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Effect of population mobility on a Regional public investment policy

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Abstract

In a regional economy, many people can be mobile thanks to readily available transportation. This results in high concentrations of people in one region. Since such agglomerations are not uniform, some people remain in other regions. This paper examines the issues of regional public investment policy across such regions. When people are imperfectly mobile, what is their optimal allocation?

An optimal policy depends on workers who cannot migrate into low productivity regions. If the number of such workers is sufficiently low, public investment should be concentrated in one region with scale economies. When that number is large enough, it may be expected that the optimal policy would be an infrastructure policy. However, it is not always optimal for the government to provide public investment to a low productivity region. Thus, it makes sense that public investment should be concentrated in high productivity regions in most cases.

JEL classification: R13, H41, R23

Key words: Regional policy Public investment Migration

1 Introduction

In a regional economy, many people can be mobile because of ready access to transportation. This results in high concentrations of people in one region. However, such access is not available to many people, who must then remain in other regions. How does such imperfect mobility affects a regional policy?

This paper analyzes a regional distribution policy in which each region is asymmetrical with scale economies. Such a policy includes a regional allocation of public capital. When public capital (infrastructure) improves regional productivity, the government can reduce regional productivity differences through that policy. For example, Furukawa (2006) has analyzed the regional allocation of public infrastructure when regional differences exist. The object of this paper is to compare the two allocation policies of public investment. In one policy the public investment is allocated to each region while in the other it is concentrated in a highly populated region.

In analyzing the regional economy, it is important to consider the question of migration behavior. In the context of the new economic geography (NEG), when transport costs are sufficiently low, all manufacturing and workers are concentrated in one region to benefit from scale economies. For example, Fujita and Thisse (2002) have reported their analyses. Ihara (2008) and Fenge, Ehrlich and Wrede (2009) have analyzed the relationship between public policy and transportation costs. That region develops economically and becomes the core region, while the other remains on the periphery. In their analyses of this agglomeration, workers can migrate freely across regions. Therefore, workers prefer to migrate. In this case, the public investment to other regions is not utilized because workers that use it do not locate to the region. Therefore, it is optimal to allocate public investment in a region where workers concentrate.

Previous studies have analyzed regional policy, but do not explicitly consider the migration of households. Caminal (2004) has analyzed the regional allocation of public investment and the transfer policy based on the assumption that households cannot migrate across regions. However, because of recent transportation developments, many household can migrate. When they do so, they prefer to locate in a rich region, while others remain in a poor region. As a result, a few households in the poor region utilize public investment. In such an economy, public investment may prove inefficient since only a small fraction of households use it. That being the case, should the government allocate the public investment to a poor region? This paper examines whether or not public investment should be allocated to a poor region when some people cannot migrate across regions.

The remainder of this paper is organized as follows. Section 2 presents the model. Section 3 and 4 analyze the public investment policy when that investment is allocated to each region or only to one region. Section 5 compares these policies to arrive at an optimal policy. Section 6 contains conclusions.

2 The model

The economy is comprised of two regions, in which both agricultural and manufactured goods are produced. The agricultural goods are produced with unskilled labor as the input under constant returns technology. This good is produced in each region and is traded without cost. Its price is normalized to one. That is, this good is taken as the numeraire. The manufactured good is produced in each region. Two regions are differ in terms of their production technology. Region 1 has increasing returns to scale in production, while region 2 has constant returns to scale. If households are perfectly mobile across regions, they concentrate in region 1 because of scale economies. In region 1, the manufacture goods are produced with intermediate goods as inputs. In region 2, this good is produced using skilled labor and a public infrastructure and is traded across regions without cost.

The government provides a public infrastructure that is not tradable in each region. It has a bi-regional policy. One is a public investment allocation policy by which the government provides the public infrastructure in each region, while the other is a concentration policy by which it withholds the public infrastructure from region 2.

The labor force is comprised of skilled and unskilled workers. The former can work in each production sector, whereas the latter must work only in the agriculture sector. The number of the skilled is $\mu\bar{L}$, and the number of the unskilled is $(1-\mu)\bar{L}$. I assume that the unskilled workers are distributed in each region equally. That worker is immobile across regions and supplies one unit of labor. Some skilled workers can move between regions without cost while others cannot. The share of skilled workers who can move is $(1-\epsilon)$. The number of skilled workers who cannot move and thus locates in region i (i=1,2) is $\frac{1}{2}\epsilon\mu\bar{L}$.

Each worker has the same preference. The individual in region i has the utility function:

$$U_i = {x_i}^{\mu} {z_i}^{(1-\mu)}$$

where x_i is the consumption of manufacture goods and z_i is the consumption of agricultural goods. μ is the expenditure share of the manufacture goods. To simplify the analysis, this paper assumes that this share is equal to the share of a skilled worker who can move across regions.

The budget constraint of individuals in region i is

$$P_x x_i + z_i = (1-t)Y_i$$

where Y_i is the income that is each individual's wage, t is the income tax rate and P_x is the price of manufactured goods.

The utility maximization yields demand functions of both manufactured and agriculturl goods:

$$\begin{aligned} x_i &= \frac{\mu(1-t)Y_i}{P_x} \\ z_i &= (1-\mu)(1-t)Y_i \end{aligned}$$

The indirect utility in region i is

$$V_i = (1-t)Y_i \left[\frac{\mu}{P_x}\right]^{\mu} [1-\mu]^{1-\mu} \tag{1}$$

Manufactured and agricultural goods are produced in this economy. First, the agricultural goods are produced under perfect competition and with constant returns technology using unskilled labor as the input. The production technology assumes that one unit of unskilled labor produces one unit of agricultural goods: $Z = L_Z$ where Z is the amount of agricultural goods and L_Z denotes the amount of unskilled labor used to produce those goods. Agricultural goods are produced in each region. Each good is freely traded and is taken as the numeraire. Therefore, $w_u = 1$ where w_u is the wage of unskilled workers.

The production technology of manufactured goods differs in each region. In region 1, the manufactured goods are produced under perfect competition with an intermediate good as the input. The production function of manufactured goods is

$$X_1 = \left[\int_0^N (q_n)^{\rho} dn\right]^{\frac{1}{\rho}}, \quad 0 < \rho < 1$$

where q_n is the intermediate good and N is the number of the intermediate good. ρ is the parameter of substitution. The first-order condition for profit maximization is

$$p_k = P_x \left[\int_0^N (q_n)^\rho dn \right]^{\frac{1}{\rho}-1} (q_k)^{\rho-1} \quad (k \in [0, N])$$

where p_k is the price of intermediate good k . From the first-order condition , the aggregate demand of intermediate good k is

$$q_k{}^d = \frac{p_k^{\frac{1}{\rho-1}}}{\left[\int_0^N p_n{}^{\frac{\rho}{\rho-1}} dn \right]^{\frac{1}{\rho}}} X_1 = \frac{p_r^{\frac{1}{\rho-1}}}{B^{\frac{1}{\rho-1}}} X_1 \tag{2}$$

where

$$B = \left[\int_0^N p_n{}^{\frac{\rho}{\rho-1}} dn \right]^{\frac{\rho-1}{\rho}}$$

is a price index.

The intermediate goods sector operates under monopolistic competition. The intermediate good n is produced by one firm using labor and the public infrastructure. The skilled labor requirement for the intermediate good n is as follows:

$$L_{sn} = \frac{f + bq_n}{G_1^\gamma} \quad (n \in [0, N])$$

where $\frac{f}{G_1^\gamma}$ is the fixed labor requirement, $\frac{b}{G_1^\gamma}$ is the marginal input of labor and G_1 is the public infrastructure in region 1. Each firm knows the demand for the intermediate good (2) and takes the price index B, the public infrastructure and the amount of the manufactured good production as given. The first-order condition for profit maximization is

$$p_n = \frac{w_{s1} b}{\rho G_1^\gamma}$$

where w_{s1} is the wage of a skilled worker in region 1, and the zero profit condition yields the output of the intermediate good and skilled labor input.

$$\begin{aligned} q_n &= \frac{\rho f}{b(1-\rho)} \\ L_{sn} &= \frac{f}{(1-\rho) G_1^\gamma} \end{aligned}$$

In region 2, the manufactured good is produced under perfect competition and with constant returns technology. The production function is as follows:

$$X_2 = G_2^\beta L_{sx}$$

where G_2 is the public infrastructure in region 2 and L_{sx} is the amount of skilled labor. When the government adopts the concentration policy, no manufactured good is produced in region 2 because $G_2 = 0$. The producer of this good takes the public infrastructure as given. The first-order condition for profit maximization is as follows:

$$P_x G_2^\beta = w_{s2}$$

where w_{s2} is the wage of a skilled worker in region 2.

The government provides public infrastructure in each region when the allocation policy is adopted. The public infrastructure is produced using skilled labor in the same region. The production function is as follows:

$$G_i = L_{sG_i}$$

The government's budget constraint is

$$w_{s1}L_{sG_1} + w_{s2}L_{sG_2} = t\left\{w_{s1}L_{s1} + w_{s2}L_{s2} + (1-\mu)\bar{L}\right\}$$

where L_{si} is the population of skilled workers in region i and $L_{s1} + L_{s2} = \mu\bar{L}$. The tax rate t is uniform across regions.

Concerning government policy, I then consider another case in which the government utilizes the concentration policy that the government provides to the public infrastructure only in region 1. Then, the governments budget constraint is

$$w_{s1}L_{sG_1} = t\left\{w_{s1}L_{s1} + w_{s2}L_{s2} + (1-\mu)\bar{L}\right\}$$

In this case, public infrastructure is not provided in region 2.

When the government provides the public infrastructure in region 2, market clearing conditions for the manufactured and agricultural goods are

$$\frac{\mu(1-t)\left[w_{s1}L_{s1} + w_{s2}L_{s2} + (1-\mu)\bar{L}\right]}{P_x} = \left[\int_0^N (q_n)^\rho dn\right]^{\frac{1}{\rho}} + G_2^\beta L_{sx}$$
$$(1-\mu)(1-t)\left[w_{s1}L_{s1} + w_{s2}L_{s2} + (1-\mu)\bar{L}\right] = L_{Au}$$

Factor market clearing conditions are written as

$$\begin{aligned} NL_{sn} + L_{sG_1} &= L_{s1} \\ q_k^d &= q_k \quad (k \in [0, N]) \\ L_{sx} + L_{sG_2} &= L_{s2} \\ L_{Au} &= (1-\mu)\bar{L} \end{aligned}$$

Next, I consider another case where the government adopts the concentration policy. In this case, the manufactured goods cannot be produced in region 2 because the public infrastructure does not exist. The skilled worker in region 2 is employed in the agricultural sector. The producer of those goods regards the worker as unskilled. Then, market clearing conditions for manufactured and agricultural goods are

$$\frac{\mu(1-t)\left[w_{s1}L_{s1}+w_{s2}L_{s2}+(1-\mu)\bar{L}\right]}{P_x} = \left[\int_0^N (q_n)^\rho dn\right]^{\frac{1}{\rho}}$$
$$(1-\mu)(1-t)\left[w_{s1}L_{s1}+w_{s2}L_{s2}+(1-\mu)\bar{L}\right] = L_{Au}$$

Factor market clearing conditions are expressed as

$$\begin{aligned} NL_{sn}+L_{sG_1} &= L_{s1} \\ q_k^d &= q_k \quad (k \in [0,N]) \\ L_{Au} &= (1-\mu)\bar{L}+L_{s2} \end{aligned}$$

3 Public investment allocation policy

In this section, I analyze a case whereby the government provides the public infrastructure in each region. The government determines the amount of public infrastructure to maximize welfare.

The welfare is the sum of all individual's utility. From the indirect utility (1), the welfare is

$$W = (1-t)\left[w_{s1}L_{s1}+w_{s2}L_{s2}+(1-\mu)\bar{L}\right]\left[\frac{\mu}{P_x}\right]^\mu [1-\mu]^{1-\mu} \tag{3}$$

I determine the equilibrium population of skilled workers in region i. $(1-\epsilon)\mu\bar{L}$ of skilled workers can migrate across regions where the utility is higher. From the indirect utility, if $w_{s1} > w_{s2}$ all skilled workers migrate to region 1. If region 1 has large scale economies, this condition holds. Then, equilibrium populations are

$$L_{s1} = \left(1-\frac{1}{2}\epsilon\right)\mu\bar{L} \tag{4}$$
$$L_{s2} = \frac{1}{2}\epsilon\mu\bar{L} \tag{5}$$

In region 2, if $w_{s2} > 1$, all skilled workers are employed in the manufacturing sector. I assume that this condition holds. From these conditions and market clearing conditions,

w_{s1} , w_{s2} and P_x are expressed as

$$w_{s1} = \frac{\mu\bar{L}}{\left(1-\frac{1}{2}\epsilon\right)\mu\bar{L} - G_1 + \frac{b}{\rho}\frac{G_2^\beta}{G_1^\gamma}\left[\frac{(1-\rho)G_1^\gamma}{f}\left\{\left(1-\frac{1}{2}\epsilon\right)\mu\bar{L} - G_1\right\}\right]^{1-\frac{1}{\rho}}\left(\frac{1}{2}\epsilon\mu\bar{L} - G_2\right)} \tag{6}$$

$$w_{s2} = \frac{b}{\rho}\frac{G_2^\beta}{G_1^\gamma}\left[\frac{(1-\rho)G_1^\gamma}{f}\left\{\left(1-\frac{1}{2}\epsilon\right)\mu\bar{L} - G_1\right\}\right]^{1-\frac{1}{\rho}} w_{s1} \tag{7}$$

$$P_x = \frac{b}{\rho}\frac{\mu\bar{L}}{\left[\frac{1-\rho}{f}\right]^{\frac{1}{\rho}-1} G_1^{\frac{\gamma}{\rho}}\left\{\left(1-\frac{1}{2}\epsilon\right)\mu\bar{L} - G_1\right\}^{\frac{1}{\rho}} + \frac{b}{\rho}G_2^\beta\left(\frac{1}{2}\epsilon\mu\bar{L} - G_2\right)} \tag{8}$$

Moreover, these conditions and the government budget constraint yield the following tax rate in equilibrium.

$$t = \frac{w_{s1}G_1 + w_{s2}G_2}{\bar{L} + w_{s1}G_1 + w_{s2}G_2} \tag{9}$$

Substituting (4) $\sim$ (9) into the welfare, I obtain

$$W = \bar{L}\left[\frac{1}{P_x}\right]^\mu [\mu]^\mu [1-\mu]^{1-\mu} \tag{10}$$

The government determines the public infrastructure in each region so as to maximize the welfare (10) . Then, the optimal public infrastructures in each region are

$$G_1 = \frac{\gamma}{\gamma+1}\left(1-\frac{1}{2}\epsilon\right)\mu\bar{L} \tag{11}$$

$$G_2 = \frac{\beta}{\beta+1}\frac{1}{2}\epsilon\mu\bar{L} \tag{12}$$

From (11) and (12), I obtain the following lemma

Lemma 1

When the government provides the public infrastructure in each region, optimal amounts of public infrastructure are equal to

$$G_1 = \frac{\gamma}{\gamma+1}\left(1-\frac{1}{2}\epsilon\right)\mu\bar{L} \qquad G_2 = \frac{\beta}{\beta+1}\frac{1}{2}\epsilon\mu\bar{L}$$

The lemma shows that when γ and β are large, the optimal amounts of public infrastructure in each region are large. When the public infrastructure productivity in one region is higher, the governemnt should increase that infrastructure in the corresponding region. Intuitively, this result appears reasonable.

In the equilibrium, $\frac{1}{2}\epsilon$ denotes the ratio of skilled workers who cannot migrate across regions and thus locate in region 2. If these workers increase, the government should increase the amount of public infrastructure in region 2 because of manufactured production. In region 2, skilled workers cannot migrate to region 1. If those workers increase, skilled workers in region 1 decrease. To increase the amount of manufactured goods production effectively, the government should increase the amount of public infrastructure in region 2 because more worker utilize it.

4 Public investment concentration policy

Section 3 examines the government policy by which the public infrastructure is allocated to each region. In this section, I analyze another policy whereby the infrastructure is concentrated in region 1. Under this policy, region 2 is not provided to the infrastructure.

Region 2 cannot produce manufactured goods because the public infrastructure is zero. The skilled worker who can migrate across regions locates in region 1 because only region 1 can produce manufactured goods. The other skilled worker in region 2 is employed in the agricultural sector. Equilibrium populations are (4) and (5) which are the same as in section 3. From these equations and market clearing conditions, w_{s1} and P_x are expressed as

$$w_{s1} = \frac{\mu}{1-\mu}\frac{(1-\mu)\bar{L}+\frac{1}{2}\epsilon\mu\bar{L}}{\left(1-\frac{1}{2}\epsilon\right)\mu\bar{L}-G} \tag{13}$$

$$P_x = \frac{b}{\rho}\frac{\frac{\mu}{1-\mu}\left[(1-\mu)\bar{L}+\frac{1}{2}\epsilon\mu\bar{L}\right]}{\left[\frac{1-\rho}{f}\right]^{\frac{1}{\rho}-1}G_1^{\frac{\gamma}{\rho}}\left[\left(1-\frac{1}{2}\epsilon\right)\mu\bar{L}-G_1\right]^{\frac{1}{\rho}}} \tag{14}$$

From these conditions and the government budget constraint, I obtain

$$G_1 = \frac{t}{\mu+t(1-\mu)}\left(1-\frac{1}{2}\epsilon\right)\mu\bar{L} \tag{15}$$

Substituting (4) , (5) , (13) $\sim$ (15) into the welfare (3), I obtain

$$W = \left[(1-\mu)\bar{L}+\frac{1}{2}\epsilon\mu\bar{L}\right]^{1-\mu}\left[\frac{\rho}{b}\right]^{\mu}\left[\frac{1-\rho}{f}\right]^{\mu\left(\frac{1}{\rho}-1\right)} * \left[\frac{t}{\mu+t(1-\mu)}\left(1-\frac{1}{2}\epsilon\right)\mu\bar{L}\right]^{\mu\frac{\gamma}{\rho}}\left[\frac{\mu(1-t)}{\mu+t(1-\mu)}\left(1-\frac{1}{2}\epsilon\right)\mu\bar{L}\right]^{\frac{\mu}{\rho}} \tag{16}$$

The government determines the income tax rate in each region to maximize the welfare. The optimal tax rate is

$$t = \frac{\gamma\mu}{\gamma\mu+1} \tag{17}$$

and the amount of public infrastructure is as follows

$$G_1 \quad = \quad \frac{\gamma}{\gamma+1}\left(1-\frac{1}{2}\epsilon\right)\mu\bar{L} \tag{18}$$

From (18) , I obtain the following lemma

Lemma 2

When the government adopts the concentration policy, the amount of public infrastructure is

$$G_1 = \frac{\gamma}{\gamma+1}\left(1-\frac{1}{2}\epsilon\right)\mu\bar{L}$$

Compared to section 3, the amount of public infrastructure in region 1 does not change. The equilibrium population does not change which policy the government chooses in region 2. Therefore, to utilize region 1's worker efficiently, the government should not change the amount of public infrastructure.

5 Comparing investment policies

This section analyzes whether or not the public infrastructure should be provided in region 2. Government policies are of two kinds: One is the public investment allocation policy in which the infrastructure is allocated in each region, and the other is the concentration policy in which the investment is not provided in region 2. Comparing these two policies reveals which is the optimal one.

The object of the government is to maximize the welfare. In order to obtain the optimal policy, it is useful to compute the welfare in each policy. Under the infrastructure distribution policy, the amount of the infrastructure is determined in section 3. Using this result, the welfare with the infrastructure distribution policy is

$$\begin{aligned} W_I &= [1-\mu]^{1-\mu}\left[\frac{\rho}{b}\right]^{\mu}\bar{L}^{1-\mu} \\ &\times\left[\left\{\frac{1-\rho}{f}\right\}^{\frac{1}{\rho}-1}\left\{\frac{\gamma^{\gamma}}{(\gamma+1)^{\gamma+1}}\right\}^{\frac{1}{\rho}}\left\{\left(1-\frac{1}{2}\epsilon\right)\mu\bar{L}\right\}^{\frac{\gamma+1}{\rho}}+\frac{b}{\rho}\left\{\frac{\beta^{\beta}}{(\beta+1)^{\beta+1}}\right\}\left\{\frac{1}{2}\epsilon\mu\bar{L}\right\}^{\beta+1}\right]^{\mu} \end{aligned} \tag{19}$$

When the government adopts the concentration policy, the amount of the infrastructure is determined as shown in Section 4. From these results, the welfare is

$$W_S = [1-\mu]^{1-\mu}\left[\frac{\rho}{b}\right]^{\mu}\left[\left\{1+\frac{1}{2}\epsilon\frac{\mu}{1-\mu}\right\}\bar{L}\right]^{1-\mu} \times\left[\left\{\frac{1-\rho}{f}\right\}^{\frac{1}{\rho}-1}\left\{\frac{\gamma^{\gamma}}{(\gamma+1)^{\gamma+1}}\right\}^{\frac{1}{\rho}}\left\{\left(1-\frac{1}{2}\epsilon\right)\mu\bar{L}\right\}^{\frac{\gamma+1}{\rho}}\right]^{\mu} \quad (20)$$

When $W_I > W_S$, the optimal policy comprises the infrastructure distribution policy. Conversely, when $W_I < W_S$, the optimal policy comprises the concentration policy.

Combining (19) and (20) yields the following equation:

$$\frac{W_S}{W_I} = \left[1+\frac{1}{2}\epsilon\frac{\mu}{1-\mu}\right]^{1-\mu} \times\left[\frac{\left\{\frac{1-\rho}{f}\right\}^{\frac{1}{\rho}-1}\left\{\frac{\gamma^{\gamma}}{(\gamma+1)^{\gamma+1}}\right\}^{\frac{1}{\rho}}\left\{\left(1-\frac{1}{2}\epsilon\right)\mu\bar{L}\right\}^{\frac{\gamma+1}{\rho}}}{\left\{\frac{1-\rho}{f}\right\}^{\frac{1}{\rho}-1}\left\{\frac{\gamma^{\gamma}}{(\gamma+1)^{\gamma+1}}\right\}^{\frac{1}{\rho}}\left\{\left(1-\frac{1}{2}\epsilon\right)\mu\bar{L}\right\}^{\frac{\gamma+1}{\rho}}+\frac{b}{\rho}\left\{\frac{\beta^{\beta}}{(\beta+1)^{\beta+1}}\right\}\left\{\frac{1}{2}\epsilon\mu\bar{L}\right\}^{\beta+1}}\right]^{\mu} \quad (21)$$

The optimal policy consists of the public investment allocation policy if (21) < 1 , while it consists of the concentration policy if (21) > 1 . These analyses yield the following proposition.

Proposition

If (21) < 1 , the optimal policy consists of public investment in each region. The amount of public infrastructure allocated to each region is determined by (11) and (12) .

If (21) > 1 , the optimal policy consists of the public investment concentration. The amount of public infrastructure is determined by (18) .

The first bracket of (21) includes the effect of agricultural good. This effect is over 1, and the optimal policy consists of the concentration policy when the government consists of the agriculture sector only. When the concentration policy is adopted, the production of agricultural goods increases because the skilled worker in region 2 is employed in the agriculture sector. Therefore, the welfare rises through the agriculture sector.

The second bracket of (21) includes the effect of the manufactured goods. This effect is under 1, and the optimal policy consists of the infrastructure distribution policy when the government considers the manufacturing sector only. When the public investment allocation policy is adopted, the production of manufactured goods increases because the skilled worker in region 2 produces that good. Therefore, the welfare rises through the manufacturing sector.

Combining these effects, the optimal policy depends on the skilled worker in region 2 who cannot migrate across regions. The numbers of this worker increase as ϵ rises. If ϵ is sufficiently small, (21) > 1 and the optimal policy consists of the concentration policy. When the government provides the public infrastructure in region 2, the region rarely produces manufactured goods because of so few skilled workers. Therefore, the public infrastructure policy should not be provided in region 2.

As ϵ rises, the case appears in which the optimal policy consists of the infrastructure allocation policy. When large numbers of skilled worker locate in region 2, the production of manufactured good in region 1 decreases due to the small number of skilled workers. In region 2 many manufactured goods can be produced by utilizing the skilled worker and by providing the public infrastructure. When the manufactured goods share (μ) is large, the effect of the manufactured goods is important. In this case, when ϵ is larger, the public investment allocation policy is expected as the optimal policy. But when μ is small, those effects are not important, thus rendering the public infrastructure unnecessary in region 2. When the skilled workers in region 2 increase, it is not always optimal for the government to provide the public infrastructure in that region.

6 Conclusion

This paper has examined the regional public investment distribution policy where each region is asymmetrical with scale economies. There are two kinds of policy. One is the regional allocation of public infrastructure, while the other is the public infrastructure concentration policy whereby the entire infrastructure is provided in one region that has scale economies. When people are imperfectly mobile, which policy is optimal? To determine that policy, this paper has compared the two policies.

When the policy consists of the regional allocation of public infrastructure, the government should increase the amount of infrastructure in a low productivity region if the workers who cannot migrate increases. When the policy is the public infrastructure concentration policy, the government should not alter the amount of infrastructure in a high productivity region compared to the first policy case.

The optimal policy depends on workers in the low productivity region who cannot migrate. If the number of such workers is sufficiently low, the concentration policy is optimal. When that number is sufficiently high, the case in which that optimal policy consists of the infrastructure policy appears. However, it is not always optimal for the government to provide the public infrastructure in a low productivity region.

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