Decentralisation and the quality of the politicians: The political economy of task complexity and candidate selection

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Abstract

This paper uses a citizen-candidate model in a two-layer government setup to analyze how the assignment of tasks between the central and local governments endogenously determines the quality of politicians at both levels. We setup a model where a political job is composed of several tasks, and the outcome of each task is a random variable with a higher expected value, the more competent is the politician that performs it. Voters observe the outcome of the different tasks but not the politician's ability. More complex tasks increase the probability that the type of the decision maker is revealed, and, therefore make the job more attractive for able candidates and the less for unable ones. Each citizen may run for office at either the local or the central level, or not enter the political market, in which case she earns an exogenous market wage. We show that pooling and separating equilibria at both government levels are possible, depending on the number of tasks assigned to each level.

Keywords: Endogenous candidates, decentralization, political economy
JEL Classification:

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1 Introduction

The allocation of competencies across government levels varies a lot worldwide (see, e.g., Ter-Minassian, 1997, OECD 1999, 2002, Stegarescu 2005, Arzaghi and Henderson, 2005). The fiscal federalism literature, starting with Oates (1972) seminal work, provides different explanations for these differences, based on whether (or de degree to which) the public good is subject to scale economies, it generates inter-regional spillovers, or it must target heterogeneous local preferences. More recently, the political economy literature has joined the debate, putting forward a powerful argument in favor of decentralization, namely, that it provides voters with a discipline mechanism based on yardstick competition. With correlated economic contexts, voters may use the performance of neighbor jurisdictions to condition the reelection of the official in their own (Belleflamme and Hindriks, 2005, Hindriks and Lockwood, 2009).

This paper sheds light on the previously unnoticed effect of the assignment of tasks between the local and central government on the quality of politicians. Indeed, good policy outcomes result from an institutional context that provides the right incentives either to implement good policies (e.g., yardstick competition), or to foster the entry of good politicians into the political market. Both have been documented empirically (see, e.g., Besley and Case on yardstick competition and Besley et al., 2005 on candidate selection). Starting with Besley and Coate (1997) and Osborne and Slivinski (1996) citizen-candidate models, the literature has developed several arguments explaining the quality of politicians. Caselli and Morelli (2004) offer an explanation for why incompetent individuals have a comparative advantage in running for political office, based on their lower outside option, while Poutvarra and Takalo (2005) show that the rewards paid to politicians are successful in selecting good candidates only if campaign costs are sufficiently high.

This paper is the first to propose a theory of candidate quality based on the coexistence of two government layers. We argue that the assignment of tasks to the different government levels has an impact on the quality of the pool of agents that run for each level. In a nutshell, our model shows that good politicians are attracted by complex political jobs. We setup a model where a political job is composed of several tasks, and the outcome of each task is a random variable with a higher expected value, the more competent is the politician that performs it. Voters observe the outcome of the different tasks but not the politician's ability. In this framework, the more complex the tasks assigned to a particular level of government, the higher the probability that the type of the decision maker is revealed, and, therefore the more attractive that level of government is for able candidates and the less it is to unable ones. Our citizen-candidate model allows agents to run for office at either the local or the central level, or not to enter the political market, in which case they earn an exogenous market wage. We characterize the quality of the polity at both the central and local level of government depending on the number of tasks assigned to each level, and assuming that the local government never handles more tasks than the central one. Our main results are as follows. Firstly, low quality candidates never run at the central level; secondly, high quality candidates run at the central level, and may also run at the local level if its complexity is high enough; thirdly, increasing the complexity of the political job at the local level increases the proportion of high quality local candidates.

Our analysis reveals a trade-off in the assignment of tasks between the two government levels. Indeed, assigning more tasks to the local level increases the proportion of high quality local politicians, but it may decrease the expected quality of the performed tasks because, it decreases the number of central tasks, which are the only ones that will be performed by a good politician *for sure*. This induces a non-monotonic relationship between average task outcome and the number of tasks assigned to the local level. Full centralization (i.e., no tasks performed by the local level) is the most efficient organization; but once one starts to allocate some tasks to the local level, then efficiency decreases at first, and then starts to increase once the number of tasks is sufficiently high so as to attract good politicians for the local government.

A full-fledged efficiency analysis must take into account the costs incurred by the candidates. In our framework, this costs are important as they serve as a selection device.

The paper is organized as follows. In Section 2 we present the model with only one level of government and show how the complexity of the task to be performed has an impact on the expected quality of candidates. Section 3 presents the two-tier government setup and derives our main results.

2 The Model

The economy is populated by overlapping generations of 2κ agents, who live for two periods and do not discount the future. They may decide whether to enter the political market at the beginning of their lives. There are two types of agents, the good and the bad, denoted $j = g, b$, in equal proportions. All the agents who either do not enter the political market or do enter, but are not elected, enjoy a wage in the private market which we normalize to zero, while the elected ones enjoy an ego-rent, or wage, of $\mu \geq 0$.

The agents pay a campaining cost of γ to enter the political market, whenever they face competition. When one agent is the single candidate, she need not campain and pays no entry cost. Since the campaign is uninformative about the quality of the politician, they all face an equal chance of winning the election, which we denote q. We write $F(\gamma)$ as the expected share of each type of agents that has an entry cost bellow γ, assumed to follow a uniform distribution between 0 and $\bar{\gamma}$. The entry process generates an endogenous proportion of politicians of the good type, denoted β.[1]

The political office comprises n tasks, a higher number of tasks implying a greater complexity of the office. The politician in charge is responsible for all the tasks. The outcome of each task is a normal random variable with variance σ^2 and expectation λ_i, which can either be high or low, $\lambda_1 > \lambda_2$, for competent and incompetent agents, respectively. A good agent has a probabilty θ_g to be competent while a bad type has a probability θ_b to be competent with $\theta_g = 1 - \theta_b > 1/2$. We are thus assuming that politicians' competence changes the expected outcome of a task, but not its variability. Voters observe a vector of task outcomes $\boldsymbol{x} = (x_1, x_2, \ldots, x_n)$. Given the normality assumption, the probability that politician with competence $i = 1, 2$ generates vector $\boldsymbol{x}$ is

$$v(\boldsymbol{x}, \lambda_i) = \prod_{j=1}^{n} \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{\left(x_j - \lambda_i\right)^2}{2\sigma^2}} = \left(\frac{1}{\sqrt{2\pi\sigma^2}}\right)^n e^{-\sum_{j=1}^{n} \frac{\left(x_j - \lambda_i\right)^2}{2\sigma^2}}$$

[1] We show below that β is time-invariant.

2.1 The re-election stage

Politicians are term-limited, and can only be re-elected once. At the end of the first period in office, the voters compute the posterior probability that the politician is competent, given the observed performance.

$$p(\boldsymbol{x}) = \frac{\beta\theta_g \upsilon\left(\boldsymbol{x}, \lambda_1\right) + (1-\beta)\theta_b \upsilon\left(\boldsymbol{x}, \lambda_1\right)}{\beta[\theta_g \upsilon\left(\boldsymbol{x}, \lambda_1\right) + (1-\theta_g)\upsilon\left(\boldsymbol{x}, \lambda_2\right)] + (1-\beta)[\theta_b \upsilon\left(\boldsymbol{x}, \lambda_2\right) + (1-\theta_b)\upsilon\left(\boldsymbol{x}, \lambda_2\right)]}$$

However, voters make mistakes and even when the posterior probability is greater than the prior $\pi = \beta\theta_g + (1-\beta)\theta_b$, they may oust the politician with a probability of α, possibly due to coordination failures or to personal reasons that lead the politician to an early retirement from politics. For $0 \leq \beta \leq 1$[2], the updated probability of a facing a good politician is greater than the prior if and only if

$$\upsilon\left(\boldsymbol{x}, \lambda_1\right) > \upsilon\left(\boldsymbol{x}, \lambda_2\right)$$

which, after straightforward simplification, becomes

$$\frac{\sum_{i=1}^{n} x_i}{n} > \frac{\lambda_1 + \lambda_2}{2} \tag{1}$$

Using (1) and recalling that the distribution of the sample average follows a normal distribution with expectation λ_i and variance σ^2/n, the probability that a competent politician is re-elected is given by $\rho_1(n) = (1-\alpha)P_1(n)$, where

$$\begin{aligned} P_1(n) = P\left(\frac{\sum_{j=1}^{n} x_j}{n} > \frac{\lambda_1 + \lambda_2}{2}\right) &= 1 - P\left(\frac{\sum_{i=1}^{n} x_i/n - \lambda_1}{\sqrt{\sigma^2/n}} \leq \frac{(\lambda_1+\lambda_2)/2 - \lambda_1}{\sqrt{\sigma^2/n}}\right) \\ &= 1 - \Phi\left(\frac{\sqrt{n}}{\sigma}\frac{\lambda_2 - \lambda_1}{2}\right) \end{aligned} \tag{2}$$

Where $\Phi(\cdot)$ is the distribution function of the standardized normal distribution. Analogously, the probability that an incompetent politician is re-elected is $\rho_2(n) = (1-\alpha)P_2(n)$, with

$$P_2(n) = 1 - \Phi\left(\frac{\sqrt{n}}{\sigma}\frac{\lambda_1 - \lambda_2}{2}\right) \tag{3}$$

A few interesting properties are apparent from (2) and (3). Firstly, using the symmetry of the normal distribution,

$$P_1(n) = 1 - P_2(n),\ \forall n$$

Secondly, the fact that $\lambda_1 > \lambda_2$ ensures that the competent politician faces a higher probability of being re-elected than not, while the reverse happens for the incompetent one, i.e.

$$P_1(n) \geq \frac{1}{2} \geq P_2(n)$$

[2] on a ajoute cette histoire pour eviter que dans le cas separating les mauvais ne soientt jamais re-elus. Car maintenant ce qui compte pour l'electeur c'est si le politicien fait λ_1 ou λ_2 et non pas s'il est bon ou mauvais.

Thirdly, increasing the complexity of the political task increases the re-election chances of the competent politician, while it decreases those of the incompetent one. Indeed,

$$\frac{\partial P_1(n)}{\partial n} = -\frac{\lambda_2 - \lambda_1}{2\sigma^2}\phi\left(\frac{\sqrt{n}}{\sigma}\frac{\lambda_2 - \lambda_1}{2}\right) > 0 \tag{4}$$

$$\frac{\partial P_2(n)}{\partial n} = -\frac{\lambda_1 - \lambda_2}{2\sigma^2}\phi\left(\frac{\sqrt{n}}{\sigma}\frac{\lambda_1 - \lambda_2}{2}\right) = -\frac{\partial P_1(n)}{\partial n} < 0 \tag{5}$$

where $\phi(\cdot)$ stands for the standardized normal density. This property is very important for our results, for it ensures that more complex political jobs (i.e., those with higher number of tasks) are relatively more attractive for good politicians.

2.2 The entry decision

The expected utility of running for office for a candidate of type $j = g, b$ is thus given by

$$q\mu[1 + \theta_j \rho_1(n) + (1 - \theta_j)\rho_2(n)] - \gamma$$

yielding a type-specific cut-off entry cost of

$$\hat{\gamma}_j(q; n) = q\mu[1 + \theta_j \rho_1(n) + (1 - \theta_j)\rho_2(n)],\ j = g, b \tag{6}$$

which is increasing in both the election and re-election probabilities, i.e., the agents are willing to pay a higher cost to enter the political market if they face better election prospects.

The share of good agents in the political market is given by

$$\beta = \frac{\hat{\gamma}_g}{\hat{\gamma}_g + \hat{\gamma}_b}$$

Note that β is stationary.[3]

From (6), the expected number of agents in the political market is

$$\kappa\frac{\hat{\gamma}_g + \hat{\gamma}_b}{\bar{\gamma}}$$

Hence, the election probability for an individual agent is given by

$$q = \frac{\bar{\gamma}}{\kappa\left(\hat{\gamma}_g + \hat{\gamma}_b\right)} \tag{7}$$

Armed with these preliminary results, we derive the equilibrium of the entry game in the next subsection, and show the fundamental relationship between complexity and average candidate quality.

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[3]We now show that β is stationary. To see why, take the entry decision of the young agents in any period after the initial one, taken after performance is revealed, but before the uncertainty about ousting an incumbent with a good performance is resolved. If the incumbent's performance is low, she is voted out of office, and the decision is the same as in the first period. If her performance is good, there is a probability α that she is voted out of office. The expected value of entering the political market is then

$$\alpha\tilde{q}\mu[1 + \theta_j \rho_h + (1 - \theta_j)\rho_l] - \gamma$$

where $\tilde{q}$ denotes the election probability in periods after the initial one, yielding a cut-off entry cost of

$$\tilde{\gamma}_j = \alpha\tilde{q}\mu[1 + \theta_j \rho_h + (1 - \theta_j)\rho_l]$$

implying that the quality of the polity is stationary.

2.3 Complexity and candidate quality

The number and average quality of candidates on the market is the result of the system of equations formed by

$$\hat{\gamma}_g + \hat{\gamma}_b = q\mu[2-\alpha] \tag{8}$$

where we have used the facts that $\rho_1 + \rho_2 = 1-\alpha$, and $\theta_g + \theta_b = 1$. Using (8) in (7) we get

$$q^* = \sqrt{\frac{\bar{\gamma}}{\kappa\mu(2-\alpha)}}$$

which is smaller than one provided that $\bar{\gamma} < \kappa\mu(2-\alpha)$, an hypothesis we assume hereafter. One may now compute the impact of increased complexity on the number of candidates on the market and the election probability. Notice that q^*does not change with n. However,

$$\frac{\partial\hat{\gamma}_g^*}{\partial n} = q^*\mu(1-\alpha)\left(\theta_g\frac{\partial P_1}{\partial n} + (1-\theta_g)\frac{\partial P_2}{\partial n}\right) = q^*\mu(1-\alpha)\left(\frac{\partial P_1}{\partial n}(2\theta_g - 1) + (1-\theta_g)\right) > 0$$

where we have used (4) and the fact that $\theta_g > 1/2$. This, together with the fact that the total share of agents running for candidates does not change, implies that $\hat{\gamma}_b$ must decrease.

We summarize our results in the following proposition.

Proposition 1 *When the complexity of the political task increases, the number of good politicians on the market increases, while that of the bad ones decreases. Overall, the number of politicians is unchanged.*

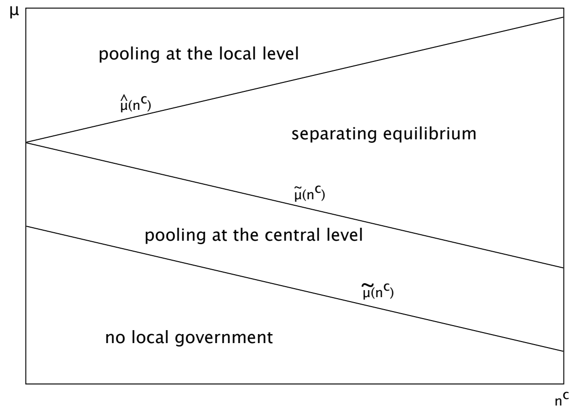
Our setup has the interesting property that it endogenously generates a better polity when the political job is more complex. We now extend it to include two government layers, with the aim of characterizing how the assignment of tasks to the local government drives the average quality of candidates running *both* for the central and local governments.

3 The equilibrium with two government levels

We now suppose that there are two government levels, the central and the local one, with complexity n^c and $n^l < n^c$, respectively, implying that competent agents face better re-election prospects at the central level, while incompetent ones face better re-election prospects at the local level. We further suppose that there is a large number of tasks to allocate between the two levels, so that $n^c \in [n/2, n]$ and $n^l \in (0, n/2]$, with $n^c + n^l = n$. In this setup, re-election probabilities depend on both the politician's type and the government level. We shall denote ρ_j^l (resp., ρ_j^c) the re-election probability of politician of type $j = g, b$ running at the local (resp., central) government. These re-election probabilities are given by

$$\begin{aligned}
\rho_j^l &= \theta_j\rho_1(n^l) + (1-\theta_j)\rho_2(n^l),\ j = g, b \\
\rho_j^c &= \theta_j\rho_1(n^c) + (1-\theta_j)\rho_2(n^c),\ j = g, b
\end{aligned}$$

Figure 1: Separating and Pooling equilibria



Notice that at the lower bound of n^c, we have $\rho_b^c = \rho_b^l < \rho_g^l = \rho_g^c$, while at the upper bound $\rho_b^l = \rho_g^l = (1-\alpha)/2$. Importantly, we assume that both government levels *must* exist, so n^l is bounded away from zero.

The ego-rent generated by the central office is normalised to $\mu^c = 1$, without loss of generality, while that of the local office is lower, and given by $\mu^l = \mu \leq 1$. In each period, each individual agent decides whether to enter the political market at the central or local level, or not to enter at all. The expected utility of a type $j = g, b$ citizen entering at level $i = c, l$ is then

$$U_j^i = q^i \mu^i (1 + \rho_j^i) - \gamma \tag{9}$$

An agent becomes a politician at the central level if $U_j^c \geq U_j^l \geq 0$, at the local level if $U_j^l \geq U_j^c \geq 0$, and does not enter the political market otherwise. In what follows, we shall use $\hat{\gamma}_j^i$ to denote the marginal entry cost of a type j agent entering the political market at level i.

There are several possible equilibria, depending on whether each type of politician operates at the central, local or both government levels. However, the fact that the central government is more complex than the local one makes it a natural pole of attraction to the competent candidates, and we may state a first result.

Proposition 2 *There are always some good politicians at the central level.*

Hence, there is always a positive probability that central tasks are undertaken by a good politician. The relative attractiveness of the central level has two components. The first, the ego-rent, is not type specific. The second is related to the re-election probabilities, and it is type-specific. Good types prefer the central level, while bad types prefer the local level. This discrepancy is softened as more tasks are devoluted to the local government. The interplay between these two components generates the equilibrium configuration displayed in Figure 1.

We summarise our findings in the following Propositions.

Proposition 3 *The equilibrium of the game depends on the relative attractiveness of the local government. When μ is*

(i) high, the unique equilibrium is characterised by pooling of bad and good candidates at the local level, and only good candidates at the central level.

(ii) intermediate, the equilibrium depends on the devolution of tasks to the local government; less devolution generates a separating equilibrium with good candidates at the central level and bad candidates at the local level.

(iii) low, the unique equilibrium is characterised by pooling of bad and good candidates at the central level, and only bad candidates at the local level.

When the local level is very unattractive for the bad candidates, due to the combination of high task devolution and low μ, one may end up with the very unpleasant situation of having no candidates, whatsoever, running at the local level. This happens despite the fact that the election probability is equal to 1 in such cases. However, the local office has a very low return and bad candidates prefer to go to the central level where they have some positive probability of earning a much higher rent. This can never happen at the central level, however. Should all the candidates cluster at the local level, a good candidate running at the central level wins in all respects: she is elected for sure, earns a higher rent, and faces better re-election prospects. We state our next result.

Proposition 4 *The local office is not filled by any politician when μ is very low and task devolution is sufficiently high.*

As it is clear from Figure 1, and Propositions **??** and 4, the effect of complexity is different, depending on the range of μ. It need not be the case that increasing the complexity of the local government increases the likelihood that a good politician holds it. This is the object of our next Proposition.

Proposition 5 *When μ is high, task devolution increases the proportion of good politicians at the local level. When μ is low, task devolution increases the proportion of bad politicians at the central level, eventually driving the number of politicians at the local level to zero.*

This result implies that it is not necessarily desirable to increase the complexity of the local government. When the local ego-rent, or wage, is very low, good politicians are never attracted by this government level, no matter its complexity. Hence, increasing the number of tasks allocated to the local government, instead of attracting some good politicians, makes some bad politicians move to the central government, where even if they face lower re-election prospects, they enjoy a higher ego-rent. In this case, the local government is still in the hands of a bad politician for sure, and the central government now has some probability of also being held by a bad politician. Moreover, one is moving tasks which are performed by a good politician with some probability to the local government, where they are performed by a bad politician for sure. To much devolution may have an even stronger negative consequence: leaving local tasks without any official in charge, and thus not undertaken at all.

Conversely, when the local government pays sufficiently, then increasing its complexity attracts good politicians and increases the probability that both levels of government are held by a good candidate. In this case, there is a clear trade-off. Each task that is moved from the central to the local level is no longer performed for sure by a good politician; however, it increases the prospects that all the local tasks are performed by good politicians. This suggests that there is an optimal task assignment that maximizes the combined payoff from central and locally performed tasks.

One may envisage changing μ, interpreted as the (relative) local political wage instead of a pure ego-rent, instead of the task assignment, as a means to influence the quality of the polity at the different government layers. This is the object of our next proposition.

Proposition 6 *Increasing the local political wage when it is*

(i) very low, attracts some bad candidates to the otherwise unoccupied local government;

(ii) low, drives down the share of bad politicians at the central level to zero;

(iii) intermediate, has no impact on the equilibrium;

(iv) high, attracts an increasing share of good politicians to the central level;

This proposition implies that there is a whole range of μ for which increasing it plays no role in the quality of the polity in both government layers, hence it is a pure transfer from the tax payers to the politicians. Contrary to task devolution, the political wage, when it does play a role, it is a positive one.

These two results set the ground for the welfare analysis which we undertake in the next section.

4 Welfare analysis

Let us distinguish the effect of centralisation between its impact on the expected quality of the public decisions and on the political costs.

By expected quality of the public decision we mean that centralisation has an impact on the probability to get an able decision maker at the cental and the local level and therefore on the expected number of tasks that are performed by an able politician.

By political cost we refer to the γ the cost incurred by candidates to become a politician. Centralisation has an impact on the number of each type of politician running for office at each level and therefore on the aggregate political cost.

When n_c and μ are such that we have a separating equilibrium, an increase in n_c increases the share of tasks performed by able politicians, this means that the expected quality of the public decision is improved. This is done at some cost as centralisation increases the number of low quality politicians at the local level as centralisation increases the probability of reelection for an unable politicians and therefore makes it more attractive for that type of politicians. Exactly the same occurs at the central level where more able candidates are attracted by a higher reelection prospect.

When n_c and μ are such that there is a pooling equilibrium at the central level. Centralisation has two consequences on the expected quality of public decision. First, it transfers tasks from a level at which all decision makers are of bad quality to a level at which with some probability, the decision maker will be able. Second it increases the probability that the decision maker at the central level is of high quality. As it makes that level more attractive to able candidates and less for unable ones.To see this last point note that by (17) the quality of the polity is simplifies to

$$\begin{aligned}\pi_c &= \frac{\hat{\gamma}_g}{\hat{\gamma}_g + \theta\hat{\gamma}_b} \\ &= \frac{x_g^c}{x_g^c + \theta x_b^c}\end{aligned}$$

(**??**) implies that π_c is increasing in n_c.

The impact of centralisation on the cost incurred by candidates is proportional to

$$\begin{aligned}\hat{\gamma}_g + \hat{\gamma}_b &= \hat{q}^c(x_g^c + x_b^c) \\ &= \hat{q}^c(1-\alpha)\end{aligned}$$

which is shown in appendix to be increasing in centralisation.

When n_c and μ are such that there is a pooling equilibrium at the local level. Centralisation has an ambiguous effect on the expected quality of the public decision. It adds more task to the central level that will be in the hand of an able decision maker but it decreases the probability that local politician is an able one.

$$\pi_l = \frac{(1-\theta)\hat{\gamma}_g}{(1-\theta)\hat{\gamma}_g + \hat{\gamma}_b}$$

where θ is increasing in the level of centralisation.

5 Appendix

We begin by introducing some notation which is used in the subsequent proofs. Let

$$\begin{aligned}x_b^c &= 1+\rho_b^c && (10)\\ x_b^l &= \mu(1+\rho_b^l) \\ x_g^c &= 1+\rho_g^c && (11)\\ x_g^l &= \mu(1+\rho_g^l)\end{aligned}$$

Before analyzing further the different possible configurations, we present some useful properties of x_i^j, $i = g, b$, $j = l, c$.

Claim 1

$$\frac{x_b^c}{x_b^l} \leq \frac{x_g^c}{x_g^l} \tag{12}$$

Where the equality arises for $n^c = n^l = n/2$.

Proof. It follows from the facts that $P_g^c(n^c) \geq P_g^l(n^c)$, $\forall n^c$, while $P_b^c(n^c) \leq P_b^l(n^c)$, $\forall n^c$, and that $P_\theta^c(n/2) = P_\theta^l(n/2)$, $\theta = c, l$. ■

Claim 2

$$x_g^c \geq x_g^l \tag{13}$$

Proof. It follows from $\mu \leq 1$ and $P_g^c(n^c) \geq P_g^l(n^c)$, $\forall n^c$. ■

Claim 3

$$\frac{x_b^l}{x_b^c} \in \left[\mu, \frac{3-\alpha}{2}\mu\right]$$

Moreover, when n_c is low enough, $\frac{x_b^l}{x_b^c} < 1$.

Proof. $\frac{x_b^l}{x_b^c}$ is increasing in n^c. Moreover, $\rho_b^l(n/2) = \rho_b^c(n/2)$, and $\lim_{n\to\infty} \rho_b^l(n) = \frac{1-\alpha}{2}$ and $\rho_b^c(0) = 0$. The Claim then follows. ■

5.1 Proof of Proposition 2

Proof. Suppose that all the good candidates run at the local level. Then, it must be the case that

$$U_g^l > U_g^c \tag{14}$$

Two cases may arise:

(i) All the bad agents who become politicians enter at the local level. Then, anyone entering at the central level is elected for sure ($q^c = 1$), and (14) becomes

$$x_g^l q^l > x_g^c \Leftrightarrow q^l > \frac{x_g^c}{x_g^l} > 1$$

by Claim 2. We thus reach a contradiction.

(ii) There are some bad agents who become politicians at the central level. Then, the entry conditions read

$$q^c x_b^c \geq x_b^l q^l$$
$$q^l x_g^l > q^c x_g^c$$

the two inequalities can be rewritten as

$$\frac{x_g^c}{x_g^l} < \frac{q^l}{q^c} \leq \frac{x_b^c}{x_b^l}$$

which is impossible by Claim 1.

■

5.2 The separating case

In the separating case, there are only good politicians at the central level, and only bad ones at the local level. The cut-off entry costs are thus given by $\hat{\gamma}_g = q^c x_g^c$, $\hat{\gamma}_b = q^l x_b^l$. And one may use

$$q^c = \min\left[\frac{\bar{\gamma}}{\kappa\hat{\gamma}_g}, 1\right], \; q^l = \min\left[\frac{\bar{\gamma}}{\kappa\hat{\gamma}_b}, 1\right]$$

to solve for the equilibrium values of q^c, q^l, yielding

$$q^c = \begin{cases} \sqrt{\frac{\bar{\gamma}}{\kappa x_g^c}}, & \text{when} \quad x_g^c \geq \frac{\bar{\gamma}}{\kappa} \\ 1 & \text{otherwise} \end{cases} \tag{15}$$
$$q^l = \begin{cases} \sqrt{\frac{\bar{\gamma}}{\kappa x_b^l}}, & \text{when} \quad x_b^l \geq \frac{\bar{\gamma}}{\kappa} \\ 1 & \text{otherwise} \end{cases}$$

A separating equilibrium exists if and only if $h_b(n^c, \mu) = \hat{q}^l(n^c, \mu)x_b^l(n^c, \mu) - \hat{q}^c(n^c, \mu)x_b^c(n^c) > 0$ and $h_g(n^c, \mu) = \hat{q}^c(n^c, \mu)x_g^c(n^c) - \hat{q}^l(n^c, \mu)x_g^l(n^c, \mu) > 0$. Note that

(i) $h_b(n^c,\mu)$ is increasing in n^c. Indeed, $q^l x_b^l = \sqrt{\frac{\bar{\gamma}}{\kappa} x_b^l}$ (or $q^l x_b^l = x_b^l$ when $q^l = 1$), and given that x_b^l is increasing in n^c, so is $q^l x_b^l$. Moreover, both x_b^c and q^c are decreasing in n^c.

(ii) $h_b(n^c,\mu)$ is increasing in μ. Indeed, $q^l x_b^l = \sqrt{\frac{\bar{\gamma}}{\kappa} x_b^l}$ (or $q^l x_b^l = x_b^l$ when $q^l = 1$), and given that x_b^l is increasing in μ, so is $q^l x_b^l$.

(iii) $h_g(n^c,\mu)$ is increasing in n^c.Indeed, $q^c x_g^c = \sqrt{\frac{\bar{\gamma}}{\kappa} x_g^c}$ (or $q^c x_g^c = x_g^c$ when $q^c = 1$), and given that x_g^c is increasing in n^c, so is $q^c x_g^c$. Moreover, both x_g^l and q^l are decreasing in n^c.

(iv) $h_g(n^c,\mu)$ is decreasing in μ. Indeed, $q^l x_g^l = \sqrt{\frac{\bar{\gamma}}{\kappa} \frac{x_g^{l2}}{x_b^l}}$ (or $q^l x_g^l = x_g^l$ when $q^l = 1$), and given that x_g^{l2}/x_b^l is increasing in μ, so is $q^l x_g^l$.

We establish the following two Lemmas.

Lemma 1 *There exist $\tilde{\mu}(n^c) \in (0,1)$, $\forall n^c \in (n/2, n)$, such that $h_b(n^c,\mu) \leq 0$ for $\mu \leq \tilde{\mu}(n^c)$, and $h_b(n^c,\mu) > 0$ for $\mu > \tilde{\mu}(n^c)$. Moreover, $\tilde{\mu}(n^c)$ is increasing in n^c.*

Proof. We compute $h_b(n^c,\mu)$ at the boundary values $\mu = 0$ and $\mu = 1$. Given that when $\mu = 0$, we have $q^l = 1$ and $x_b^l = 0$, $h_b(n^c, 0) = -x_b^c \sqrt{\frac{\bar{\gamma}}{\kappa x_g^c}} < 0$. Moreover, $h_b(n^c, 1) = x_b^l \sqrt{\frac{\bar{\gamma}}{\kappa x_b^l}} - x_b^c \sqrt{\frac{\bar{\gamma}}{\kappa x_g^c}} > 0$, given that $x_g^c > x_b^c$ and, when $\mu = 1$, $x_b^l \geq x_b^c$. This shows that there exists a $\tilde{\mu}(n^c) \in (0,1)$ such that $h_b(n^c,\mu) > 0$ is verified if and only if $\mu > \tilde{\mu}(n^c)$.

Moreover, given that $h_b(n^c,\mu)$ is increasing in both n^c and μ, by the implicit function theorem, one has $\frac{d\tilde{\mu}}{dn^c} < 0$. ■

Lemma 2 *There exist $\hat{\mu}(n^c) > 0$, $\forall n^c \in (n/2, n)$, and $\hat{n}^c \in (n/2, n)$ such that $h_g(n^c,\mu) \geq 0$ for $\mu \leq \hat{\mu}(n^c)$, and $h_g(n^c,\mu) < 0$ for $\mu > \hat{\mu}(n^c)$. Moreover, $\hat{\mu}(n^c) \leq 1$ when $n^c \leq \hat{n}^c$. Moreover, $\hat{\mu}(n^c)$ is decreasing in n^c.*

Proof. Firstly, note that $h_g(n^c, 0) = q^c x_g^c > 0$. Now when $\mu = 1$ we have

(i) $h_g(n/2, 1) = \sqrt{\frac{\bar{\gamma}}{\kappa} x_g^c} \left(1 - \sqrt{\frac{x_g^l}{x_b^l}}\right) < 0$, where we have used the facts that $x_g^c = x_g^l$ when $\mu = 1$ and $n^c = n/2$, and $x_g^l > x_b^l$.

(ii) using the fact that when the local government has no tasks, we have $x_g^l = x_b^l$, we may write $h_g(n, 1) = \sqrt{\frac{\bar{\gamma}}{\kappa} x_g^c} - \sqrt{\frac{\bar{\gamma}}{\kappa} x_g^l}$, which is positive noticing that $x_g^c > x_g^l$ when $\mu = 1$ and $n^c = n$.

(iii) *(i)* and *(ii)* together imply that there exists $\hat{n}^c$ such that $h_g(n^c, 1) \geq 0$ when $n^c \geq \hat{n}^c$.

This shows that there exists a $\hat{\mu}(n^c) > 0$ such that $h_g(n^c,\mu) > 0$ is verified if and only if $\mu < \hat{\mu}(n^c)$. Moreover, $\hat{\mu}(n^c) \leq 1$ if and only if $n^c \leq \hat{n}^c$.

Moreover, by the implicit function theorem, one has $\frac{d\tilde{\mu}}{dn^c} < 0$. ■

We now relate $\tilde{\mu}(n^c)$ and $\hat{\mu}(n^c)$ in the following Lemma.

Lemma 3

$$\tilde{\mu}(n/2) = \hat{\mu}(n/2)$$

Proof. When $n^c = n/2$, $\rho_j^l = \rho_j^c$, $j = g, b$, implying that $x_j^l = \mu x_j^c$, $j = g, b$ allowing us to write $h_b(n^c, \mu) = x_b^c(q^l\mu - q^c)$, $h_g(n^c, \mu) = x_g^c(q^c - q^l\mu)$, implying that $\tilde{\mu}(n/2) = \hat{\mu}(n/2)$. ■

Lemma 4 *In a separating equilibrium, an increased centralisation increases the total political cost.*

Proof. The political cost is directly proportional to:

$$\hat{\gamma}_g + \hat{\gamma}_b = \hat{q}^c x_g^c + \hat{q}^l x_b^l$$

which is increasing in n_c by **??**. ■

5.3 The equilibrium with no candidates at the local level and pooling at the central level

When there are no candidates at the local level, we have $q^l = 1$. This equilibrium arises when $q^c x_g^c - x_g^l > 0$ and $q^c x_b^c - x_b^l > 0$. By claim 1, we know that $x_g^l/x_g^c \leq x_b^l/x_b^c$, hence a necessary and sufficient condition for the equilibrium to exist is that $q^c x_b^c - x_b^l > 0$.

Lemma 5 *There exist $\widehat{\mu}(n^c) \in (0,1)$, $\forall n^c \in (n/2, n)$ such that $q^c x_b^c - x_b^l \geq 0$ for $\mu \leq \widehat{\mu}(n^c)$, and $q^c x_b^c - x_b^l < 0$ for $\mu > \widehat{\mu}(n^c)$. Moreover, $\widehat{\mu}(n^c) < \hat{\mu}(n^c)$, $\forall n^c \in (n/2, n)$ and $\widehat{\mu}(n^c)$ is decreasing in n^c.*

Proof. The cut-off entry costs in this case are $\hat{\gamma}_g = q^c x_g^c$, $\hat{\gamma}_b = q^c x_b^c$. Using $q^c = \min\left[\dfrac{\bar{\gamma}}{\kappa(\hat{\gamma}_g + \hat{\gamma}_b)}, 1\right]$, one readily obtains

$$q^c = \begin{cases} \sqrt{\frac{\bar{\gamma}}{\kappa(x_g^c + x_b^c)}}, & \text{when} \quad x_g^c + x_b^c \geq \frac{\bar{\gamma}}{\kappa} \\ 1 & \text{otherwise} \end{cases}$$

We now show that q^c does not change with n^c. Indeed, $x_g^c + x_b^c = 1 + \theta_g\rho_1 + (1-\theta_g)\rho_2 + 1 + \theta_b\rho_1 + (1-\theta_b)\rho_2 = 1 + \rho_1 + \rho_2$, recalling that $\theta_g = 1 - \theta_b$. Now since $\dfrac{d\rho_1}{dn^c} = -\dfrac{d\rho_2}{dn^c}$, we have that $\dfrac{dq^c}{dn^c} = 0$. This, together with the facts that x_b^c and x_b^l are decreasing and increasing, respectively, in n^c implies that the expression $q^c x_b^c - x_b^l$ is decreasing in n^c. Moreover, it is increasing in μ.

We now check its value at the boundary values of μ. Firstly, when $\mu = 0$, $q^c x_b^c - x_b^l = q^c x_b^c > 0$. Secondly, when $\mu = 1$, x_b^c is always lower than x_b^l, hence $q^c x_b^c - x_b^l < 0$. Hence, there exists a $\widehat{(\mu)}(n^c) \in (0,1)$ such that $q^c x_b^c - x_b^l > 0$ if and only if $\mu < \widehat{(\mu)}(n^c)$. By the implicit function theorem, $\widehat{(\mu)}(n^c)$ is a decreasing function.

Finally, note that when $q^c x_b^c - x_b^l = 0$, $h_b(n^c, \mu) < 0$, ensuring that $\widehat{\mu}(n^c) < \hat{\mu}(n^c)$, $\forall n^c \in (n/2, n)$. ■

5.4 The equilibrium with pooling at the central and some candidates at the local level

We know from Lemma 5 that this equilibrium can only arise when $\mu > \widehat{\mu}(n^c)$. The cut-off entry costs in this case are $\hat{\gamma}_g = q^c x^c_g$, $\hat{\gamma}_b = q^l x^l_b = q^c x^c_b$. Let η_c be the endogenous share of the bad politicians running at the central level. In that case, $q^c = \min\left[\frac{\bar{\gamma}}{\kappa(\hat{\gamma}_g+\eta_c\hat{\gamma}_b)}, 1\right]$ and $q^l = \min\left[\frac{\bar{\gamma}}{\kappa(1-\eta_c)\hat{\gamma}_b}, 1\right]$ to obtain election probabilities:

$$
\begin{aligned}
q^c &= \begin{cases} \sqrt{\frac{\bar{\gamma}}{\kappa(x^c_g+\eta_c x^c_b)}}, & \text{when} \quad x^c_g + \eta_c x^c_b \geq \frac{\bar{\gamma}}{\kappa} \\ 1 & \text{otherwise} \end{cases} \\
q^l &= \begin{cases} \sqrt{\frac{\bar{\gamma}}{\kappa(1-\eta_c)x^l_b}}, & \text{when} \quad (1-\eta_c)x^l_b \geq \frac{\bar{\gamma}}{\kappa} \\ 1 & \text{otherwise} \end{cases}
\end{aligned} \tag{16}
$$

The equilibrium exists if and only if

$$
\hat{q}^l x^l_b - \hat{q}^c x^c_b = 0 \Leftrightarrow \frac{q^l}{q^c} = \frac{x^c_b}{x^l_b} \tag{17}
$$

$$
\hat{q}^c x^c_g - \hat{q}^l x^l_g > 0 \Leftrightarrow \frac{q^l}{q^c} < \frac{x^c_g}{x^l_g} \tag{18}
$$

Note that (17) implies (18) by claim 1. We now tackle (17). When $\mu = \tilde{\mu}(n^c)$, we know from Lemma 1 that (17) is respected with $\eta_c = 0$. When $\mu = \widehat{\mu}(n^c)$, we know from Lemma 5 that (17) is respected when $\eta_c = 1$. It is straightforward from (16) that (17) is increasing in η_c. Hence, for all $\mu \in (\widehat{\mu}(n^c), \tilde{\mu}(n^c))$ there exists one $\eta_c \in (0,1)$ that solves (17). Using (16) in (17) and after straightforward manipulation, it is given by

$$
\eta_c = \frac{x^{c^2}_b - x^c_g x^l_b}{x^c_b(x^c_b + x^l_b)}
$$

. Moreover, given that (17) is increasing in n^c and increasing in η_c, the share of bad politicians running at the central level decreases in n^c.

Lemma 6 *In a pooling at the central level equilibrium, an increased centralisation increases the total political cost.*

Proof. The political cost is directly propotional to $\hat{\gamma}$:

$$
\begin{aligned}
\hat{\gamma}_g + \hat{\gamma}_b &= \hat{q}^c(x^c_g + x^c_b) \\
&= \hat{q}^c(3-\alpha)
\end{aligned}
$$

By lemma **??** $\hat{q}^c$ is increasing in n_c ■

5.5 The equilibrium with pooling at the local level

The cut-off entry costs in this case are $\hat{\gamma}_g = q^c x^c_g = q^l x^l_g$, $\hat{\gamma}_b = q^l x^l_b$ Let η_l be the endogenous share of good politicians running at the local level. In that case, $q^c = \min\left[\frac{\bar{\gamma}}{\kappa(1-\eta_l)\hat{\gamma}_g}, 1\right]$

and $q^l = \min\left[\frac{\bar{\gamma}}{\kappa(\hat{\gamma}_b+\eta_l\hat{\gamma}_c)}, 1\right]$ to obtain election probabilities:

$$q^c = \begin{cases} \sqrt{\frac{\bar{\gamma}}{\kappa(1-\eta_l)x_g^c}}, & \text{when} \quad (1-\eta_l)x_g^c \geq \frac{\bar{\gamma}}{\kappa} \\ 1 & \text{otherwise} \end{cases} \tag{19}$$

$$q^l = \begin{cases} \sqrt{\frac{\bar{\gamma}}{\kappa\left(x_b^l+\eta_l x_g^l\right)}}, & \text{when} \quad x_b^l + \eta_l x_g^l \geq \frac{\bar{\gamma}}{\kappa} \\ 1 & \text{otherwise} \end{cases}$$

The equilibrium exists if and only if

$$\hat{q}^c x_g^c - \hat{q}^l x_g^l = 0 \Leftrightarrow \frac{q^l}{q^c} = \frac{x_g^c}{x_g^l} \tag{20}$$

$$\hat{q}^l x_b^l - \hat{q}^c x_b^c > 0 \Leftrightarrow \frac{q^l}{q^c} > \frac{x_b^c}{x_b^l} \tag{21}$$

Note that (20) implies (21) by claim 1. We now tackle (20). When $\mu = \hat{\mu}(n^c)$, we know from Lemma 2 that (18) is respected with $\eta_l = 0$. From Proposition 2, we know that it is impossible to have $\eta_l = 1$ in equilibrium. It is straightforward from (19) that (20) is increasing in η_l. Moreover, from Lemma (1) we know that (20) with $\eta_l = 0$ is negative when $\mu > \hat{\mu}(n^c)$. Hence, for all $\mu > \hat{\mu}(n^c)$, there exists one $\eta_l \in (0,1)$ that solves (20). Using (19) in (18) and after straightforward manipulation, it is given by

$$\eta_l = \frac{x_g^{l^2} - x_b^l x_g^c}{x_g^l(x_g^c + x_g^l)}$$

. Moreover, given that (20) is increasing in n^c and increasing in η_l, the share of good politicians running at the local level decreases in n^c.

Lemma 7 *The expected quality of the politicians at the local level is increasing with the complexity of the local tasks*

Proof. The probability to have a high quality candidate at the local level is given by

$$\frac{(1-\theta(n_c))\hat{\gamma}_g c}{(1-\theta(n_c))\hat{\gamma}_g c + \hat{\gamma}_b c} = \frac{(1-\theta(n_c))x_g^l}{(1-\theta(n_c))x_g^l + x_b^l}$$

As $\theta(n_c)$ and $x_b^l$are increasing in n_c and x_g^l is decreasing in n_c, we have that the ratio is decreasing in n_c. QED. ■

Lemma 8 *In a pooling at the local level equilibrium, an increased centralisation decreases the probability of election both at the central and the local level*

$$\frac{dq^l}{dn_c} < 0$$

$$\frac{dq^c}{dn^c} < 0$$

Proof. (i) The impact of centralisation on the probability of election at the central level is direct:

$$\frac{dq^c}{dn^c} = \underbrace{\frac{\partial \hat{q}^c}{\partial n^c}}_{<0} + \underbrace{\frac{\partial \hat{q}^c}{\partial \theta}}_{>0} \underbrace{\frac{d\hat{\theta}}{dn^c}}_{<0} < 0$$

(ii) For the central level it is a bit more intricated as

$$\frac{dq^l}{dn^c} = \underbrace{\frac{\partial \hat{q}^c}{\partial n^c}}_{<0} + \underbrace{\frac{\partial \hat{q}^l}{\partial \theta}}_{<0} \underbrace{\frac{d\hat{\theta}}{dn^c}}_{<0}$$

q^l is implicitly defined by f^l. One easily check that to show $\frac{dq^l}{dn^c} > 0$ it is enough to show that $\theta x_g^l + x_b^l$ is decreasing in n^c.

As

$$\begin{aligned}
\frac{d\theta}{dn_c} &= -\frac{\frac{dh_g}{dn^c}}{\frac{dh_g}{d\theta}} \\
&= \frac{\frac{d\rho_g^l}{dn_c} q^l \left(1 + \frac{c}{\bar{\gamma}} \frac{x_g^l (q^l)^2}{2-q^l}\theta\right) + \frac{q^c}{2-q^c}\frac{d\rho_g^c}{dn_c}}{\frac{q^c x_g^c (1-q^c)}{\theta(2-q^c)} + \frac{c}{\bar{\gamma}} \frac{(q^l)^3 (x_g^l)^2}{2-q^l}}
\end{aligned}$$

We can write

$$\begin{aligned}
d\frac{x_b^l + (1-\theta)x_g^l}{dn^c} &= \frac{d\rho_b^l}{dn_c} + (1-\theta)\frac{d\rho_g^l}{dn_c} - x_g^l \frac{d\theta}{dn_c} \\
&= \frac{d\rho_b^l}{dn_c}\theta - x_g^l \frac{d\theta}{dn_c} =
\end{aligned}$$

$$\begin{aligned}
&\frac{1}{\frac{dh_b}{d\theta}} \left[\frac{d\rho_b^l}{dn_c}\theta \left(\frac{q^c x_g^c (1-q^c)}{\theta(2-q^c)} + \frac{c}{\bar{\gamma}} \frac{(q^l)^3 (x_g^l)^2}{2-q^l} \right) - x_g^l \left(\frac{d\rho_b^l}{dn_c} q^l \left(1 + \frac{c}{\bar{\gamma}} \frac{x_g^l (q^l)^2}{2-q^l}\theta\right) + \frac{q^c}{2-q^c}\frac{d\rho_g^c}{dn_c} \right) \right] \\
= \; & \frac{1}{\frac{dh_b}{d\theta}} \left[\frac{d\rho_b^l}{dn_c} \left(\frac{q^c x_g^c (1-q^c)}{(2-q^c)} - x_g^l q^l \right) - x_g^l \left(\frac{q^c}{2-q^c}\frac{d\rho_g^c}{dn_c} \right) \right] \\
= \; & \frac{1}{\frac{dh_b}{d\theta}} \left[\frac{d\rho_b^l}{dn_c} x_g^l q^l \left(\frac{-1}{(2-q^c)} \right) - x_g^l \left(\frac{q^c}{2-q^c}\frac{d\rho_g^c}{dn_c} \right) \right] \\
= \; & -\frac{1}{\frac{dh_b}{d\theta}} \frac{x_g^l}{(2-q^c)} \left[\frac{d\rho_b^l}{dn_c} q^l + q^c \frac{d\rho_g^c}{dn_c} \right] < 0
\end{aligned}$$

■

Lemma 9 *In a pooling at the local level equilibrium, an increased centralisation increases the total political cost.*

Proof. The political cost is directly propotional to $\hat{\gamma}$:

$$\begin{aligned}
\hat{\gamma}_g + \hat{\gamma}_b &= \hat{q}^l (x_g^l + x_b^l) \\
&= \hat{q}^l \mu (3 - \alpha)
\end{aligned}$$

By **??** $\hat{q}^l$ is increasing in n_c ■

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