(\epsilon_i)$. The first-order condition of (4.1) is:

$$\int_{-\sigma/2}^{\widehat{\theta}} \left(\frac{1}{h} \left(T - t_i \left(\widehat{\epsilon}_i \right) \right) + \int_{\widehat{\epsilon}_i}^{h/2} (-1) \frac{d\epsilon_i}{h} \right) \frac{d\theta}{\sigma} = 0 \Rightarrow$$

$$\int_{-\sigma/2}^{\widehat{\theta}} \left(T - \left(v_m - \frac{\delta}{m} \left(T(1-m) + \int_{i \in M} v_i^d di \right) \right) - \left(h/2 - \theta - v_m + v_i^0 + d_i \right) \right) \frac{d\theta}{\sigma} = 0$$

$$\Rightarrow d_i + v_i^0 = E_\theta \left(T + \frac{\delta}{m} \left(T(1-m) + \int_{i \in M} v_i^d di \right) + \theta - h/2 \right), \tag{8.2}$$

where E_θ is taking the expectation over θ conditional on $\theta \leq \widehat{\theta}$. The second-order conditions are trivially fulfilled. Thus, all $v_i^d = d_i + v_i^0 + \epsilon_i - \theta = d + v^0 + \epsilon_i - \theta$ are uniformly distributed on $[d + v^0 - \theta - h/2, d + v^0 - \theta + h/2]$. Since I have ordered the delegates by decreasing value, such that $i_d < j_d$ if $v_i^d > v_j^d$, $v_i^d = d + v^0 - \theta + h/2 - hi$. v_m is the $(1-m)$-fractile of the v_i^ds, and it becomes

$$\begin{aligned} v_m &= d + v^0 + h/2 - hm - \theta, \text{ and} \\ \int_{i \in M} v_i^d di/m &= d + v^0 + h/2 - hm/2 - \theta. \end{aligned}$$

The project is implemented whenever $\theta \leq \widehat{\theta}$, where

$$\begin{aligned} \widehat{\theta} &= d + v^0 + h/2 - hm/2, \text{ and} \\ E_\theta \theta &= E\left(\theta \mid \theta \leq \widehat{\theta} \right) = \frac{(d + v^0 + h/2 - hm/2) - \sigma/2}{2}. \end{aligned} \tag{8.3}$$

Substituted in (8.2) gives:

$$\begin{aligned} d_i + v_i^0 &= T + \frac{\delta}{m} T(1-m) + \delta \left(d + v^0 + h/2 - hm/2 - E_\theta \theta \right) + E_\theta \theta - h/2 \\ &= T \left(1 + \delta/m - \delta \right) + \left(d + v^0 \right) \left(\frac{1+\delta}{2} \right) - \frac{h}{4} \left[(1-\delta) + m(1+\delta) \right] - \sigma \left(\frac{1-\delta}{4} \right) \end{aligned}$$

Solving for $d + v^0 = d_i + v_i^0 \forall i$ gives (4.3), and substituting d into (8.3) gives (4.4). That d increases in δ can best be seen from (8.2). *QED*

Proof of Proposition 4: Part (i) follows from (bp). Each district chooses d_i in order to

$$\max_{d_i} \int_{-\sigma/2}^{\widehat{\theta}_{dc}} \int_{-h/2}^{h/2} \left(v_i^0 + \epsilon_i - \theta - t_i \right) \frac{di}{h} \frac{d\theta}{\sigma} - c_i d_i^2/2 \text{ s.t. (bp) and } m = 1 \text{ and } \delta \to 1.$$

This gives the first-order condition:

$$-c_i d_i = \widehat{\theta}_D + \sigma/2,$$

where the project is implemented if

$$\begin{aligned} v^0 + d - \theta &\geq 0 \Rightarrow \theta \leq \widehat{\theta}_D \equiv v^0 + d \Rightarrow \\ -d_i &= \frac{v^0 + d + \sigma/2}{c_i}. \end{aligned}$$

$$-d = \frac{v^0 + d + \sigma/2}{\widetilde{c}} \Rightarrow -d = \frac{v^0 + \sigma/2}{\widetilde{c}+1}.$$

$$\widehat{\theta}_{dc} \equiv v^0 + d = v^0 - \frac{v^0 + \sigma/2}{\widetilde{c}+1} = \frac{v^0\widetilde{c} - \sigma/2}{\widetilde{c}+1} < v^0,$$

so the social loss, compared to the first-best, is:

$$\frac{1}{2\sigma}\left(\widehat{\theta}_D - v^0\right)^2 + c_i d_i^2/2 = \left(\frac{1}{2\sigma}\right)\left(\frac{v^0 + \sigma/2}{\widetilde{c}+1}\right)^2 + \frac{1}{2\widetilde{c}}\left(\frac{(v^0 + \sigma/2)\,\widetilde{c}}{\widetilde{c}+1}\right)^2 = L^D.$$

QED

Proof of Proposition 8: When M is random, so is $\int_M v_i^d di$. But when each $i \in I_d$ is a member of M with the same probability, m, and these are i.i.d., then, by (a slight abuse of) the law of large numbers, $\int_M v_i^d di = v^0 + d - \theta$, and the project is implemented if $\theta \leq \widehat{\theta}_s \equiv v^0 + d$. The principals' problem becomes:

$$\max_{d_i} (1-s) \int_{-\sigma/2}^{\widehat{\theta}} \left(\int_{-h/2}^{\widehat{\epsilon}_i} (v_i - T)\frac{d\epsilon_i}{h} + \int_{\widehat{\epsilon}_i}^{h/2} (v_i - t_i)\frac{d\epsilon_i}{h} \right) \frac{d\theta}{\sigma} \tag{8.4}$$
$$+sm\mathrm{E}_{\widehat{\theta}_s} \int_{-\sigma/2}^{\widehat{\theta}_s} (v_i - t_i)\frac{d\theta}{\sigma} \text{ s.t. (bp) and (pp),}$$

and it can be solved the same way as in Section 4.2. The first-order condition becomes:

$$d = d(m) - \frac{smhq}{1-s}, \text{ where } q = \frac{v^0 + d + \sigma/2}{v^0 + d + \sigma/2 + h(1-m)/2}. \tag{8.5}$$

$d(m)$ is the same function as before (equation 4.3), and q is the probability that the project is implemented if the majority coalition is independent of the v_i^ds compared to when it is not. By introspection, the comparative static for d is just the same as before.

Take d, for a moment, as given. The social loss, compared to the first-best, can be written as:

$$\begin{aligned} s\frac{\left(\widehat{\theta}_s - v^0\right)^2}{2\sigma} + (1-s)\frac{\left(\widehat{\theta} - v^0\right)^2}{2\sigma} &= \\ s\frac{d^2}{2\sigma} + (1-s)\frac{\left(d + h(1-m)/2\right)^2}{2\sigma}. \end{aligned}$$

Minimizing this w.r.t d gives the optimal d, d^*:

$$d^* = -h(1-m)(1-s)/2.$$

Combined with (8.5), the optimal m must ensure that $d^* = d$, implying

$$\begin{aligned} -v^0 + 2T\left(\frac{1+\delta/m-\delta}{1-\delta}\right) - \frac{h}{2}\left[1 + m\left(\frac{1+\delta}{1-\delta}\right)\right] - \frac{\sigma}{2} - \frac{smhq}{1-s} &= -h(1-m)(1-s)/2 \\ -v^0 + 2T\left(\frac{1+\delta/m-\delta}{1-\delta}\right) - \frac{h}{2}\left[1 + m\left(\frac{1+\delta}{1-\delta}\right)\right] - \frac{\sigma}{2} + h(1-m)/2 &= \frac{smhq}{1-s} + hs(1-m)/2 \\ -v^0 + 2T\left(\frac{1+\delta/m-\delta}{1-\delta}\right) - \frac{hm}{1-\delta} - \frac{\sigma}{2} &= \frac{smhq}{1-s} + hs(1-m)/2. \end{aligned}$$

By introspection, the comparative static is the same as before. *QED*

Proof of Proposition 9: The first-order condition of (6.3) is:

$$\begin{aligned} \int_{-\sigma/2}^{\widehat{\theta}} \frac{1}{h}\left(T - t_i^{\overline{M}}(\overline{\epsilon}_i) + t_i^{\overline{M}}(\underline{\epsilon}_i) - t_i^{M}(\underline{\epsilon}_i) - \int_{\overline{\epsilon}_i}^{\epsilon_i}\frac{d\epsilon_i}{h} - \int_{\underline{\epsilon}_i}^{h/2}\frac{d\epsilon_i}{h}\right)\frac{d\theta}{\sigma} &= 0 \Rightarrow \\ \int_{-\sigma/2}^{\widehat{\theta}} \left(T - v_{\overline{m}} + \frac{\delta}{\underline{m}}\left(T(1-\overline{m}) + \int_{i\in\overline{M}} v_i^d di\right) - \int_{\overline{\epsilon}_i}^{h/2} d\epsilon_i\right)\frac{d\theta}{\sigma} &= 0 \Rightarrow \\ \int_{-\sigma/2}^{\widehat{\theta}} \left(T - v_{\overline{m}} + \frac{\delta}{\underline{m}}\left(T(1-\overline{m}) + \int_{i\in\overline{M}} v_i^d di\right) - \left(h/2 - \theta - v_{\overline{m}} + v_i^0 + d_i\right)\right)\frac{d\theta}{\sigma} &= 0 \end{aligned}$$

$$d_i + v_i^0 = E_\theta\left(T + \frac{\delta}{\underline{m}}\left(T(1-\overline{m}) + \int_{i\in\overline{M}} v_i^d di\right) + \theta - h/2\right) = d + v^0, \tag{8.6}$$

where E_θ is taking the expectation over θ conditional on $\theta \le \widehat{\theta}$. The second-order conditions are trivially fulfilled. Thus, all $v_i^d = d_i + v_i^0 + \epsilon_i - \theta = d + v^0 + \epsilon_i - \theta$ are uniformly distributed on $[d+v^0-\theta-h/2, d+v^0-\theta+h/2]$. $v_{\overline{m}}$ is the $(1-\overline{m})$-fractile of the v_i^ds, and we get, similarly to before:

$$\begin{aligned} v_m &= d+v^0+h/2-h\overline{m}-\theta, \\ \int_{i\in\overline{M}} v_i^d di/\overline{m} &= d+v^0+h/2-h\overline{m}/2-\theta, \\ \widehat{\theta} &= d+v^0+h/2-h\overline{m}/2, \text{ and} \\ E_\theta\theta &= E\left(\theta \mid \theta \leq \widehat{\theta}\right) = \frac{(d+v^0+h/2-h\overline{m}/2)-\sigma/2}{2}. \end{aligned}$$

Substituted in (8.6) gives: $d(m) = -h(1-m)/2$

$$\begin{aligned} d_i+v_i^0 &= T\left(1+\delta(1-\overline{m})/\underline{m}\right)+\delta\frac{m}{\underline{m}}\left(d+v^0+h/2-h\overline{m}/2-E_\theta\theta\right) \qquad (8.7) \\ &\quad +E_\theta\theta-h/2 \\ &= T\left(1+\delta(1-\overline{m})/\underline{m}\right)+\left(d+v^0\right)\left(\frac{1+\delta\overline{m}/\underline{m}}{2}\right)+ \qquad (8.8) \\ &\quad \frac{h}{4}\left(1-\overline{m}\right)\left(1+\delta\overline{m}/\underline{m}\right)-h/2-\frac{\sigma}{4}\left(1-\delta\frac{\overline{m}}{\underline{m}}\right) \\ &= T\left(1+\delta/\underline{m}\right)-\delta\overline{m}/\underline{m}\left(T-\left(d+v^0\right)/2-\frac{\sigma}{4}\right) \qquad (8.9) \\ &\quad +\left(d+v^0\right)/2+\frac{h}{4}\left(1-\overline{m}\right)\left(1+\delta\overline{m}/\underline{m}\right)-h/2-\frac{\sigma}{4} \end{aligned}$$

Equation (8.7) shows that d_i is stable if and only if $\partial d_i/\partial d < 1 \Rightarrow \delta\overline{m}/\underline{m} < 1$, (8.8) shows that d_i decreases in $\underline{m}$ and (8.9) shows that d_i decreases in $\overline{m}$. Solving (8.8) for $d+v^0 = d_i+v_i^0$, we can write:

$$\left(d+v^0\right)\left(\frac{1-\delta\overline{m}/\underline{m}}{2}\right) = T\left(1+\delta\frac{1-\overline{m}}{\underline{m}}\right)-\frac{h}{4}\left(1-\overline{m}\right)\left(1-\frac{\delta\overline{m}}{\underline{m}}\right)-\frac{h\overline{m}}{2}-\frac{\sigma}{4}\left(1-\frac{\delta\overline{m}}{\underline{m}}\right). \qquad (8.10)$$

The selection of projects is optimal if $v^0 = \widehat{\theta} = d+v^0+h/2-h\overline{m}/2 \Rightarrow d = -h\left(1-\overline{m}\right)/2$. Substituted in (8.10) gives:

$$\begin{aligned} v^0\left(\frac{1-\delta\overline{m}/\underline{m}}{2}\right) &= T\left(1+\delta(1-\overline{m})/\underline{m}\right)-h\overline{m}/2-\frac{\sigma}{4}\left(1-\delta\frac{\overline{m}}{\underline{m}}\right) \Rightarrow \qquad (8.11) \\ v^0/2 &= T\left(1+\delta/\underline{m}\right)-\delta\overline{m}\left(T-v^0/2-\frac{\sigma}{4}\right)/\underline{m}-\frac{h}{2}\overline{m}-\frac{\sigma}{4}. \qquad (8.12) \end{aligned}$$

So, if v^0, σ or h increases, while T or δ decreases, $\underline{m}$ should decrease (as shown by (8.11)), or $\overline{m}$ should decrease (as seen from (8.12)). *QED*

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