Abstract: "Optimal integration policy under a threat of secession",

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In this paper, we analyze the possibility of integration and secession between a majority region and a minority region. There is assumed to be an different preference for public policy between two regions and a government is assumed to have to offer a constant level of public goods. We introduce two forms of governance, centralized integration and decentralized integration. Then when small level of public good is necessary, the form of governance is shown to chance from centralized integration to secession to decentralized integration as the size of the minority region becomes large. And when large level of public good is necessary, the form of government is shown to change from centralized integration to decentralized integration . as the size of the minority region becomes large.

Resume:Optimal Integration Policy under a Threat of Secession

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1   Introduction

In this paper we investigate the mechanism of integration and secession among regions, focusing on the policy decision. In particular, we take a policy-preference approach in the situation where there are policy conflicts between two regions. Under the threat of secession, the optimal policy of a majority region is obtained and the possibility of secession is shown to depend on the policy-gap and population-gap between two regions. By considering incentives of policy decisions in each region, we show the possibility of integration and secession and how the welfare of each region is realized through strategic determination of policy.

2   Model

2.1   two-region model

We assume that there are two region A and B, with the population N_A and $N_B (N_A > N_B)$ respectively. Region B is called a minority region and region A is called a majority region. Each region is facing the decision of a single and common public policy. For example a region may take a conservative or liberal stance about religious policy or education policy. For the simplicity, the stance X of the common public policy is located on the interval $[0, 1]$. Then the most preferable policies, bliss points of the citizen are assumed to be $\bar{X}_B, \bar{X}_A$, respectively. As the actual policy becomes remote from the bliss point, the utility of the citizen decreases. If the policies that their regions implement for a common policy issue are different, political friction for the regional economy may occur. This is called a policy externality, which causes the utility loss in each region. We assume that a constant level g of a public good is needed

to manage an independent country and the level g is the same irrespective of the population, as in $Aslea = Spolaore(1997)$. Of course the public good is assumed to be of non-rivality.

2.2 Secession between two regions

Let us consider the situation of secession of two regions. In region i, income tax is levied to produce the level g of the public good. Then $g = N_i \tau_i y_i$ $(i = A, B)$is assumed to be held.$y_i(1 - \tau_i)$ goes to private consumption. Let us denote the utility U_A, U_B of the representative citizen for each region as follows, when each region implements a policy X_B, X_A respectively.

$$U_A = -a(\bar{X}_A - X_A)^2 + y_A(1 - \tau_A) + g \tag{1}$$

$$U_B = -b(\bar{X}_B - X_B)^2 - s(X_B - X_A)^2 + y_B(1 - \tau_B) + g \tag{2}$$

Here the utility at the bliss point is normalized to be zero. When there is a conflict between the majority region and minority region, the minority region incurs a policy external marginal cost s, while the majority region does not. Furthermore we assume that the policy difference between the majority region and the minority region does not influence the utility of the majority region, reflecting the difference of the population.

2.3 Policy decision under secession

Now let us seek the equilibrium policy that each region makes under secession. The optimal policy for region B, given the policy X_A for region A, is shown by

$$X_B^O = \frac{b\bar{X}_B + sX_A}{b + s}$$

On the other hand, the optimal policy for region A is obviously the bliss point$\bar{X}_A$, whatever the policy for region O may be. Therefore, the optimal public policy in region B is shown as follows.

$$X_B^{O*} = \frac{b\bar{X}_B + s\bar{X}_A}{b + s} \tag{3}$$

As a result, the utility of region O is

$$U_B^{O*} = -b(\bar{X}_B - \bar{X}_A)^2 + y_O - \frac{g}{N_B} + g = -(\bar{X}_B - \bar{X}_A)^2 \frac{bs}{(b + s)} + y_B - \frac{g}{N_B} + g \tag{4}$$

Then the utility of region A is

$$U_A^{O*} = y_A - \frac{g}{N_A} + g \tag{5}$$

2.4 Policy decision under centralized integration

Let us consider the integration of two region A,B. Here there are two forms of integration. One is a centralized integration (CI). The other is a decentralized integration(DI). Under the centralized integration, the same level of public policy is implemented. Under the decentralized integration, there is a room to implement different level of the public policy. In this subsection, we consider the case of centralized integration. In this case, the first effect of regional integration for the majority region is in general a policy effect. By integration, the majority region can dominate the policy in the minority region. But in this two-region model, the policy effect for the majority region is neglected. The second effect is a scale effect. By integration, the population increases and personal income increases. So when region A and region B integrate and a policy X_A is implemented, the utility of the representative citizen for region A and B are

$$U_A^{CI} = -a(\bar{X}_A - X_A)^2 + y_A(1 - \tau_A) + g$$

$$U_B^{CI} = -b(\bar{X}_B - X_A)^2 + y_B(1 - \tau_B) + g$$

Here we have $\tau_A y_A N_A + \tau_B y_B N_B = g$.We have the three effects of integration for the minority region. One is the deletion of the policy conflicts, which is positive for the minority region. Second is the delegation of policy decision, which is negative. And the third is of course a scale effect.

The region A proposes a pair of public policy X_A and tax policy (τ_A, τ_B) to the region B. Region B can refuse the proposal if it makes region B worse than in the secession. Therefore, region A has to propose the policies so as to satisfy the following integration-acceptance condition.

$$-b(\bar{X}_B - X_A)^2 + y_B(1 - \tau_B) + g \geq U_B^{O*} \tag{6}$$

Region A decides the policies to maximize the utility of the representative citizen for region A. By making this integration -acceptance condition equalize and considering (4), we obtain

$$-b(\bar{X}_B - X_A)^2 - y_B(1 - \tau_B) + g = -b(\bar{X}_B - \bar{X}_A)^2 \frac{bs}{(b+s)} + y_B - \frac{g}{N_B} + g$$

Then using the fiscal balance $\tau_B y_B N_B = g - \tau_A y_A N_A$, the integration-acceptance condition is

$$\frac{\tau_A y_A N_A}{N_B} = b(\bar{X}_B - X_A)^2 - \frac{sb}{(s+b)}(\bar{X}_B - \bar{X}_A)^2 \tag{7}$$

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From this equality, the utility of representative citizen in region A is

$$-a(\bar{X}_A - X_A)^2 + y_A - b(\bar{X}_B - X_A)^2 \frac{N_B}{N_A} + \frac{sb}{(s+b)}(\bar{X}_B - \bar{X}_A)^2 \frac{N_B}{N_A} + g$$

Therefore, using the first-order condition, we have the optimal public policy.

$$X_A^{CI*} = \frac{aN_A\bar{X}_A + bN_B\bar{X}_B}{aN_A + bN_B} \tag{8}$$

This is obviously the efficient public policy.

Proposition 1 Under centralized integration, the optimal public policy becomes efficient.

By substituting the value of the optimal public policy into (7), we have the maximum utility of representative citizen in region A under integration as follows.

$$U_A^{CI*} = -a\left(\frac{bN_B(\bar{X}_B - \bar{X}_A)}{aN_A + bN_B}\right)^2 + y_A - b\left(\frac{aN_A(\bar{X}_B - \bar{X}_A)}{aN_A + bN_B}\right)^2 \frac{N_B}{N_A} + \frac{sb(\bar{X}_B - \bar{X}_A)^2}{s+b} \frac{N_B}{N_A} + g$$

Once we obtain the maximum utility in region A under integration, let us examine whether the region A has the motivation of integration or not. We compare the utility in region A under integration with the utility in region A under secession.

$$U_A^{CI*} \geq U_A^{O*} \tag{9}$$

This condition is shown as follows.

$$\frac{g}{N_A} - \left(b\left(\frac{aN_A}{aN_A + bN_B}\right)^2 - \frac{sb}{s+b}\frac{N_B}{N_A}\right)(\bar{X}_B - \bar{X}_A)^2 \geq a\left(\frac{bN_B}{aN_A + bN_B}\right)^2(\bar{X}_B - \bar{X}_A)^2 \tag{10}$$

The right-hand side of this equality shows the merits of the decrease in per capita tax burden in the minority region due to the scale merit of integration. The left-hand side shows policy adjustment loss in the minority region due to integration. Therefore, the integration will be implemented if the former effect is larger than the latter effect. These effects are shown as the function of relative population in region B.

As the relative population in the minority region increases, the optimal public policy goes to the ideal point for the minority region. This implies the increase of policy adjustment cost for the majority region.

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Proposition While the centralized integration will occur in the case of small relative population in the minority region, secession will occur when the relative population becomes larger than the certain level

The integration condition is rearranged as follows.

$$\frac{g}{N_A} \geq (a(\frac{bN_B}{aN_A + bN_B})^2 + b(\frac{aN_A}{aN_A + bN_B})^2 - \frac{sb}{s+b}\frac{N_B}{N_A})(\bar{X}_B - \bar{X}_A)^2$$

From this inequality, the possibility of secession increases as the ideal point gap of public policy between two regions becomes large and the cost of public goods becomes large.

2.5 tax policy

Let us examine the tax policy for each region under integration. the total volume of tax in A is show as follows.

$$\tau_A y_A N_A = N_B(b(\frac{aN_A}{aN_A + bN_B})^2 - \frac{sb}{s+b})(\bar{X}_B - \bar{X}_A)^2 \tag{11}$$

From this equation, the total volume of tax and the tax rate in the majority region becomes large as the ideal point gap becomes large. And when the cost of policy adjustment is small, the total volume of tax and the tax rate in the majority region increase with the relative population in the minority region. On the other hand, the total volume of tax and the tax rate in the majority region is a convex function of the level of the relative population in the minority region.

The total volume of tax in the minority region is written

$$\tau_B y_B N_B = g - \tau_A y_A N_A$$

Therefore the volume becomes small as the ideal point gap of public policy becomes large.

3 Decentralized integration policy

3.1 Decentalized integration model

So far we assumed the public policy under integration is universal between two regions. However even under the integration, different contents of public policy may be allowed. We call an integration allowing different policy in

different region a decentralized integration. For example, native language may be allowed as a formal language with a common language in a minority region. Then under a decentralized integration the utility of the representative citizen in the majority region is show as follows.

$$-a(\bar{X}_A - X_A)^2 - c(X_A - X_B)^2 - y_A(1 - \tau_A) + g$$

Then the optimal policies can be obtained to solve the following maximization problem.

$$\max_{X_A} -a(\bar{X}_A - X_A)^2 - c(X_A - X_B)^2 - y_A(1 - \tau_A) + g$$

$$s.t. \max_{X_B} -b(\bar{X}_B - X_B)^2 - s(X_B - X_A)^2 + y_B(1 - \tau_B) + g \geq U_B^{O*}$$

The optimal public policy of minority region as an optimal response is shown as follows

$$X_B = \frac{b\bar{X}_B + sX_A}{b + s}$$

From this, we can get the optimal public policy of majority region.

$$X_A^{DI*} = \frac{aN_A\bar{X}_A + \frac{bs}{b+s}N_B\bar{X}_B + c(\frac{b}{b+s})^2 N_A\bar{X}_B}{aN_A + \frac{bs}{b+s}N_B + c(\frac{b}{b+s})^2 N_A} \tag{12}$$

Proposition 6 Under the decentralized integration, the public policy of majority region becomes near the ideal point of public policy in minority region.

$$X_B^{DI*} - X_A^{DI*} = \frac{b}{b + s} \frac{aN_A}{aN_A + \frac{bs}{b+s}N_B + c(\frac{b}{b+s})^2 N_A}(\bar{X}_B - \bar{X}_A) \tag{13}$$

3.2 Selection on integration and secession

The utility of majority region is shown as a function of the relative population in minority region in the case of centralized integration and decentralized integration.

4 Conclusion

In this paper we analyzed the mechanism of integration and secession between two region, using policy-preference model with the cost of policy conflict. In Particular, we showed that centralized integration will occur when the relative population in minority region is small, and secession will occur when the relative population in minority region is larger than a certain level. And it was shown that integration will occur as the policy preferences in two regions are similar, and that secession will occur when the cost of policy adjustment is large. Lastly we investigated about the two types of integration, centralized integration and decentralized integration. Then, we showed that ,depending on the cost level of public goods, the two dynamic processes of going from centralized integration to decentralized integration, via secession, and of going directly from centralized integration to decentralized integration will occur with the increase of the relative population in minority region.