Local Cooperative Coordination and Community System : Beyond the Market Mechanism

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Abstract

Agglomeration economies are generally argued to benefit local economic activity through cost-saving opportunities. While such forces are typically external to the firm, further accelerations can be made by internal economic factors within the firm or individual. This paper demonstrates the interactions among these factors in a systematic way together with the framework of externalities. While agglomeration economies are frequently referred to as urbanisation economies and localisation economies, our analysis approaches rural agglomeration economies, which are external to both the firm and industry but internal to the region. This paper indicates that rural agglomeration economies may be expected to solve various problematic issues that are associated with the allocation of resources to individuals and society. It also addresses how rural agglomeration economies can be boosted by community forces such as regional policies.

Key Words

Regional planning, spatial configuration, cooperative behaviour, sustainable development

Contents

1 Introduction

Economic advantages may vary according to location. For example, firms commonly locate their headquarters in a country's capital city because it may have the merit of administrative accessibility. Additionally, job-matching often seems easier in large metropolitan areas than in rural areas because they might offer more variety than rural areas. Benefits from administrative accessibility, a varied labour supply, well-organised infrastructure, and highly advanced transportation and communication system can be classified as urbanisation economies, as summarised by Parr (2002).

Another type of agglomeration economy is the 'localisation economy'. Localisation economies are external to the firm but internal to the industry. Marshall (1892 : 151–155) identified localisation economies as cost-saving opportunities that take advantage of informal information ; specialised services such as

machinery repair, sharing labour forces and machineries; and other location proximity benefits among local firms.

Parr (2015) introduced a different type of agglomeration economy, the 'rural agglomeration economy'. Although detailed analyses of such economies have not yet been made, rural agglomeration economies may be external to the firm and to the industry but internal to the region (Nakamura, 2020a). A historical example is the miracle of the Third Italy during the 1970s, according to Capello (2016 : 207). In that example, neighbouring informal economic coordination and trust were crucially important for the creation of regional economic strength. Our paper will focus on rural agglomeration economies because these may be able to solve accumulating problems in the market mechanism.

Modern society typically works with a market mechanism. There are two types of market : namely, markets for goods and services and markets for factors of production. Markets for goods and services are commonly exemplified by transactions between firms and households whereby produced final goods and services are sold by firms and purchased by households. Conversely, in markets for factors of production, households lend inputs such as labour and capital to firms.

The market system works effectively so long as the economic situation remains normal. In such cases, the optimal allocation of resources may be led by 'an invisible hand', which was descried by Adam Smith (Smith, 1776). However, this can be attained only if the conditions of perfect information and competition are present. Otherwise, the balance between supply and demand for anything related to economic activity could face problematic issues. In a market for factors of production, for instance, the balance between supply and demand in markets for goods and services may work with less uncertainty if relevant consumer information is more securely available. Similarly, the balance between supply and demand for the labour market can be more stable if relevant information between employers and employees is more complete or accessible and more reliable economic forecasts are available.

In this article, we focus on stable rural development by describing the organisation of local cooperative coordination, as an extension of that described by Nakamura (2020b). In the following section, we illustrate a location model to reveal the failure of the market mechanism in a particular circumstance. Then, we explore a better economic environment that is created through enhanced local cooperative coordination. Finally, we address an extension of the work in this article before concluding the paper.

2 Location model

Suppose that there is a region in which the population is declining that is not physically isolated from other neighbouring areas but is functionally separated from them. The primary objective of this region is to maximise its welfare function W_v under a limited availability of local resources.

$$\max \quad W_v = W_v(U_v, \pi_v) \tag{1}$$

$$\text{s.t.} \quad Z_v = AZ_v(L_v, K_v) \tag{2}$$

Here, the welfare function $W_v(W_v \geq 0)$ at a region V depends on the level of a representative local consumer's utility level $U_v(U_v \geq 0)$ and profit level of a local representative firm $\pi_v(\pi_v \geq 0)$. Local

resources can be expressed by $Z_v(Z_v \geq 0)$ that depends on the level of available labour $L_v(L_v \geq 0)$ and capital $K_v(K_v \geq 0)$ as well as parameter $A(A \geq 0)$ at region V. For reasons of simplicity, other factors are not considered here. These equations imply that more local resources may secure higher regional welfare level.

Regions with declining populations may typically have less L_v and K_v because of a shrinkage of the local economy unless there is an exclusively competitive economic activity within the area. Hence, the welfare level of such regions cannot improve because of the stronger constraint of Z_v. We now explore how these regions can expand their growth opportunity. One possibility is to raise parameter A in Eq. (2). This parameter might work with agglomeration economies. For instance, a large metropolitan area may increase its economic force by using an urbanisation economy, or a rural industrial area can save its processing costs by using a localisation economy.

If a region is neither a large metropolitan area nor a rural industrial area, it must find a way to increase the level of parameter A. In this article, we suggest this as reducing avoidable risk and uncertainty through local cooperative coordination. Here, avoidable risk and uncertainty may be exemplified as the presence of incomplete information due to simple missing linkages between two objects, while unavoidable risk and uncertainty include natural disasters and other unpredictable events.

Fig. 1 illustrates the relationship between an individual and the public. A representative individual can improve his or her satisfaction by earning more income and consuming more goods and services, as commonly assumed in microeconomic theory. However, if his or her earnings and consumption of goods and services are restricted by some surrounding factors such as a pandemic, the individual's satisfaction cannot increase sufficiently. This is not the fault of the individual's behaviour but rather the unavoidable situation in the public.

When a pandemic continues in the society, people may mostly understand that non-urgent activities should be postponed for some time. If some individuals decide to maximise their own satisfaction without waiting, a problem may be prolonged unless law enforcement strictly controls individual behaviour. There might be no place for specific types of economic activity to do so. In that case, policy remedies such as subsidiary payments and other temporary public services with a limited term are expected to minimise potentially hazardous situations.

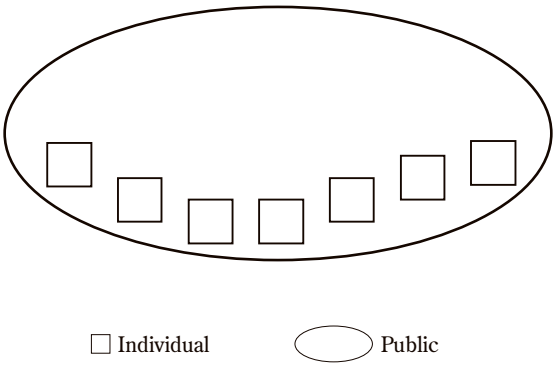

Fig. 1 Individuals in a community (Created by the author)

During a pandemic, people believe that the duration of the pandemic may be reduced when everyone behaves cooperatively. Otherwise, the above-mentioned short-sighted behaviour to gain satisfaction may delay the attainment of any long-term objective. That is the principle of cooperative community coordination, which will be addressed in the following section.

3 Application of the analysis

The previous section showed that smaller-scale regions may face difficulties with sustaining a stable regional economic system. However, smaller-scale regions have an advantage with respect to 'indivisibility'. For instance, Fig. 2 panel (a) illustrates the work tasks of a labour. It is normally difficult for him or her to be exempted from some tasks, as shown in panel (b).

If a short-term exemption is available but a long-term one is not, this person may have to choose whether he or she completes all tasks or quits the job. In either case, the labourer cannot maximise his or her satisfaction because he or she must decide between compromises. If this job does not require a specialised skill, missing spaces shown in panel (b) can be logically replaced by someone else. Panel (c) describes this scenario, in which the labourer's work is divided into six parts, for instance.

However, two things are needed to introduce such systems : namely, complete information access to the local labour force and trust among all locally involved stakeholders. The first point shows that information of the local labour force should be satisfactorily available. In other words, it is always necessary for organisers to arrange for a sufficient database between demand and supply regarding the labour shift. This may be difficult on a broader scale such as the national level but can be easier on a narrower scale such as within a community. The second criterion implies that trust must be established among all locally involved stakeholders. Even in a matching system between demand for and supply of a specific object, an untrusted arrangement could not securely work without a legal contract and other formal procedures (Capello, 2016 : 210).

Once those criteria are firmly established, other 'indivisibility' problems can be also solved in the public. As stated earlier, this should be much easier at a community level than the national level. The next concern must be given to the exploration of how this system begins and is sustained under the framework of principal-agent problem in a community, which normally does not have a pecuniary transaction. Here, we assume that there are $N_T (N_T \geq 0)$ number of residents and a some of the

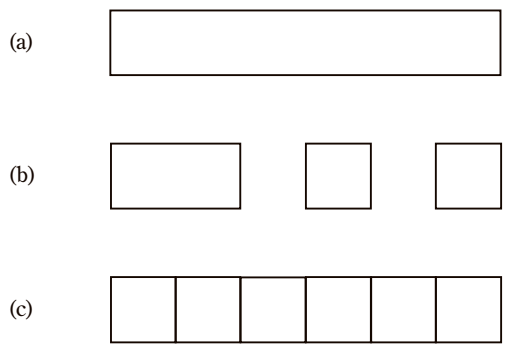

Fig. 2 Resource indivisibility (Created by the author)

residents, $N_C (N_C \geq 0)$, are ready to join this system. This may be expressed through the following equation with a converting parameter $\alpha (0 \leq \alpha \leq 1)$.

$$N_C = \alpha N_T \tag{3}$$

Notably, there is a difference between the initial example of a labour market and community participation. To be concrete, the former generally works with the price mechanism such as desired wages while the latter basically works with a voluntary action. However, the voluntary action might have an implicit consumer utility maximisation behaviour. For instance, if the completion of a community task expands the atmosphere of trust within the community, this action could improve parameter α. Conversely, if the completion of the community task merely reduces the time available to do other things, fewer people are attracted to join such activities and the value of parameter α decreases.

Methodologically, parameter α should take a higher value because community tasks in the aggregate term as expressed by a parameter $\beta (\beta \geq 0)$ and its unit burden per agent as described by a parameter $\gamma (\gamma \geq 0)$ can be given as Eq. (4). Here, the unit burden per agent γ may be interpreted as the frequency of replacement, such as that seen in Fig. 2.

$$\frac{\beta}{(\alpha N_T)} = \gamma \tag{4}$$

As a community development policy, it is therefore necessary to promote the attractiveness to become a member of N_C, that is, to engage in voluntary work. Although the role of N_C is voluntary work, there is another dimension. As long as one agent's contribution increases, this agent can receive more complimentary services in the community, for instance ; these are generally charged as a part of the market mechanism, if he or she does not have an access to such complimentary services.

Once the above stated system is established at every community level, the region's attractiveness as the sum of communities within that region may improve and its welfare level as defined by Eq. (1) increases. Such a system does not require location forces of urbanisation economies and/or localisation economies. However, there are actually spatially constrained external economies. Consequently, we can relate them to rural agglomeration economies. In the following sections, we further discuss some missing elements of this article.

4 An extension

Above, we have focused on the economic factors on a software facet such as local cooperative coordination strategy. To adequately analyse a sustainable regional system, it is also necessary to consider the hardware of economic factors such as physical infrastructure arrangements. In this section, we analyse three types of strategic regions, which have different targets for their long-term development planning.

Case 1 : The region does not need to expand economic growth

If the region is not involved in interregional competition and local outputs are mostly extracted within the region, they may be able to improve local wellbeing by organising cooperative coordination, as described earlier. However, in this scenario, we cannot expect a constant increase of regional income.

As a minimum requirement to raise regional income, it is necessary to produce goods and services, which can then be continually sold outside of the region (North, 1955 ; Parr, 1999).

Case 2 : The region needs to expand economic growth (*a passive approach*)

If the region is involved in interregional competition, it may be useful to enhance the localisation economy, which is associated with export-base sectors, in addition to local cooperative coordination, unless there are urbanisation economies. In this case, a localisation economy may work stronger than other areas because the cooperative coordination already exists. If a passive approach is considered for interregional competition, further expansion of transportation infrastructure and other external-access opportunities should be carefully planned because openness to other areas also invites competitors to that region (Capello, 2016 : 104).

Case 3 : The region aims to be strongly competitive (*an active approach*)

If the region is involved in interregional competition and aims to be strongly competitive, it is essential for the region to be attractive to innovative, creative, and/or highly skilled workers and firms, which can contribute remarkably to and take advantage of a localisation economy. This is because competitive export-base sectors need to maintain their exclusive economic strength and sufficient market access. In other words, further expansion of transportation infrastructure and other external-access opportunities should be effectively planned as long as the influx of competitors from outside is weaker than those within the region. Moreover, local cooperative coordination may strengthen such beneficial forces.

5 Avenues for further research

In this article, we limited our scope to analyse the importance of local cooperative coordination. The next step should to generate the model, which can be supported by empirical analysis. To do so, it may be necessary to take parameter A in Eq. (2) as diminishing returns, for instance. With this respect, urbanisation economies can be easy to imagine ; that is, they receive not only benefits but also negative externalities such as congestion, pollution, and a high price of land when the region's size expands beyond the optimal size. Such arguments can be further expanded.

The idea of cooperative coordination may be applicable to unpredictable risky and uncertain situations such as disaster management. When evacuation or aid is needed, local government can operate with its resources. However, it may take time to process several transactions, including a privacy-statement argument and other legal matters. Conversely, evacuation or aid with neighbourhood must be much easier because of the physical proximity and informal processes with a reliable atmosphere.

From the above argument, it is apparent that the establishment of local cooperative coordination is expected to proceed promptly. For this to be effective, coordinators, who can connect every existing local activity with each other, are needed. Under limited local budget and human resources, coordinators must also receive benefits by completing their tasks. These can include the exemption of current duties ; for instance, two units of current job duties may be exempted by doing one unit of a coordinator task.

6 Conclusion

We have examined the notion of local cooperative coordination, which may improve regional wellbeing and local firms' productivity with the local government's minimum budget expenditure. If the region aims to expand its economic activity, the condition of minimum local government expenditure may change. In any case, however, local cooperative coordination can be the common platform to attain a sustainable regional system. Moreover, as argued in the previous section, this conceptual framework may expand our general horizons from an economy-oriented society to the quality development of the region as an advanced regional system.

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