Localization economies, product differentiation and sustainable regional economic development

Daisuke Nakamura

ICSEAD, The International Centre for the Study of East Asian Development, Kitakyushu

Abstract The Japanese economy has been involved in a severe international cost competition, and the enhancement of regional economic activity may have significant roles. This paper will reveal the impact of changes in product-differentiation strategies by regional economic activity on the long-run sustainability of the domestic industries. The first part of the paper examines recent changes of market conditions with the international cost competition. An alternative model is then introduced to established industrial location theory with the notion of spatially-constrained internal and external economies as well as the network of interregional transportation and communication. The final part explores the methodological connectivity of the alternative model framework with hypothetical scenarios. The outcome is expected to show that the spatially-constrained internal economies of complexity or vertical integration may include important elements for enhancing revenue increases and cost savings through the opportunity of learning for the demand condition of the market by the upstream stages of production. Moreover, roles played by horizontal and lateral integrations in addition to external economies are also investigated.

JEL Classification: D83, L14, L23, O18, R58

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EXECUTIVE SUMMARY

The main part of the paper is summarized as follows.

Industries in developed nations are now involved in a severe international competition with developing countries where significant cost-saving opportunities are available. Due to lower-price preferences of consumers, suppliers of these countries tend to replace their contracts to foreign firms from the domestic producers. One of the biggest problems can be the hollowing-out in particular industries. Parr et al., (2002) provided details of recent structural changes of firm and establishment.

In such circumstances, local areas may have more important role to enhance economic force by value-added productions than the core area, since the core area already has excess economies of agglomeration these are called urbanization diseconomies. The value-added productions are directly relevant to product differentiation of goods and services which can be an alternative method to sustain from cost-saving market system of products. The theoretical expansions of the product differentiation are made with entry deterrence, which should refer to Schmalensee (1978), Gabszewicz and Thisse (1979) and Kawashima (1983).

The main concern of this paper is to examine roles played by vertical integration in internal term as well as localization economies at local areas together with the network of interregional transportation and communication in external term. Regarding agglomeration economies, these can be divided into three parts; namely, the economies of scale, scope and complexity according to the categorization by Parr (2002). There, vertical integration may be relevant to spatially-constrained internal economies of complexity and localization economies are to spatially-constrained external economies of scale.

In this paper, the analysis initially investigates a processing stage model with respect to revenue maximization and cost minimization for producers under the condition where information of the market is available or unavailable. The theory of information between a manager and a worker or a retail firm and a customer is examined as the principal-agent problem in Varian (1992: 440-472) and Hart (1995). These are left as further extension of the analysis, since the objective of this paper is to reveal the importance of market information for upstream stages of processes which can be enhanced by vertical integration and localization economies.

The following conditions are assumed in the model framework. The producer selects the combination of each input and output level. There is no fixed cost. The producer has the following two choices. One is cost minimization processes $(P=1)$ and another is processes maximizing market information that may not minimize cost $(P=0)$. The processing cost can be expressed as:

$$C(x)=P\cdot(c_1x_1\alpha+c_2x_2(1-\alpha))+(1-P)\cdot(c_1x_1\beta+c_2x_2(1-\beta)) \tag{1}$$

where P = a parameter ($P=0$ or 1), c_i = the unit input cost $(i=1,2)$, x_i = the amount of input and α, β = parameters ($0<\alpha<\beta<1$). Since the cost minimization processes are assumed only if $P=1$,

$$c_1x_1\alpha+c_2x_2(1-\alpha)<c_1x_1\beta+c_2x_2(1-\beta). \tag{2}$$

If the producer has no information of the final market and solely knows prevailed goods which are sold by a number of other producers, then $P=1$ and the cost minimized processing may be selected. Here, the isoquant is defined as:

$$q=q^*(x_\alpha, x_{1-\alpha}) \tag{3}$$

This particular combination of inputs x_1 and x_2 satisfies the cost minimization of processing the product where the isoquant is tangent to the iso-cost line in Fig.1 . If the producer has information of the final market and knows that existing goods are under severe price competition, then $P=0$ and potential revenue maximized processing can be chosen.

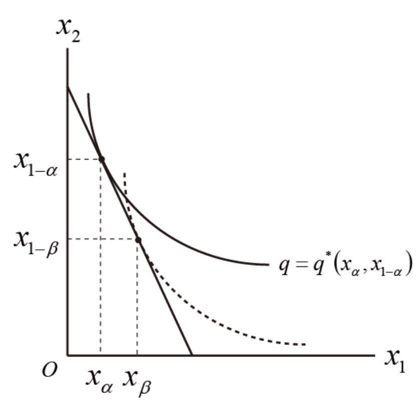

Fig. 1 The isoquant and the iso-cost line

In the long run, the cost increase by $P=0$ can be set-off by innovation through changing the shape of production function. In order to estimate an optimal production function, the producer has to obtain more complete information of the market with forecasting expected consumer preferences for the relevant product. Once the producer specifies the demand condition, the production function can be controlled by technological externality with innovation enhancing agglomeration economies in terms of scale and complexity. These economies enable the producer to negotiate detailed examinations for further improvement of machinery to other specialized firms within the industry maximizing their spatial proximity. Also, agglomeration economies allow firms to share specific knowledge and information of the relevant market. Such efficient and cost-saving opportunities may reflect either to the form of production function or factor cost curve. According to Meade (1952) and Scitovsky (1954), the former type relates to the technological term of externality, while the latter is relevant to the pecuniary term of externality. For reasons of simplicity, the technological term of externality can be assumed to add B in equation (3), referring to Nakamura (2007):

$$q = q\left(x_{\beta}, x_{1-\beta}, B\right) \tag{4}$$

where B = an additional variable as spatially-constrained external economies. This variable enables the producer to process more quantity of output under the same condition of the iso-cost line.

$$q\left(x_{\beta}, x_{1-\beta}, B\right) > q\left(x_{\alpha}, x_{1-\alpha}\right) \tag{5}$$

For the pecuniary term of externality, the direct impact can be observed by implicit declines of input costs c_1 and c_2 within the set of $(1-P)$ in equation (1). If this type of externality sufficiently works, the following condition may be achieved.

$$c_1 x_1 \alpha + c_2 x_2 (1-\alpha) > c_1 x_1 \beta + c_2 x_2 (1-\beta) \tag{6}$$

where $0 < \alpha < \beta < 1$. Hence, fully utilization of market information with agglomeration economies changes the condition (2) by shifting the isoquant from solid to dashed curve in Fig. 1. This shift may have various patterns with respect to changes in the amount of two types of input x_1 and x_2.

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