

Comparative Analysis of Power Separation between Politicians and Bureaucrats

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1 Introduction

In this paper, we consider the allocation of authority of policy making between politicians and bureaucrats and analyze the efficiency of the political governances in several political-administrative institutions. In general, politicians pick up the subjects of policy and carry out the policy after the examination of these subjects with bureaucrats. Namely, they clarify the contents of these subjects, consider the basic line of the policy, adjust some stakes, and enact the policy.

Here, we focus on each incentive of politicians and bureaucrats. The difference of their incentives is that only politicians face election by citizens. In the process of making a policy, politicians decide the allotment of tasks with bureaucrats, which is considered as the delegation of their tasks to bureaucrats. If their political and administrative outcome is highly evaluated by citizens, the politicians will be reelected. It is often pointed out that the politicians set a basic agenda and the bureaucrats subsequently add some means to implement this agenda. We discuss the problem of how their tasks should be divided to implement the policy under the politicians' re-elected incentive.

On the other hand, what is the bureaucrats' object in examining the agenda setting? This is the problem of the bureaucrats' incentive. As for this problem, there are many arguments. Some argue that the bureaucrats work sincerely for citizens and the others do that the bureaucrats work for their future post and profit. In this paper, we describe the bureaucrats in the view of latter, which is often called career concern.

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The career concern is an idea that the bureaucrats give the first priority to his own future career path because the evaluation of his ability of agenda setting, or, in general, his administrative ability decides his wage or post, and especially, his post after retirement which is called "AMAKUDARI". Therefore, the bureaucrats make an effort to be evaluated that his ability would be high.

In these ways, the politicians and bureaucrats fulfill their tasks under the different incentives. The purpose of tasks of the politicians and bureaucrats is same in the meanings of service for the public. However, citizens often see the frictions between the politicians and the bureaucrats, so that their behaviors are based on different incentives. The politicians execute the policy and bill in the legislative and the bureaucrats subsequently govern them. As we understand this process, it required the smoothness of connecting in the tasks between the politicians and the bureaucrats. But the boundary is obscure. Even in the modern society where the notion of "division of powers" is established, the boundary of the legislative and the administration is different in every country.

Where should we draw the boundary line to induce the politicians' and bureaucrats' effort and to make their political and administrative performances more effective for citizens?

In these motivations, we examine the problem of the allocation of authority between the politicians and the bureaucrats in two regimes -regime where politicians can decide this allocation and the one where the constitution does. Furthermore, Coalition system of politicians and bureaucrats and bureaucrats dominant system are investigated.

In the recent development of new political economics, we can see the notable contributions about the analysis of the behaviors of the politicians and bureaucrats. Especially, Besley and Smart(2003) and Borgne and Lockwood(2004) analyze the situation where the voters decide to re-elect or not after they observed the performance of incumbent politicians. Besley and Smart(2003) analyze how the constraint of finance, for example, an upper limit of taxation, affects the voters' re-election strategy.

Also, Borgne and Lockwood(2004) analyze what is the desirable selection system to induce the politicians' adequate effort. Moreover, as for the behaviors of the politicians and bureaucrats, Alesina and Tabellini(2003) analyze the problem which should be given the tasks. They also analyze the effect of bribe and contribution to the politicians or bureaucrats.

As the normative analysis of interaction between the politician and the bureaucrats is exercised by economic methods, the game-theoretical analysis is done in the field of political science. The allocation of authority to bureaucrats is considered as the delegation of tasks from politicians to bureaucrats.

The analysis of political science has focused on the degree of this delegation.

As the typical analysis of political science, Epstein and O'Halloran(1999) study the degree of discretion about agenda setting which the politicians give to the bureaucrats when the only bureaucrats can overcome an uncertainty of outcome of policy implementation. If the politicians give the bureaucrats too much discretion, then the bureaucrats may carry out their favorable policy and such a policy decrease the politicians' utility since it generates the convergence from the politicians' ideology. However, if the politicians give the less discretion to them, they can not overcome the uncertainty and they may lose in the next electoral competition since they can not derive the policy outcome which they had been expected due to the uncertainty.

Using the setting of Epstein and O'Halloran, Bennedsen and Feldman(2004) analyze the situation where the special interest group yields bribe or contribution to the politicians and the bureaucrats as Epstein and O'Halloran described.

Our analysis in this paper is as follows. At first, we present the basic model. Subsequently, we examine the first best allocation of authority and the politicians' and the bureaucrats' effort. Then, we study the case which the politicians can decide the allocation of authority. In this case, it is clarified that the politicians and the bureaucrats make the less effort comparing with the first best.

Moreover, we discuss the case that this allocation is decided in the constitution. In this case, the optimal allocation of the politicians' authority in the institution is smaller than the one when they can decide the size of their authority. This is one of the main results in our paper.

2 The Model

At first, we consider a fixed policy which consists of many subjects to check. The number of subjects is assumed to be normalized to 1. These subjects are worked by the politician and the bureaucrats. We define that v is the number of the subjects that the politicians have to work and $1 - v$ is the ones the bureaucrats have to do. We can interpret this $1 - v$ as the degree of delegation from the politicians to the bureaucrats.

Each politicians and bureaucrats examine their subjects and, thereby, the concrete policy is realized. The citizens judge this realized policy by their policy preference. If the evaluation of the citizens is high, the politicians would be reelected. Under motivation of reelection, the politicians decide the optimal degree of delegation of the policy subjects to the bureaucrats and they make effort to their subjects.

Once the allocation of subjects is decided, the politicians and the bureaucrats begin to examine to their subjects. In this examination, the politicians and the bureaucrats make an effort e_p and e_b , respectively. Also, we define the politicians' and the bureaucrats' ability θ_p^i, θ_b^i , ($i = H, L$). $0 < \theta_j^L < \theta_j^H$, ($j = p, b$) This ability means the one to examine the subjects. Their ability is high (H) or low (L). We can interpret as these abilities the effectiveness of effort. If their ability is high, their efforts generate the political and administrative output on which the citizens' evaluation is high.

Here, we assume that their abilities is unknown to themselves and any other individuals and $Prob(\theta_j = \theta_j^L) = Prob(\theta_j = \theta_j^H) = 1/2$ ($j = p, b$) as all players' initial belief. By using this distribution of probability, we can obtain the politicians' and the bureaucrats' expected ability θ_p^e, θ_b^e . For the present, we do not care about which their expected abilities are high. Thus, political and administrative output depends on the politicians' and the bureaucrats' abilities and efforts.

Anyhow, under the politicians' and the bureaucrats' collective operation, not always cooperative, the policy is made and implemented. Once the policy is implemented, the citizens decide whether they reelect or not the politicians. This election is taken in the forms of retrospective voting.

The result of election would depend on how they made efforts for policy making. Namely, the politicians would be reelected if they could find out the citizens' need or preference by the politicians' and the bureaucrats' effort.

Now, we assume the politicians' probability of the reelection depends on the political and administrative output. This relation is written by $Pr(v\theta_p^i e_p, (1-v)\theta_b^i e_b)$. Especially, we assume a specific re-election probability,

$$Pr(v\theta_p^i e_p, (1-v)\theta_b^k e_b) = a(v\theta_p^i e_p + (1-v)\theta_b^k e_b). \quad (1)$$

We consider the summation of the politicians' output (political output) $v\theta_p^i e_p$ and the bureaucrats' output (administrative output) $(1-v)\theta_b^i e_b$ as the political and administrative output. This parameter $a(> 0)$ means the difficulty of reelection. If a is small, the difficulty of reelection is high and, therefore, the subject of this policy has large political importance. This reelection probability has substitution for the politicians' and the bureaucrats' efforts¹.

The timing of events in our model is as follows. At first period, the politicians decide the allocation of authority and their effort. At second

¹On the contrary, we can consider the reelection probability model which has complementarity for both agents' efforts.

period, the bureaucrats make an effort under the given politicians' effort and authority. At last period, the citizens' preference is decided for the political and administrative output and they make the decision of reelection or not. The politicians' and the bureaucrats' future profits depend on the result of this election.

2.1 The bureaucrats' utility

The bureaucrats make an effort under the given allocation of authority and the politicians' effort. Here, we assume the bureaucrats' decision of their effort level is not controlled by the politicians. Namely, in the decision of the bureaucrats' effort, the politicians can not cooperate with the bureaucrats². Only the politicians can do is to control the bureaucrats' effort indirectly by operating the allocation of authority³.

Then, the bureaucrats care about their evaluation of public, because this established evaluation affects their future rewards and career, and their post after retirement, which is called "AMAKUDARI". This evaluation is established indirectly through the judge of the citizens. That is, we can interpret the result of election as the signal of the bureaucrats' ability⁴.

We adapt the framework of career concern to draw the efforts of the bureaucrats. The career concern is the idea that an individual put the others' evaluation about his ability on his first priority. Moreover, we assume the updated bureaucrats' expected ability by the result of election is equal to their future profit from career concern. To simplify the discussion, we assume the term of politicians and the bureaucrats in office are same.

Then, if the citizens reelect incumbent politicians(S), the posterior belief that the delegated bureaucrat's ability is high is, by using Bayes rule and the information of (v, e_p, e_g) ,

$$Pr(\theta_b^H : S) = \frac{v\theta_p^e e_p + (1-v)\theta_b^H e_b}{2v\theta_p^e e_p + (1-v)(\theta_b^H + \theta_b^L)e_b}. \quad (2)$$

²We can discuss about the case that the politicians and the bureaucrats make an effort cooperatively.

³The result of the game when the timing of the politicians' and the bureaucrats' decision is simultaneous is same as the game in this paper. We explain later, because the bureaucrats' effort strategy is dominant strategy, it does not affect the result of the game.

⁴Although we can understand this citizens' judge as the signal of the politicians' ability, we must discuss more about the relevance of using the result of election as the signal of bureaucrats' ability. However, by assuming that the term of the bureaucrats in office is equal to that of the politicians in office, this can be justified.

The bureaucrats value the politicians' output as $v\theta_p^e e_p$ since they do not know the politicians' ability. Also,

$$Pr(\theta_b^L : S) = 1 - Pr(\theta_b^H : S). \quad (3)$$

Therefore, in case that the politicians have been reelected, the bureaucrats evaluate their ability as follows,

$$E(\theta_b : S) = \theta_b^H Pr(\theta_b^H : S) + \theta_b^L (1 - Pr(\theta_b^H : S)). \quad (4)$$

Similarly, in case that the politicians have not been reelected (F), the posterior belief that the delegated bureaucrat's ability is high is

$$Pr(\theta_b^H : F) = \frac{1 - a(v\theta_p^e e_p + (1 - v)\theta_b^H e_b)}{2(1 - av\theta_p^e e_p) - a(1 - v)(\theta_b^H + \theta_b^L)e_b}. \quad (5)$$

In this case, the updated bureaucrats' expected ability is,

$$E(\theta_b : F) = \theta_b^H Pr(\theta_b^H : F) + \theta_b^L (1 - Pr(\theta_b^H : F)). \quad (6)$$

Here, we assume that the bureaucrats can obtain the interests when the politicians are reelected. We call this the authority interests, which -s assumed to depend on their authority $1 - v$ that the politician assigned to them.

This authority interests is generated from the results that these bureaucrats have worked to make the policy with incumbent politicians and their political and administrative output is valued well by the citizens. As the result, the bureaucrats obtain this interests and the politicians are reelected⁵. The size of this interests is I and the bureaucrats' profit is $(1 - v)I$.

Given the politicians' decision (v, e_p) , by the establishment of the bureaucrats' reputation and the authority interests, we define the bureaucrats' expected utility as follows,

$$\begin{aligned} U_b &= ((1 - v)I + E(\theta_b : S))a(v\theta_p^e e_p + (1 - v)\theta_b^e e_b) \\ &\quad + E(\theta_b : F)(1 - a(v\theta_p^e e_p + (1 - v)\theta_b^e e_b)) - C((1 - v)e_b) \\ &= (1 - v)Ia(v\theta_p^e e_p + (1 - v)\theta_b^e e_b) - \frac{1}{2}((1 - v)e_b)^2 \quad (7) \end{aligned}$$

⁵In fact, if incumbent politicians who work with these bureaucrats are reelected, so this government is under a long term regime, in the second term, it would make the bureaucrats easy to obtain the interest or bribes from several special interest groups.

$C((1-v)e_b)$ is bureaucrats' cost function for their effort, assumed $C', C'' > 0$. To simplify the analysis, we assume a specific function $C((1-v)e_b) = \frac{1}{2}((1-v)e_b)^2$.

2.2 The politicians' utility

Now, we define the politicians' utility. As same as the bureaucrats do, the politicians obtain the authority interests vI only when they would be reelected. Moreover, different from the bureaucrats, only the politicians can obtain a reelection rent R if they would be reelected, and can not obtain it if they would not be reelected⁶. From these rent and interests, we define the politicians' utility as follows,

$$\begin{aligned} U_p &= (R + vI)a(v\theta_p^e e_p + (1-v)\theta_b^e e_b(v, e_p)) - C(v e_p) \\ &= (R + vI)a(v\theta_p^e e_p + (1-v)\theta_b^e e_b(v, e_p)) - \frac{1}{2}(v e_p)^2. \end{aligned} \quad (8)$$

Although we use the same cost function for politicians as that for the bureaucrats', this cost depends on the politicians total effort input $v e_p$. Therefore, the politicians' cost function is $C(v e_p) = \frac{1}{2}(v e_p)^2$.

Also, we must note that the bureaucrats' optimal effort level $e_b(v, e_p)$ is included in the politicians' utility function through the reelection probability.

2.3 The citizens' utility

Finally, we define the citizens' utility. Now, we suppose that the government implements a policy \hat{t} and then the citizens' real preference t of this policy distributes uniformly around \hat{t} . Let the range of this distribution be $2m$. We assume that the citizens' utility is a single peaked function $U = -(t - \hat{t})^2$ and their reservation utility is $-w^2$. Then, since this distribution is a uniform distribution, under the proposed policy, the probability that the politicians will be reelected is w/m and the variance of this distribution is $m^2/3$.

Moreover, we assume that the political and administrative output by effort input of the politicians and the bureaucrats $E(= v\theta_p^e e_p + (1-v)\theta_b^e e_b)$ can decrease the degree m of the uncertainty of the citizens' real preferences⁷.

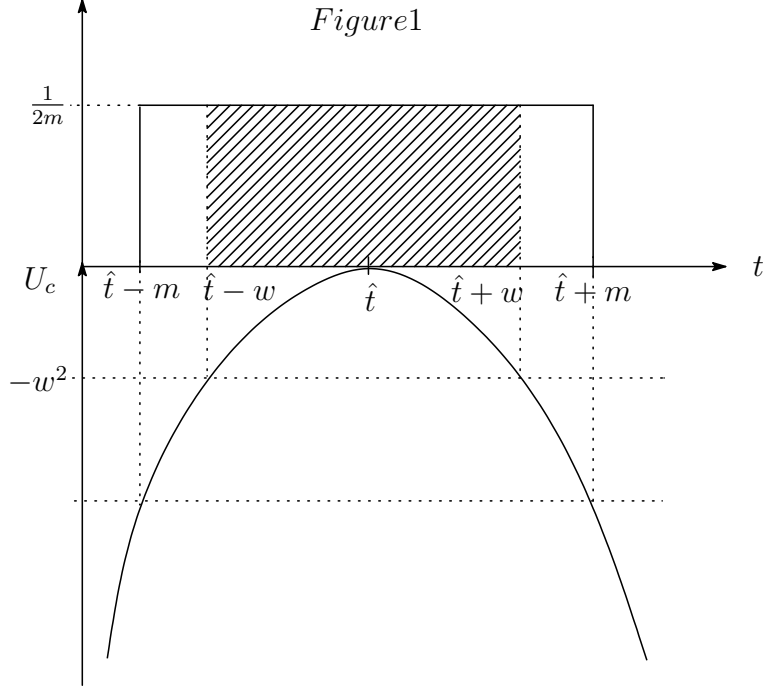
⁶This reelection rent includes not only the monetary rents as the wage and the pension for representative that the reelected politicians can derive from the nation and the subsidies for political parties but also the non-monetary rents as the politicians' satisfaction and vanity by obtaining the post of the representative.

⁷We can interpret this political and administrative output as the effect on the accountability to the citizens. Namely, the politicians' and the bureaucrats' efforts indicate that

Especially, we specify this relation is

$$m = c/E. (c > 0) \quad (9)$$

Rewriting this equation, we can obtain wE/c as reelection probability. In addition, by defining $w/c \equiv a$, the equation (1) is derived. We explain this discussion by using following figure.



The range of the citizens' preference is decided after input of the politicians' and the bureaucrats' efforts, as we see Figure.1. Under an uniform distribution, the individual whose utility is higher than their reservation utilities locates on an interval $[\hat{t} - w, \hat{t} + w]$, namely, the shadowed area in this figure. Since this density is $\frac{1}{2m}$, this area equals to the probability of reelection.

Since this probability can be rewrite $\frac{w}{c}E$ by the political and administrative output, we obtain equation (1).

Then, we can express the citizens' expected utility U_c as follows.

$$U_c = \int_{\hat{t}-w}^{\hat{t}+w} \frac{-(\hat{t} - t)^2}{2m} dt - 2 \int_{\hat{t}-m}^{\hat{t}-w} \frac{w^2}{2m} dt = -\frac{w^2(3m - 2w)}{3m} \quad (10)$$

how they fulfill their accountability to the citizens. Unless the politicians and the bureaucrats fulfill sufficient accountability, since the citizens' preference to the policy will be based on their own ideology, the range of this distribution will be wide. However, if they fulfill sufficient accountability to the citizens, it is considerable that this accountability makes easier to persuade the citizen. Therefore, the degree of the uncertainty will decrease.

Now we assume $m > w$.

Rewriting this U_c by using E , we obtain following the citizens' expected utility function.

$$U_c = -\frac{w^2(3m - 2w)}{3m} = -w^2\left(1 - \frac{2w}{3m}\right) = -w^2\left(1 - w\frac{2E}{c}\right) \quad (11)$$

3 The first best effort level and allocation of authority

We define the expected social welfare $SW(e_p, e_b, v)$ as the summation of expected utility of the politicians, the bureaucrats and the citizens.

$$SW(e_p, e_b, v) = \left(\frac{2w^3 + ac(R + I)}{c}\right)(v\theta_p^e e_p + (1 - v)\theta_b^e e_b) + \theta_b^e - w^2 - \frac{1}{2}((ve_p)^2 + ((1 - v)e_b)^2) \quad (12)$$

The first best solutions maximize this expected social welfare.

The first order conditions for e_p^f, e_b^f, v^f are,

$$v^f e_p^f = \frac{2w^3 + ac(R + I)}{c} \theta_p \quad (13)$$

$$(1 - v^f) e_b^f = \frac{2w^3 + ac(R + I)}{c} \theta_b \quad (14)$$

$$\left(\frac{2w^3 + ac(R + I)}{c}\right)(\theta_p^e e_p^f - \theta_b^e e_b^f) = (v^f e_p^f) e_p^f - ((1 - v^f) e_b^f) e_b^f. \quad (15)$$

(13) and (14) mean that the marginal surplus to their efforts should be equal to the marginal costs. But, (15) is not independent of these two equations. Therefore, note that in the first best solution only total effort for each player, that is the product of the authority, is obtained. ⁸Both the degree of delegation v and the effort level are indeterminate. It is caused by the assumption that the politicians' effort and the bureaucrats' one is substitutive

⁸We can easily check that this expected social welfare function satisfies second order conditions.

in the political and administrative output which influences the precision of desirable policy making.

From these first-order conditions, in the view of social welfare, the larger the politicians' authority is, the lower their effort is and the higher the bureaucrats' effort is. Because the increase of the politicians' authority leads the increase of the bureaucrats' marginal cost and the decrease of the politicians' marginal cost. Therefore, keeping the political and administrative output constant, it is socially desirable that the agent who is allocated more authority makes more effort, because his marginal cost is relatively low.

Moreover, under an allocation of authority, the increase of both agents' ability and authority interests leads the increase of their effort. The increase of a which denotes the political importance of the policy also leads the increase of their effort.

When w rises, namely, the citizens' reservation utility decreases, it is desirable to bring down their effort. Because, in this situation, the effect of the increasing the expected social welfare by decreasing their effort cost is larger than the effect of the decreasing the expected social welfare by their lower effort, since the sufficient large political and administrative output is obtained without higher effort.

Therefore the policy outcome in the first-best is obtained as follows

$$E^f = \left(\frac{2w^3}{c} + a(R + I)\right)(\theta_p^2 + \theta_b^2) \quad (16)$$

4 Dominant Politicians System

Dominant Politician System is the case that politicians can decide the allocation of authority. In this system, politicians can decide the authority allocations as a first mover. We will solve this problem in backward way. Therefore, at first, we treat the problem of the bureaucrats' decision making, and then, investigate the one of the politicians' decision making.

4.1 The bureaucrats' decision making

The bureaucrats decide their effort to maximize his utility under given politicians' effort level and the allocation of authority. From the bureaucrats' utility function (7), we obtain

$$E(\theta_b : S)a(v\theta_p^e e_p + (1 - v)\theta_b^e e_b) + E(\theta_b : F)(1 - a(v\theta_b^e e_p + (1 - v)\theta_b^e e_b)) = \theta_b^e$$

That is to say, the expected their ability based on posterior belief equals to the one based on prior belief. This denotes that the future profit caused by career concern does not depend on their effort when the scheme of this profit is linear to the expected their ability based on posterior belief. Therefore, we see that the bureaucrats do not have any effort incentives under such a scheme.⁹.

lemma 1 When the bureaucrats' future profit which corresponds to their career path is a linear scheme of their posterior expected ability, the bureaucrats have no incentive to an additional effort.

Now back to the bureaucrats' maximization problem,

$$\max_{e_b} (1-v)Ia(v\theta_p^e e_p + (1-v)\theta_b^e e_b) + \theta_b^e - \frac{1}{2}((1-v)e_b)^2.$$

From the first-order condition of this problem,

$$e_b^* = Ia\theta_b^e. \quad (17)$$

As we understand by observing the bureaucrats' objective function, $(1-v)^2$ is included in two effects that the increase of their effort leads to the increase of their marginal future profit and marginal cost. The decision of the bureaucrats' optimal effort level is not affected by v . The bureaucrats' optimal effort is a dominant strategy since this decision is not affected by the politicians' effort.

Moreover, their optimal effort is increasing with the political importance of the policy a , the size of the authority interests I and their prior expected ability θ_b^e . The increase of I leads to the increase of the expected revenue of the authority interests. So, they make more efforts to obtain the more expected revenue of these interests by the higher probability which corresponds to the reelection probability. Also, since the increase of a and θ_b^e make their effort more effective, the bureaucrats make more efforts.

4.2 The politicians' decision making

Subsequently, we analyze the problems of the politicians' decision making of their effort and allocation of authority. The politicians face the following maximization problem, considering the bureaucrats' optimal effort.

⁹Needless to say, these bureaucrats make an effort to carry out their regularly administrative tasks except the delegated work from the politician.

$$\max_{e_p, v} (R + vI)a(v\theta_p^e e_p + (1 - v)Ia(\theta_b^e)^2) - \frac{1}{2}(ve_p)^2.$$

From the first-order condition of the effort,

$$e_p^* = \frac{(R + vI)a\theta_p^e}{v}. \quad (18)$$

It is obvious that the second-order condition is satisfied.

Subsequently, the first-order condition of the optimal allocation of authority for the politicians is as follows.

$$v^* = \frac{I(\theta_b^e)^2 + R((\theta_p^e)^2 - (\theta_b^e)^2)}{I(2(\theta_b^e)^2 - (\theta_p^e)^2)} \quad (19)$$

The second-order condition is,

$$\frac{\partial^2 U_p}{\partial v^2} = I((\theta_p^e)^2 - 2(\theta_b^e)^2) < 0.$$

The second-order condition is equal to

$$(\theta_p^e)^2 < 2(\theta_b^e)^2. \quad (20)$$

Here, we consider the condition of $0 \leq v^* \leq 1$.

By $v^* \leq 1$,

$$(R + I)((\theta_p^e)^2 - (\theta_b^e)^2) \leq 0$$

Therefore $v^* < 1$ is held if $(\theta_p^e)^2 \leq (\theta_b^e)^2$.

$v^* = 1$ is held if $(\theta_p^e)^2 \leq (\theta_b^e)^2$

The second-order condition (19) is satisfied whenever this inequality is held strictly.

In addition, as the condition of $0 \leq v^*$, we obtain

$$(\theta_p^e)^2 \geq \frac{R - I}{R}(\theta_b^e)^2$$

The sufficient condition to be satisfy this inequality is $I > R$.

From (17) and (18), we can rewrite the politicians' optimal effort as follows.

$$e_p^* = \left(\frac{I(2(\theta_b^e)^2 - (\theta_p^e)^2)}{I(\theta_b^e)^2 + R((\theta_p^e)^2 - (\theta_b^e)^2)} R + I \right) a \theta_p^e \quad (21)$$

Then the policy outcome is obtained as follows

$$E^* = v \theta_p e_P + (1 - v) \theta_b e_b = (R + vI) a \theta_p + (1 - v) I a \theta_b^2 = R a \theta_p^2 + I a \theta_b^2 + v^* a I (\theta_p - \theta_b^2) \quad (22)$$

4.3 The comparative statics

As for the politicians' optimal allocation of authority v^* , we rewrite the equation (18) as follows.

$$v^* = \frac{1 + \frac{R}{I} \left(\left(\frac{\theta_p^e}{\theta_b^e} \right)^2 - 1 \right)}{2 - \left(\frac{\theta_p^e}{\theta_b^e} \right)^2} \quad (23)$$

Note that v^* can be denoted by the proportion of the politicians' and the bureaucrats' ability and the one of the reelection rent R and the authority interests I .

From assumption 1,

$$\frac{\partial v^*}{\partial \theta_p^e}, \frac{\partial v^*}{\partial I} > 0 \quad (24)$$

$$\frac{\partial v^*}{\partial \theta_b^e}, \frac{\partial v^*}{\partial R} < 0. \quad (25)$$

Namely, the allocation of authority which the politicians decide increases when θ_p^e and I increase and decreases when R and θ_b^e increase.

As for the politicians' effort, rewriting (17), we obtain

$$e_p^* = I a \theta_p^e + \frac{R a \theta_p^e}{v^*} \quad (26)$$

The change of parameter affects politicians' optimal effort in two ways. The first is the direct effect which the change of parameter affects directly on the right-hand-side of the above equation. The second is the indirect effect which is brought by the change of v .

Since a is not include in v , the change of a has only direct effect. Therefore, the politicians' effort increases if the political importance of policy a increases.

The increase of R decreases v and increases the numerator of the second term in the above equation. Consequently, the increase of R increases the politicians' effort. And also, the increase of θ_b^e makes the politicians' effort increase since it decreases v .

The parameters I and θ_p^e have an effect which it makes v increase. The increase of I and θ_p^e increases the authority interests in reelection and effectiveness of effort. But the rise of I and θ_p^e brings higher marginal cost of effort because it makes v increase. However, from (22) and (26),

$$e_p^* = \frac{(I + R)a\theta_p}{1 + \frac{R}{I}(1 - (\frac{\theta_p}{\theta_b})^2 + 1)} \quad (27)$$

Therefore, $\frac{\partial e_p^*}{\partial I} > 0$ and $\frac{\partial e_p^*}{\partial \theta_p^e} > 0$ are held.

4.4 The comparison with the first-best

To see whether each player's effort is socially efficient, we compare the solutions in this section with the first best solutions.

Considering (13) and (14), the following inequalities are held.

$$v^* e_p^* = \frac{(I + R)a\theta_p}{2 - (\frac{\theta_p}{\theta_b})^2} < v^f e_p^f$$

$$(1 - v^*)e_b^* = \frac{(I + R)(\theta_b^2 - \theta_p^2)a\theta_b}{2\theta_b^2 - \theta_p^2} < (1 - v^f)e_b^f$$

So, to put the power of the allocation of authority on the politicians decreases social welfare. Furthermore, we can show that the policy outcome is smaller than that in the first-best.

Therefore, we obtain the following proposition.

Proposition 1 *When the politicians can decide the allocation of authority,*

(1) *Both politicians and bureaucrats make less total effort compared with the first-best level,*

and

(2) *the policy outcome is also smaller than that in the first best.*

5 The case that the allocation of authority is decided constitutionally

In this section, we study the case that the allocation of authority is decided constitutionally. This is also called as the second-best system. In this situation, the politicians treat the allocation of authority as given.

When v is given, since the bureaucrats' decision making is not affected by the allocation of authority, their optimal effort level corresponds to the one in previous section. Moreover, the politicians' optimal effort level is given by equation (17) because v is given for the politicians.

5.1 The constitutionally optimal degree of the authority allocation

Under each player's effort level in a given v , we analyze the social optimal constitution. In this case, the social welfare function is the one derived by substituting the politicians' and the bureaucrats' optimal effort (16), (17) for (11). We calculate the social optimal allocation of authority by maximizing this function for v . As same as in the previous section, the politicians' and the bureaucrats' effort are based on the maximization of their objective function. In this case, different from the previous section, v is decided to maximize the social welfare. Therefore, it is obvious that the social welfare in this case exceeds the previous one.

However, each player's efforts is the same as previous section, so that the products of their effort and authority in equilibrium is not equal to the first best solution in any v . That is, the social welfare in this case is higher than the one in the previous section, but lower than the first best level.¹⁰

$$SW(e_p, e_b, v) = \left(\frac{2w^3 + ac(R + I)}{c}\right)((R + vI)a(\theta_p^e)^2 + (1 - v)Ia(\theta_b^e)^2) + \theta_b^e - w^2 - \frac{1}{2}(((R + vI)a\theta_p^e)^2 + ((1 - v)Ia\theta_b^e)^2) \quad (28)$$

¹⁰In this way, as for the allocation of the politicians' and the bureaucrats' authority, it ought to be decided as the constitution, not the politicians' decision. However, in many countries, the politicians and the bureaucrats carry out the making of agenda setting which relates to the actual constitutions. Unless the nation adopts the direct democracy, it is so difficult to rule the boundary between the administration and the legislative by the citizens' judge as national voting, although such a problem ought to be resolved by the citizens' judge. Therefore, to clarify the disadvantage of the representative democracy, it would be significant to compare these two regimes.

In this regime, the optimal allocation of authority satisfies the following first-order condition.

$$A I a ((\theta_p^e)^2 - (\theta_b^e)^2) + I a^2 (I (\theta_b^e)^2 - R (\theta_p^e)^2) - v I^2 a^2 ((\theta_p^e)^2 + (\theta_b^e)^2) = 0 \quad (29)$$

, where $A \equiv \frac{2w^3 + ac(R+I)}{c}$. Then, the optimal allocation of authority is obtained by

$$v^{CB} = \frac{A((\theta_p^e)^2 - (\theta_b^e)^2) + a(I(\theta_b^e)^2 - R(\theta_p^e)^2)}{I a ((\theta_p^e)^2 + (\theta_b^e)^2)}. \quad (30)$$

Also, the second-order condition is always satisfied.

Now, we check the condition that v^{CB} is in the interval $[0, 1]$. The condition of $v^{CB} \leq 1$ is held is

$$\frac{A}{a(I+R)} \left(1 - \left(\frac{\theta_b^e}{\theta_p^e}\right)^2\right) \leq 1. \quad (31)$$

We define the ability ratio where (30) is held with strict equation θ^0 . Then if the ability ratio is larger than θ^0 , the optimal allocation is $v^{CB} = 1$. On the other hand, the condition of non-negativity of v^{CB} is

$$\frac{2w^3 + acI}{2w^3 + acR} \geq \left(\frac{\theta_b^e}{\theta_p^e}\right)^2. \quad (32)$$

Consequently, if I is sufficiently larger than R or θ_b^e is sufficiently close to θ_p^e , this condition is satisfied.

The meanings of this condition are very intuitive. For v in $(0, 1)$, it means that to allocate the authority to both the politicians and the bureaucrats is socially desirable.

If the bureaucrats' ability is sufficiently higher than the politicians' one, it enhances the bureaucrats' effectiveness of effort. Although the bureaucrats' marginal cost is getting high as the bureaucrats' authority increases, it is socially desirable that all authority is allocated to the bureaucrats because their effectiveness of effort is sufficiently high.

Also, if I is sufficiently larger than R , the politicians' effort will be getting close to the bureaucrats' effort. This means that the effect to the political and administrative output to which the allocation of authority yields is getting small. Consequently, since their cost function is convex, if we decrease the

summation of their effort cost by allocating some authority to both players, the social welfare can increase. Then the policy outcome is obtained as follows.

$$E^{CB} = Ra\theta_p^2 + Ia\theta_b^2 + v^{CB}Ia(\theta_p^2 - \theta_b^2) \quad (33)$$

5.2 The comparative statics

Now we rewrite v^{CB} as follows,

$$v^{CB} = \frac{k(\theta^2 - 1) + a(I\theta - R)}{Ia(1 + \theta)},$$

and let $\theta^2 = (\frac{\theta_p^e}{\theta_b^e})^2$, $0 < x < 1$, $k = \frac{2w^3}{c}$.

From this equation, we see directly

$$\frac{\partial v^{CB}}{\partial \theta^2} = \frac{2k + a(I + R)}{Ia(1 + \theta^2)^2} > 0, \quad (34)$$

$$\frac{\partial v^{CB}}{\partial R} = \frac{-a}{Ia(1 + \theta^2)} < 0, \quad (35)$$

and

$$\frac{\partial v^{CB}}{\partial I} = \frac{k(1 - \theta^2) + aR}{I^2a(1 + \theta^2)} > 0. \quad (36)$$

The characteristics of the constitutional optimal allocation of authority is sustained for R , I , θ_b^e and θ_p^e . This is same as in the dominant politicians system. But v^{CB} is also affected by the citizens' reservation utility w unlike v^* . Taking $k = 2w^3/c$ into consideration,

$$\frac{\partial v^{CB}}{\partial w} = \frac{6w^2(\theta^2 - 1)}{Iac(1 + \theta^2)} < 0. \quad (37)$$

Namely, in a view of social welfare, it is desirable to bring down the politicians' authority with the decrease of the citizens' reservation utility.

Finally V^{CB} is influenced by the reelection parameter a . When politician's ability is relatively low, more important policy issue (i.e. a is low) brings larger authority allocation to politicians. On the other hand, when politician's ability is relatively high, more important policy issue (i.e. a is low) brings smaller authority allocation to politicians.

5.3 The efficiency of the authority allocation

Here, we compare the case which the politician can decide the authority allocation with the one it is constitutionally decided. Needless to say, the constitutional allocation of authority is more efficient than the one that the politicians can decide.

We examine whether v^* is excessive to v^{CB} or not. Comparing (19) with (30),

$$v^* - v^{CB} = \frac{a(\theta^4 - \theta^2 + 1)(I + R) + k(1 - \theta^2)(2 - \theta^2)}{Ia(2 - \theta^2)(1 + \theta^2)} > 0. \quad (38)$$

From this equation (38), we see that $v^* > v^{CB}$ if $\theta < \theta^0$ and the politicians allocate the excessive authority to themselves whenever they can decide this allocation. Then the following inequalities are held.

If $\theta_0 > \theta > 1$, $E^{CB} < E^* = (R + I)a\theta_p^2 < E^f$

If $\theta > \theta_0$, $E^{CB} = E^* < E^f$

If $\theta < 1$, $E^* < E^{CB} < E^f$.

Hence, we obtain following proposition.

Proposition 2 *When the allocation of authority between the politicians and bureaucrats is constitutional,*

(1) *as for R , I , θ_b^e and θ_p^e , the characteristics of the constitutionally optimal allocation of authority is the same as the one when the politicians can decide it. The decrease of the citizens' reservation utility leads to the decrease of the authority which is allocated to the politicians,*

and

(2) *the politicians allocate an excessive authority to themselves when they can decide the allocation of authority.*

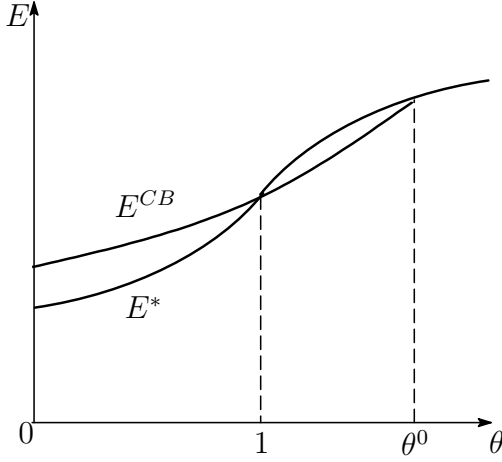


Figure 1

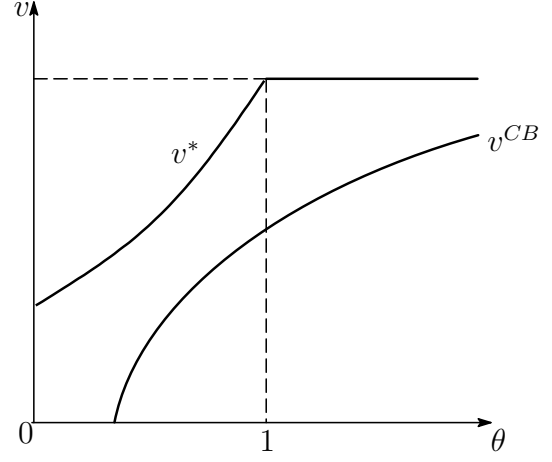


Figure 2

6 Coalition of politicians and bureaucrats

In this section, we will investigate how the authority allocation is made when the coalition of politicians and bureaucrats is formed. By the coalition they decide the authority allocation to maximize the summation of utilities for politicians and bureaucrats. The authority allocation is the term of bargaining, but their effort is not the term of bargaining. Therefore in the bargaining they must take the decisions about their effort into account. Then a monetary transfer is bargained to make their bargaining surplus equal. (17) and (18) is the decisions about their effort when the authority allocation is given. Then total utilities is given as follows.

$$\begin{aligned}
 S_P + S_W &= (R + I)a(v\theta_p e_p + (1 - v)\theta_b e_b) - \frac{1}{2}((1 - v)e_b)^2 - \frac{1}{2}(v e_b)^2 \\
 &= (R + I)a(\theta_p^2 a(R + vT) + (1 - v)Ia\theta_b^2) - \frac{1}{2}((1 - v)Ia\theta_b)^2 - \frac{1}{2}((R + vI)a\theta_p)^2
 \end{aligned}$$

From the first-order condition of the maximization problem of this total utility, we obtain

$$\frac{\partial S_p + S_b}{\partial v} = (R + I)a(Ia(\theta_p^2 - \theta_b^2)) + (1 - v)(Ia\theta_b)^2 - (R + vI)I(a\theta_p)^2 = 0$$

Therefore, the authority allocation in the coalition is given as follows.

$$v^T = \frac{I\theta_p^2 - R\theta_b^2}{I(\theta_b^2 + \theta_p^2)}$$

That is,

$$\text{if } \theta > \frac{R}{I}, \quad v^T = \frac{I\theta^2 - R}{I(1 + \theta^2)}$$

$$\text{If } \theta < \frac{R}{I}, \quad v^T = 0.$$

From (30), the authority allocation to politicians in the coalition is smaller than that in constitutional decision. That is,

$$v^T < v^{CB}$$

Therefore, the following inequalities are held as for the policy outcome.

$$\text{If } \theta < 1, \quad E^T > E^{CB} > E^*$$

$$\text{If } \theta > 1, \quad E^T < E^{CB} < E^*$$

,where

$$E^T = E^{CB} = E^*, \quad \text{if } \theta = 1$$

7 Dominant Bureaucrats system

Lastly it is interesting to consider when bureaucrats is dominant in the authority decision. In this case bureaucrats decide the authority allocation to maximize thier utilities, considering the responce of politician. Then bureaucrats' utility is shown as

$$\begin{aligned} S_B &= (1 - v)Ia\theta_p(R + vI)a\theta_p + (1 - v)^2Ia\theta_b b_b - \frac{1}{2}((1 - v)e_b)^2 \\ &= (R + vI - vR - v^2I)Ia^2\theta_p^2 + (1 - v)^2(Ia\theta_b)^2 - \frac{1}{2}((1 - v)Ia\theta_b)^2 \end{aligned}$$

Therefore, the first-order condition of utility maximization problem of bureaucrats is

$$(I - R - 2Iv)\theta_p^2 = (1 - v)I\theta_b^2$$

So,

$$v^B = \frac{(I - R)\theta^2 - I}{(2\theta^2 - 1)I} \quad (39)$$

From the non-negativity condition of v^B , $v^B = 0$ is held if $\theta < \frac{I}{I-R} = \hat{\theta}$. Then we can examine which is larger, v^B or v^T .

$$v^B - v^T = \frac{(I - R)\theta^2 - I}{(1\theta^2 - 1)I} - \frac{I\theta^2 - R}{I(1 + \theta^2)} = \frac{-(I + R)(\theta^4 - \theta^2 + 1)}{(2\theta^2 - 1)(1 + \theta)} < 0$$

Therefore, V^T is larger than v^B . Then the policy outcome in this case is

$$E^B < E^T, \quad \text{if } \theta > \hat{\theta}$$

$$E^B = Ia\theta_b, \quad \text{if } \theta < \hat{\theta}$$

Note that when $\theta = 0$, we obtain $E^B = E^{CB} = E^T$.

8 Comparative analysis of alternative political governance structures

From the above analysis, we can make comparative analysis of alternative political governance structures. First of all, as for the authority allocation to politicians, the following property is held as the above analyses are shown.

$$v^* > v^{CB} > v_T > v^B$$

Here the authority allocation to politicians in the politician dominant system is the largest compared with any other systems.

As for the policy outcome, the situation depends on the ability ratio. When politicians' ability is very low, the bureaucrats dominant system has larger policy outcome than politicians dominant system because politicians stick to the authority though their ability is low. When politician' ability is low, the coalition system of politicians and bureaucrats has the highest policy outcome. Therefore the coalition system is desirable from the point of citizen. But in the social welfare, the policy outcome is supplied more since E^T is larger than E^{CB}

When politicians' ability is high, politicians dominant system has the highest policy outcome, but supplied too much compared with the second best system (constitution dominant system). Bureaucrats dominant system has the lowest policy outcome compared with any other system when politicians' ability is relatively high.

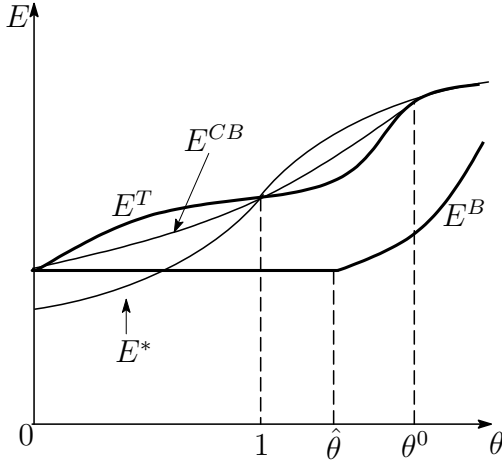


Figure 3

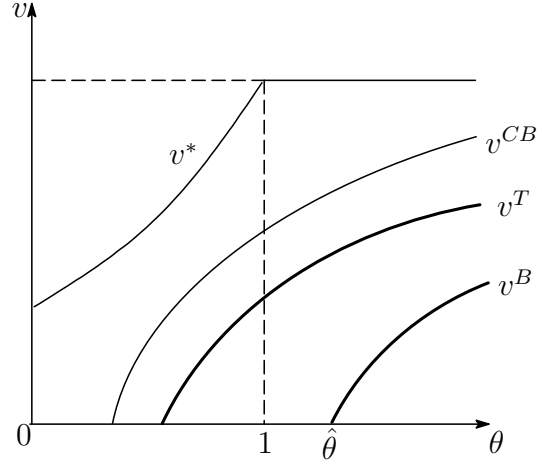


Figure 4

9 Concluding Remarks

We have considered the allocation of authority of policy making between politicians and bureaucrats and analyze the efficiency of the political governances in several political-administrative institutions.

At first we have analyzed the problem of the authority allocation between politicians who are judged by citizens through the election and bureaucrats who are not judged in the same way.

When the bureaucrats' future profit which corresponds to their career path is a linear scheme to their posterior expected ability, we showed that the bureaucrats have no incentive to an additional effort. This argument means that we must approve to deliver the nimious post, wage, and, moreover, even "AMAKUDARI" to bureaucrats to induce some additional effort.

However, the bureaucrats' incentive to effort is not only their future career but also the authority interests which they share with politicians who are in office. Although these interests make politicians and bureaucrats have a common object, since their efforts are non-cooperative, they cannot make the desirable effort for each other. This is true since their effort is costly and they have the incentive to reduce their effort cost by free ride to opponent's effort.

In two regimes where the authority allocation is decided by the politicians and is decided constitutionally , we have confirmed that these regimes

decrease the social welfare. Once the citizens delegate the decision of the policies which affect the social welfare to politicians and bureaucrats, they decide the policy to maximize their objective function, not the social welfare.

In these regimes the authority allocation to politicians is increasing with their expected ability and is decreasing with bureaucrats' expected ability. These are so intuitive results. However, it is shown that the politicians' authority is decreasing with the reelection rent. Though the reelection rent is one of motivation to make more effort for the politicians, the larger the reelection rent is, the less important the authority interests are relatively. Then, the politicians' incentive to effort for these interests is descend. In addition, the effort of the bureaucrats is not depended on the allocation of authority. In a view of revenue, in this case, it is not important for the politicians how they allocate the authority, but in a view of cost, to allocate more authority means their marginal cost of effort increase. As a result, politicians allocate more authority to bureaucrats.

Furthermore, we have found that the politicians allocate the socially excess authority to themselves when they can decide this allocation. Therefore, it is obvious that the allocation of authority should be given as the constitution. However, the agent who designs the constitution is ordinary politicians or bureaucrats who are delegated tasks from politicians. Therefore, even though the allocation of authority is given as the constitution, it is necessary to examine whether this constitution is efficient or not. It is often said that the reforms of politics and administration are favorable to politicians and bureaucrats. This is the problem of the institutional contradiction in the representative democracy. In a given constitution, although it is important that we examine the efficiency of the authority allocation and the efforts, we must study what is the efficient constitution.

Then we have introduced the coalition system of politicians and bureaucrats. In this system the authority allocation to politicians is smaller than in second-best system. Finally we have found that the dominant bureaucrats system has the smallest delegation of the authority to politicians compared to any other system. However the policy outcome in this system is larger than in politicians dominant system when politicians' ability is very low. When politicians' ability is high, politicians dominant system has the highest policy outcome, but supplied too much compared with the second best system (constitution dominant system). We have also showed that bureaucrats dominant system has the lowest policy outcome compared with any other system when politicians' ability is relatively high.

Our analysis is refined to the case of substitution type with respect to politicians' effort and bureaucrats' one. Complementary case is remained to investigate as one of our further research.

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