Economic Development Capitalizing on Brand Agriculture: 
Turning Development Strategy on Its Head

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Challenging the common literature of economic growth and development that tends to assign the agrarian sector the backseat, this paper seeks to move agriculture and rural development to the forefront through a community-based strategy designed to cause major innovation dynamics and human capital accumulation to occur. Specifically, this paper explores the possibilities of two unique Japanese concepts advocating community-based rural development -- the One Village One Product Movement (OVOP) and Michino Eki (or Roadside Stations) initiated in the peripheral regions of Japan in the early 1960s and the mid-1990s, respectively. Both OVOP and Michino Eki have attracted widespread attention in many developing countries as potential tools for bridging the gap between cities and rural areas through community-driven development, and are being implemented in many countries. From the viewpoint of spatial economics and endogenous growth theory, this paper considers both OVOP and Michino Eki as rural development strategies of a broader nature based on “brand agriculture.” Here, brand agriculture represents a general strategy for community-based rural development that identifies, cultivates and fully utilizes local resources (including natural, historical, cultural and human resources) for the development of products or services unique to a certain “village” or geographical area. This process feeds the engine of sustained development of a greater variety of these products and gradually establishing these local brands in increasingly larger markets. In the context of brand agriculture, selected examples of OVOP and Michino Eki from Japan and developing countries are introduced, with special attention given to the role of various types of infrastructure in the effective promotion of OVOP and Michino Eki. The paper concludes with a discussion of policy implications for successful promotion and implementation of brand agriculture programs in developing countries.

If farmers are rich, then the country will be prosperous. If villages are stable, then the society will also be stable.

— President Hu Jintao, China
(TIME, 13 March 2006, 22)

Agriculture as the Front Runner behind Two Laps

In common perception, economic development is supposed to proceed with the transformation of the main sector of the economy from agriculture to industry, and then to services. The principal role of rural areas is, therefore, to provide cities with food, while excess labor gradually migrates from rural to urban areas. The engine of economic growth resides in cities where most innovation and learning activities take place. In accordance with such common perception of economic development, most existing textbooks in development economics posit for the agrarian sector a role that consists of producing generic commodities or foods under constant returns to scale, paying little attention to product differentiation, endogenous innovations or knowledge externalities that might take place in the agrarian sector or rural areas. Furthermore, to a remarkable extent practical consideration is hardly given to the location of agrarian activities except in general studies on the dichotomy of urban/rural areas or North/South regions.

In this paper, I dare to challenge such common perception and treatment of the agrarian sector in development economics. This is no mere academic exercise. Indeed, if we were to grant the generally accepted hypothesis regarding the role of the agrarian sector as absolutely true, the agrarian sector and rural areas would have no choice but to remain forever in the backseat of economic development. If we assume constant returns and perfect competition in the agrarian sector, then as pointed out by Romer (1992, p.85), all of agricultural output will have to be paid as returns to input factors; nothing will remain as possible compensation for technological innovations. Thus, productivity enhancement and product innovation could be achieved only through public investments in infrastructure and R&D, leaving no possibility for endogenous innovation dynamics to arise inside the agrarian sector or rural areas. Furthermore, if farmers were to continue producing only generic goods, they would have no way of escaping from the direct competition in price and cost. Then, given the increasingly more severe competition in the commodities markets due to globalization and expanding domestic markets, farmers (except those in the most advantageous locations)

1 For a comprehensive modern textbook in development economics, see, for example, Ray (1998).
would be able to survive only under increasing subsidies and protection, while suffering from the gradual decline in their wages and incomes.

Needless to say, from the viewpoint of domestic and international economic policy, the revitalization of the agrarian sector and rural areas is of great importance not only for developing countries but also for developed countries. As illustrated in Figure 1, not only in developing countries but also in many developed countries, sizeable segments of the populations continue to reside in rural areas. Not all populations in rural areas, of course, are full-time farmers. Yet, given that most people in rural areas are directly or indirectly connected to the agriculture or local-resource-based activities there, and given that the majority of the poor in the developing world reside in rural areas, the revitalization of agriculture and related activities is essential for invigoration of rural economies.

Figure 1. Rural Population Share in Selected Countries

Historically speaking, although the population share of full-time farmers has become very low in most developed countries, the share of the rural population continues to be significant in most countries. For example, in the US, over the past two hundred years the segment of the population that are farmers has fallen from 70% to 2%, while its segment that is rural but does not consist of farmers has stayed remarkably stable at about 20% (Kilkenny 2004). Likewise, in France, although the number of farmers has fallen dramatically, non-farming rural population has remained around 8 million since 1850 (Ravignan and Roux, 1990). For another example, let us consider Latin America and the Caribbean that represents a highly urbanized region. In this region, the projections for the year 2020 by the World Bank (2006) show that while the urbanization trend will continue, the absolute number of people living in rural areas will remain roughly the same. Thus, for the sake of a balanced growth in both rural and urban areas, invigoration of rural economies remains an issue of crucial importance for both developing and developed countries.

For the invigoration of rural areas, many things should and/or could be done, possibly including the development of the following with appropriate timing:

(a) Infrastructure
   (a-1) hard: electricity, water, sanitation, transportation, telecommunications
   (a-2) soft: administration, management, financing, marketing, technical and technological assistance, R&D institutions
(b) human capital: health, education, training
(c) industries
  (c-1) agriculture (including local-resource-based industries)
  (c-2) services
  (c-3) manufacturing

Given that each rural area is unique in many aspects, it would not be very productive to discuss in a single paper general strategies for rural development. Rather, we propose, in this paper, to focus on the development of rural areas that locate in the “periphery.” By periphery we mean those areas that are inherently disadvantageous in the cultivation of generic agrarian commodities such as wheat, rice and other standard products. Disadvantages may arise either from steep topography, mountainous land, scarce water supply, extreme weather, or poor transportation access to major markets. Most countries abound in such peripheral areas. Furthermore, in landlocked parts of Asia, Africa and Latin America, many countries are almost entirely in the periphery.

Growing generic agrarian commodities in the periphery entails a population of poor farmers and a constant need for heavy subsidies, assuming the country can afford such subsidies. Meanwhile, in the face of a gloomy outlook for the future under such a development strategy, the country or region is being gradually deserted by her young people. This is true even in rich countries. In the US in 2003, for example, all of her 20 poorest counties (in terms of average wages and salaries), located on the eastern flank of the Rockies and on the western Great Plains, were engaged in the production of agricultural commodities, their farmers continuing to specialize mostly in wheat, soybeans and cattle \(\textit{Economist}, 10\ December\ 2005,\ pp.\ 38-39\). In 2003, for example, the federal government spent an average of US$9,000 per person in North Dakota counties, mostly in the form of farm subsidies, while the agriculture in the region has entirely failed to adapt to a world of cheap grain and cattle.

Japan, perhaps, is the worst example among nations whose agricultural policy has almost entirely failed in adapting to the globalizing world. Since the early 1960s, Japanese agriculture has been heavily protected through subsidies, tariffs and other policy measures. In particular, in terms of PSE (producer support estimate), the protection degree of Japanese major crops (rice, wheat for food, etc.) has been “extraordinarily” high either in international comparison or absolute term (Hayami and Koudo, 2002, p.178). Not surprisingly, such Japanese agricultural policy has heavily distorted the working of normal mechanisms in the agriculture and related markets, while impeding the modernization and adaptation of Japanese agriculture in the
Despite such a misguided agricultural policy, however, the future of agriculture and rural development in Japan is not entirely hopeless. Indeed, since around the early 1960s, grass-root movement for rural development has spontaneously arisen in many villages located in the periphery of Japan. Although each movement has evolved in a unique way, all successful rural development programs have been sharing the common basic strategy that identifies, cultivates and utilizes fully the local resources (including female labor and elderly people) for the sustained development of a greater variety of unique local products and services (often including local tourism). Through increasingly sophisticated marketing, these unique local products have been sold in larger markets, often establishing distinctive regional brand names identifying the local manufacturers of these products.

Such grassroots movement has arisen despite, and often acting in an opposite direction to, the national agricultural policy for the promotion of rice production everywhere in Japan. Given that the continued production of rice in inherently disadvantageous locations has provided no hope for the future, such grassroots action originated in Japan’s remote villages invariably out of their desperate struggle to escape from the increasing poverty and depopulation of their areas. The movement suddenly became popular and accelerated further shortly after Mr. Morihiko Hiramatsu, then governor of Oita prefecture (located in the western periphery of Japan, shown in Figure x), gave it the attractive name of One Village One Product Movement (OVOP) in 1979. Abroad, since its introduction in China in 1983, OVOP has attracted the serious attention of many developing countries. And it has actually been implemented in many countries including Malaysia, Thailand, the Philippines, Indonesia, Cambodia, Laos, Mongolia and Malawi (Africa). The potential attractiveness of OVOP for rural development in developing countries lies in the fact that it has been initiated spontaneously by local communities in the “peripheries” of Japan with little help from the national government. As explained in the fourth section, OVOP implementation experience varies substantially from country to country.

In the early 1990s, another unique concept for local community development called Michino Eki (roadside stations) was initiated in Japan. The Michino Eki road-side service stations are uniquely different from highway or motorway service areas or rest areas in other parts of the world for three reasons (World Bank, 2006): First, although the Michino Eki stations in Japan are under the general guidance of the Ministry of Land, Infrastructure and Transportation (MLIT), the actual planning, implementation, operation and management of each Michino Eki are left almost entirely autonomous in
the hands of the local community. Thus, not surprisingly, Michino Eki provide much stronger links between local communities and the users of the highways, while competing with one another on the basis of their uniqueness in terms of the design of their buildings as well as the functions and services they offer. A typical Michino Eki sells a large set of unique local products developed and produced either within the vicinity of the Michino Eki or in the surrounding rural communities. Hence, local residents are provided opportunities for entrepreneurship to increase their income, thereby empowering themselves (in particular women and elderly people). Second, in addition to economic services through market functions, Michino Eki serves as venue for the provision of a wide variety of public services to the local community such as sanitation, health care, education and training, as well as cultural activities. Third, while a normal way station or service area is intended primarily for highway users, focusing on traveler services, a Michino Eki targets the local residents as well who come either in vehicles, on foot or bicycle. Since the first group of Michino Eki was implemented in 1993, there exist today more than 800 Michino Eki throughout Japan (all outside major metropolitan areas).

Like OVOP, the Michino Eki idea has attracted the curious attention of many developing countries. And, under the guidance of Japanese MLIT, Japan Bank for International Cooperation (JBIC) and the World Bank, Michino Eki is now being implemented or in the phase of pilot study in many developing countries such as Thailand, India, China, Turkey, Kenya, Yemen as well as in Mexico.2

Both OVOP and Michino Eki have a high potential to be used as an effective strategy or tool for bridging the gap between cities and rural areas in developing countries through community-driven development. However, their attractive names tend to disguise the actual complexity of the concepts behind them, often resulting in misunderstanding. The purpose of this paper is to present a comprehensive understanding of the concepts behind OVOP and Michino Eki from the viewpoint of spatial economics and endogenous growth theory, while illustrating such concepts through actual examples of OVOP and Michino Eki both in Japan and developing countries. Special attention is paid to the role of various types of infrastructure in the effective promotion of OVOP and Michino Eki.

From the viewpoint of economic theory, this paper considers that both OVOP and Michino Eki belong to a broader category of rural development strategy based on “brand agriculture.” Here, brand agriculture represents a general strategy for

2 For a comprehensive introduction and guidance re Michino Eki, see World Bank (2006).
community-based rural development that successively identifies, cultivates and fully utilizes local resources (including natural, historical, cultural and human resources) for the continual development of an increasingly greater variety of unique local products and services (including local tourism). At the same time, through increasingly sophisticated marketing, these unique local products will be sold in larger markets, gradually establishing local brands to identify them. In so doing, the community will accumulate technical skills, know-how and practical knowledge learned by inference through experience (otherwise known as tacit knowledge) while developing their human resources that are essential for sustained or continual innovation of their unique local products and management system.

In the next section, based on spatial economics and endogenous growth theory, the framework for the analysis of brand agriculture is presented. Then, in the context of brand agriculture, OVOP and Michino Eki in Japan are introduced, to be followed by the promotion of OVOP and Michino Eki-styled projects in developing countries. The paper concludes with the discussion of policy implications and possible strategies for successful promotion of brand agriculture in developing countries.

**Economic Theory and Brand Agriculture**

At this point, we may ask what are the essential differences between agriculture and manufacturing or services. It is true that each person has one stomach and hence the capacity for food consumption is limited. But the same is true for manufacturing and services. Each person has a single body and thus the capacity for the consumption of basic products such as daily clothes, TV sets and cars is limited. Likewise, each person cannot watch TV programs, play video games and read books more than 24 hours a day. At the same time, however, one would be delighted in buying new fashionable clothes, a new digital TV set, and the newest version of BMW or Toyota. And, some people can hardly wait for new Korean soap operas (which are now enormously popular in Asia), new games with PlayStation 3, and the next version of Harry Potter. Likewise, one would love to try new varieties of fruits and sweets, to receive gorgeous bouquets occasionally, and to visit onsen (hot spring resort) and enjoy $100-dinners time to time. And, some people are ready to pay almost any price on

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3 This is true also for basic foods. For example, even in the production of the most basic crop, rice, in Japan, after just 10 years since the partial deregulation of its markets, more than a hundred varieties of rice for daily consumption are being cultivated in Japan today, some of which are exported overseas. In my recent trip to Thailand from Japan, the backcover of my air ticket happened to print the PR of one rice brand, Koshihikari cultivated in Minami Uonuma (in Niigata Prefecture), which commands
organically-grown pesticide-free crops and vegetables.

After basic needs have been satisfied, people have almost limitless potential desires for new things. The essence of economic development, thus, lies in the sustained development of new products (both tangible and intangible ones) that cultivate and fulfill such potential desirers. This is true not only in manufacturing and services but also in agriculture.

There exist, of course, fundamental differences between agriculture and manufacturing or services. Here and throughout this paper, we consider the agriculture broadly to include the forestry, fishery and stock-raising as well as all local-resource-based industries and activities such as local food processing, crafts, restaurants and tourism. Almost by definition, then, the basic characteristics of agriculture are:

A. It is bound to land and nature, and thus agrarian activity is rather specific to region.
B. Because of land constraint, its activities are geographically dispersed, and thus cannot form a large dense concentration.
C. People engaged in agriculture are also bound to land, working and living together in a rural community, forming a rather closed society.

As we will see in the rest of the paper, such characteristics of agriculture affect the innovation dynamics and resource development in rural areas differently from cities. This paper wishes to suggest that when such innovation dynamics and resource development are appropriately managed and supported by infrastructure, agriculture can become again the front runner in the economic development.

**Brand Agriculture and Local Resources**

To understand the OVOP and Michino Eki in the broader context of brand agriculture, this paper appeals to the theoretical framework of spatial economics combined with the endogenous growth theory. Both spatial economics and endogenous growth theory put an emphasis on *product differentiation*, so does the brand agriculture. As noted previously, in order to attain higher value-added in the increasingly competitive domestic and global markets, it is essential for producers to differentiate their products from others and avoid direct competition in price and cost. At the same

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the price of ¥7,660 per 10kg, more than the double of average rice price in Japan.

4 Spatial economics is often called the New Economic Geography (NEG). See Fujita, Krugman and Venables (1999) for a comprehensive exposition of the NEG. See also Fujita and Thisse (2002) and Baldwin et. al. (2003) for the recent development of the NEG. For the endogenous growth theory, see, for example, Grossman and Helpman (1991), Barro and Sala-i-Martin (1995) and Aghion and Howitt (1998).
time, such a sustained development of differentiated products constitutes the engine of economic growth.

Unlike the manufacturing and service industries in the standard spatial economics, however, product differentiation in agriculture does not lead to the formation of big agglomeration of producers and consumers. Indeed, this is not possible by the very nature of agriculture using land extensively. Rather, the key question in the theory of brand agriculture is how to achieve the sustained development of rural areas in dispersed environments. The answer lies in the role of product differentiation that plays in the coevolution of local resources and unique local products, leading to the sustained development of rural communities. Figure 2 presents schematically the evolutionary process of brand agriculture through double-loop processes.

Figure 2. Evolution of Brand Agriculture through Double-Loop Processes

To explain Figure 2, let us consider a hypothetical story, representing a typical example of OVOP. Focusing first on the outside loop in Figure 2, suppose that, in a village, a group of farmers get together and try to develop unique products which will eventually supplant the traditional crops grown there. This may be caused by a certain catastrophic event that renders the growing traditional crops there hopeless. In so doing, the first step is to identify the local resources (both tangible and intangible ones) that the village has at present. They may be unable to find any greatly-exciting local resource. They will, none the less, focus on a few local products on which they have comparative advantages under the given set of local resources. And, they will endeavor to produce better products at lower costs. Given that their products are still not very competitive in the national markets, they will aim at regional markets located relatively nearby, and try to establish the brand reputation on their products through stable and continuous supply.

The experience and know-how gained through this initial period of operations will further enrich the local resources (including various skills and know-how) and management capacity of the group. At the same time, the group may become larger by attracting successively new participants of farmers. This larger group of farmers, then, will take a fresh look at initial products, and try to refine them further, while adding a few new products (some of which may be processed products of local materials). Now, the group are able to exploit the economies of scale / scope better, leading to the supply of a larger variety of products with higher quality at lower costs. This will contribute to the more stable supply of their products in larger markets and to the higher reputation...
of their products. In this manner, the brand agriculture of the village will evolve gradually, perhaps, introducing a new set of core products periodically. Eventually, the enough reputation of the village will set the ground for promoting local tourism earnestly. Furthermore, perhaps, several full-fledged companies using local resources may appear, selling their brand products nationwide and, perhaps, overseas. In this way, the village will become a more invigorated place with increasingly higher local pride.

While a good story this hypothetical example may tell, it is hardly complete. In particular, such evolution of brand agriculture in the village cannot proceed smoothly without successive improvement of various kinds of infrastructure surrounding the village in timely manner, which is represented by the inside loop in Figure 2. First of all, the availability of various kinds of basic infrastructure such as water, road and electricity is a prerequisite to the initiation of such an evolutionary process, although what is the basic depends on the general environments of the society. Furthermore, although too much assistance from outside agents (in particular, in the form of subsidies) often turns out to be harmful, timely help in developing key new infrastructure such as better access-roads and telecommunication system as well as technical and marketing support will yield enormous benefits in accelerating the process of brand agriculture, for such infrastructure will yield the sustained positive externalities.

Thus, a successful evolution of brand agriculture will follow the double-loop processes of local resource / product development and infrastructure development.

A few additional comments are in order about the hypothetical example above and key terms in Figure 2.

*Local resources:* Although some villages may be endowed with certain resources of great values, most rural areas seem to be devoid of any such resource. It is thus encouraging to see that many successful cases of OVOP and Michino Eki, as will be illustrated later, have managed to change the seemingly ubiquitous resources such as ordinary plants and elderly people into great assets. In this sense, rich local resources are not to be given from heaven, but rather are to be created or cultivated out of struggle. This also suggests that unique brand agriculture could be developed in almost any region. Furthermore, in identifying valuable local resources in a region, fresh views of outside people often turn out to be of great help.

*Lock-in effects of local resources:* It often happens that successful manufacturing industries (in particular, footloose ones) eventually move out the original region to big cities seeking better access to markets. Fortunately, however, since a successful brand agriculture is deeply rooted in specific local resources cultivated in the community, it
tends to continue to develop in the same region. This represents the great advantage of rural development based on brand agriculture.

Shipping-to products vs. shopping-for products: As is well-known in location theory, the effective marketing strategy for “shipped-to products” is quite different from that for “shopped-for products.” Here, shipped-to products represent those goods that are delivered to consumers (eg. typical products of OVOP sold through ordinary distribution channels), whereas shopped-for products are those goods or services that consumers come to purchase (eg. local tourism, and products sold at Michino Eki). This point is elaborated further in the following sections.

Scale economies in brand establishment: It is well-known in the literature that establishing brand on an agrarian product requires a certain scale in terms of the number of farmers and land size involved in the operation. In particular, a certain scale is necessary to achieve a stable and continuous supply of the products to key markets while attaining the continuous refinement of the product through a cooperative and competitive organization. This is aside from the economies of scale in mechanization.

Scope economies leading to centipede agriculture: Successful brand agriculture often proceeds with the successive introduction of new products, leading to the so called “centipede agriculture.” This is due to the accumulation of local resources (including skills and know-how) and the enhancement of management capacity, yielding scope economies in product development and marketing. In particular, as emphasized in endogenous growth theory, the cost of developing a new product tends to become lower with the increasing cumulative number of related products developed in the region in the past. Furthermore, with the establishment of regional brand, the marketing of new products become easier.

Transfusing new blood into the community, while keeping the social capital: Finally, it must be observed that an initially successful brand agriculture often stops developing, leading to the stagnation of the community. This tends to happen from the very nature of rural society, where the same group of people live and work together in a rather closed community. In such a society, mimesis tends to be directed towards the past, custom rules and society becomes static (Toynbee, 1946). “The cake of custom” may be broken by creative personalities who initiate the brand agriculture in the village. However, in order to sustain the village in dynamic motion of brand agriculture, the

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5 For concrete examples of necessary scales in establishing local brand on agrarian products, see Kojima (2003).
6 This term of centipede agriculture is from Matui (2006).
society needs to develop an organizational system that encourages the constant transfusion of new blood in terms of new personalities and new knowledge, while developing the networks of mutual learning with other groups of brand agriculture in the nation and abroad. For this purpose, it is useful, as illustrated later by actual examples, to set up a corporate organization formed of various experts, that coordinates and leads the activity of independent farmers in the village.

**Location of Brand Agriculture: The Potential Function Approach**

In the previous section, we discussed generally the possible evolution of brand agriculture in a given region or village. In this section, we examine more precisely the location of brand agriculture. That is, using the potential function approach in spatial economics, we investigate what type of brand agriculture is likely to successfully develop where.

In order to derive the potential function for each type of brand agriculture, which measures the relative profitability of each location in the operation of each specific type of brand agriculture, we adopt the monopolistic competition model used in spatial economics and endogenous growth theory. (For the details of the analysis below, please refer to the Appendix.) To do so, let us divide all possible types of brand agriculture ($B$-agriculture) into $H$ type, denoting each by index $h=1,2,...,H$. In each type of $B$-agriculture, a large variety of differentiated products are produced, which are characterized by the combination of consumers' tastes, transport costs, and production technology.

First, consumers' tastes on type-$h$ products are specified by the substitution parameter, $\sigma_h$, which represents the elasticity of substitution between any two varieties in type $h$, which in turns shows the price elasticity of each product in type $h$. The parameter $\sigma_h$ takes a value greater than 1. A value of $\sigma_h$ close to 1 means that type-$h$ products are highly differentiated from each other, and hence have a low price-elasticity. In contrast, when $\sigma_h$ has a large value, type-$h$ products are not much differentiated from each other (i.e., highly substitutable to each other), and hence have a high price-elasticity.

Next, the economy is assumed to consist of $N$ regions (including oversea regions), denoting each by $r=1,2,...,N$. The transport costs between each pair of regions for each type products are represented in a multiplicative form. That is, let $p_r^h$ be the (f.o.b.) price of a type-$h$ variety produced in region $r$. Then, the delivered (c.i.f.) price, $p_{rs}^h$, of that variety at each consumption region $s$ is assumed to be given by

$$
p_{rs}^h = p_r^h r_{rs}^h
$$

(1)
where $T_{rs}^h$ represents the transport parameter for type-$h$ products between region $r$ and region $s$ such that $T_{rs}^h > 1$ for $r \neq s$ and $T_{rr}^h = 1$. A larger $T_{rs}^h$ means a higher transport cost for type-$h$ products from region $r$ to $s$, and hence a higher delivered price, $p_s^h T_{rs}^h$. As we discuss later, the improvement of transport/information infrastructure as well as marketing strategy will affect the parameter $T_{rs}^h$.

Turning to the production side, in a given region, all varieties in the same type have the same production technology, involving the economies of scale. Here, the economies of the scale is at the level of variety. (Economies of scope are considered later.) Specifically, in region $r$, each marginal input of the composite of one unit of land and $c_h$ units of labor yields $b_r^h$ units of a type-$h$ product; in addition to such marginal inputs, the production of any variety requires the fixed $f_r^h$ units of the same composite of land and labor. Here, subscript $r$ on the productivity parameter $b_r^h$ and fixed-input parameter $f_r^h$ indicates the possible regional differences in the production conditions in type-$h$ brand agriculture, which may arise by nature and/or by nurture. In particular, infrastructure improvement will affect both parameters, as we discuss later. By assumption, the production technology is of constant returns in terms of marginal inputs. However, since the costs of fixed inputs $f_r^h$ are spread over the total output, the unit production cost becomes lower as the output level increases. Thus, as the whole, the production of any variety exhibits economies of scale.

Now, let $w_r$ be the wage rate of farm-workers and $R_r$ the land rent in region $r$. Then, the marginal cost in the production of a type-$h$ variety in region $r$ is

$$c_h w_r + R_r$$

whereas the fixed cost is given by

$$f_r^h (c_h w_r + R_r)$$

Now, in order to make the discussion more concrete, let us consider here a specific spatial structure of the economy, represented by the bottom horizontal axis in Figure 3.

Figure 3. Potential Curves for the Three Types of Brand Agriculture

The representative foreign country locates at point $F$, whereas the domestic economy extends linearly from point $M$ to the right land side along the horizontal axis $r$. The major market of the domestic economy is concentrated at point $M$ (metropolis), while small regions of about the same size (in terms of area and income) locate contiguously along the axis $r$. This spatial structure represents roughly the economic geography of many countries dominated by major post-cities, such as Japan and many developing countries. The focus of our analysis is the possible location of each type's
brand agriculture inside the domestic economy along the axis $r$.

When we calculate the value of the potential function, $\Omega_r^h$, for each type $h$ in each region $r$, for simplifying the mathematical expression, we divide a priori the entire markets of the economy (at which the products of region $r$ are to be sold) into the following four:

- $F$: the foreign market
- $M$: the metropolitan market
- $\bar{r}$: the local markets surrounding region $r$
- $r_-$: the rest of the domestic markets (other than $M$ and $\bar{r}$)

Then, we combine appropriately the foreign market and the metropolitan market together (refer to equation (A.24) in the Appendix), and denote the combined market by $M$. Furthermore, we assume that the effective demand in the rest of region $r_-$ is negligibly small and hence drop it. Then, the potential function for type-$h$ brand agriculture at each region $r$ is given as follows (refer to the Appendix for the derivation):

$$\Omega_r^h = \frac{K_r^h}{(c_h w_r + R_r)^{\sigma_h}} \left( \frac{D_M^h}{(T_M^h)^{\sigma_h-1}} + \frac{D_{r^-}^h}{(T_{r^-}^h)^{\sigma_h-1}} \right)$$

where

$$K_r^h = \frac{(\sigma_h - 1)^{\sigma_h-1}}{\sigma_h^{\sigma_h} f_r^h} \cdot \frac{(b_r^h)^{\sigma_h-1}}{f_r^h} : \text{regional technology parameters}$$

In this expression, the value of $\Omega_r^h$ shows the relative profitability of cultivating a type-$h$ variety in region $1$. It is a normalized measure of profitability such that when the production of a type-$h$ variety in region $r$ just breaks even, the value of $\Omega_r^h$ equals 1; when it yields a positive profit (resp., a negative profit), $\Omega_r^h$ is greater than 1 (resp., less than 1). Thus, by examining in each region $r$ how close to 1 is the value of potential $\Omega_r^h$, we can judge where the type-$h$ brand agriculture is the most appropriate.

In the first term in the right hand side of equation (4), the numerator $K_r^h$ (specified by equation (5)) consists of the marginal productivity parameter $b_r^h$ normalized by the fixed input parameter $f_r^h$ (in addition to the location-independent term $(\sigma_h - 1)^{\sigma_h-1} / \sigma_h^{\sigma_h}$): the denominator represents the marginal production cost powered by $\sigma_h-1$. Thus, the first term together shows the overall production-cost advantages of region $r$ in type-$h$ brand agriculture. In the first term inside the braces in equation
(4), the potential demand $D_{M}^{h}$ for type-$h$ products at the market $M$ (which combines both the metropolitan market and the foreign market as shown by (A.24) in the Appendix) is divided by the transport cost term, $(T_{M}^{h})^{\sigma_{h}-1}$, from region $r$ to $M$. Thus, the first term inside the braces shows the effective size of the demand at market $M$ which is discounted by the associated accessibility costs. Likewise, the second term inside the braces represents the effective size of local demands discounted by the associated accessibility costs.

To examine the regional variation of potential $\Omega_{r}^{h}$, first let us take a simple case where both the marginal productivity $b_{r}^{h}$ and the fixed-input size $f_{r}^{h}$ are the same in all regions. Then the parameter $K_{r}^{h}$ is independent of region, thus represented now by $K^{h}$. Furthermore, inside the braces in equation (4), let us assume that the second term of effective local demand is much smaller than the first term of effective metropolitan demand, and hence we drop it. Then, equation (4) is simplified as

$$\Omega_{r}^{h} = \frac{K^{h}}{(c_{h}w_{r} + R_{r})^{\sigma_{h}}} \cdot \frac{D_{M}^{h}}{(T_{M}^{h})^{\sigma_{h}-1}}$$  \hspace{1cm} (6)

To be specific, let us further assume that

$$c_{h}w_{r} + R_{r} = (c_{h}w_{M} + R_{M})e^{-a_{h}r}$$ \hspace{1cm} (7)

$$T_{rM}^{h} = e^{	au_{h}r}$$ \hspace{1cm} (8)

That is, the marginal production cost $(c_{h}w_{r} + R_{r})$ decreases negative-exponentially at the rate $a_{h}$ towards the periphery, because of lower wage and lower land rent in the periphery. In contrast, the transport cost parameter $T_{rM}^{h}$ increases exponentially at the rate $\tau_{h}$ with the distance to the metropolis. Then, substituting (7) and (8) into (6) yields

$$\Omega_{r}^{h} = K^{h}D_{M}^{h}(c_{h}w_{M} + R_{M})^{-\sigma_{h}}e^{[\sigma_{h}-(\sigma_{h}-1)\tau_{h}]r}$$ \hspace{1cm} (9)

Since the first three terms in the RHS is independent of distance $r$, the last term determines the relative value of the potential among locations, leading to the following three type of $B$-agriculture.

**Type 1**: Suppose it holds that $\sigma_{h}a > (\sigma_{h}-1)\tau_{h}$, i.e.,

$$a_{h} > \frac{\sigma_{h}-1}{\sigma_{h}}\tau_{h}$$ \hspace{1cm} (10)

Then, as depicted by the curve $\Omega_{r}^{h}$ in Figure 3, the associated potential curve increases exponentially towards the periphery, implying that the most periphery is the best location for this type of $B$-agriculture.\(^7\) Given a value of parameter $a_{h}$, condition (10)
is likely to hold when $\sigma_h$ is close to 1, i.e., when the type $h$ represents the group of agrarian products that are highly differentiated from each other, while the transport parameter is not quite large. When products are highly differentiated and hence their price-elasticity is low, even a rather high transport cost does not decrease much the effective demand at the destination; thus this type of agriculture tends to locate in the periphery where the wage rate and land rent are low. The majority of highly unique agrarian products belongs to this type. We may call this type of agriculture the type 1 brand agriculture.

**Type 3**: Conversely, suppose it holds that

$$a_h < \frac{\sigma_h - 1}{\sigma_h} \tau_h$$

Then, as depicted by the curve $\Omega_3^r$ in Figure 3, the associated potential curve decreases negative-exponentially from the metropolis, implying that just suburbs of the metropolis is the best location for this type of $B$-agriculture. Condition (11) is likely to hold when $\sigma_h$ is large, i.e., when type $h$ products are not much differentiated form each other, and also the transport cost parameter is large. Cultivating rather standard fresh vegetables in green houses belongs to this type of $B$-agriculture, which tends to locate just outside the metropolis. We may call this type of agriculture the type 3 brand agriculture.

**Type 2**: So far, we have neglected the local demand represented by the last term in equation (4). However, in the intermediate situation between type 1 and type 3 such that parameter $a_h$ and $[(\sigma_h - 1)/\sigma_h] \cdot \tau_h$ are roughly the same, i.e.,

$$a_h \approx \frac{\sigma_h - 1}{\sigma_h} \cdot \tau_h$$

the last term in equation (4) becomes important. In this case, as depicted by the curve $\Omega_2^r$, the associated potential function (including the local demand) tends to achieve the maximum at a middle location where the local demand for that product is large. This may happen when the newly started brand agriculture is not yet very competitive in the metropolitan market, and hence its main target is the local markets nearby. For another example, an successful Michino Eki tends to be at an intermediate location where traveling cars wish to take a rest. We call this type of agrarian activity the type 2 brand agriculture.

In deriving the three basic types of brand agriculture above, we have used the products will be added there; thus, in the long-run, the profit moves down toward zero, i.e., $\Omega_r^1$ approaches 1 in the long-run. In the short-run, however, the value of $\Omega_r^1$ may exceed 1 in some regions.
potential function given by equation (6) or (9) in which parameter $K_r^h$ has been assumed to be independent of location $r$. In the general case, however, as shown by definition (5), the value of $K_r^h$ is affected by the locational difference in the productivity parameter $b_r^h$ and fixed-input parameter $f_r^h$. Thus, in reality, the success / failure of brand agriculture in a region is affected also by local nature as well as by local nurture, which leads us to the next topic.

**Strategies and the Role of Infrastructure in Promoting Brand Agriculture**

Here, we discuss briefly the infrastructure- and related policies affecting the values of parameters in the potential function defined by equations (4) and (5). Our focus is on the possible infrastructure policies which enhance the potential functions of type 2 and type 3 agriculture in the peripheral regions. In so doing, however, we do not consider explicitly the costs of infrastructure improvement. Neither we consider the general equilibrium effects. Thus, the discussion below is only suggestive of the possible directions in the promotion of brand agriculture in a given region.

First, the productivity parameter $b_r^h$ in equation (5) can be enhanced by improving the hard infrastructure in region $r$ such as electricity and irrigation and / or by improving the soft infrastructure such as the management and marketing systems and technical assistance. The improvement of telecommunication infrastructure will also enhance the productivity through the better management and marketing. And, human capital development in terms of health, education and training will certainly improve the productivity parameter $b_r^h$ in the long-run.

Next, concerning the fixed-input parameter $f_r^h$ in equation (5), we can consider this parameter to represent actually three different things. If we consider $f_r^h$ to represent the private infrastructure (for a group of farmers producing together a brand agrarian product) such as water-pumps and private roads, it can be partly replaced by more effective public infrastructure, making $f_r^h$ smaller. When $f_r^h$ represents the minimum input scale of land and farm-workers for the stable and continual supply of a brand agrarian product, it can be reduced by appropriate assistances through public organizations such as agricultural cooperation and public distribution systems. Last, in a dynamic context, if we consider $f_r^h$ to represent the costs (or necessary inputs) for the development of a new agrarian product, it can be reduced by public assistances in technical development and R&D. We may also note that such development costs can be reduced through the accumulation of learning-by-doing experiences in the region, and through the development of mutual learning networks with other brand-agrarian groups as well as with other learning / academic institutions.
Turning to the transport parameters $T_{rM}^h$ and $T_{rF}^h$ in equation (4), they can be possibly reduced in many different ways. Improving transport infrastructure such as roads / highways, railways, ports and ships, and airports and airways will certainly reduce $T_{rM}^h$ as well as $T_{rF}^h$. Introducing modern communication / information systems such as telephones (traditional as well as wireless ones), computers and internets, and setting up home pages and portal sites will also reduce $T_{rM}^h$ and $T_{rF}^h$ through better management / marketing / distribution. Promoting brand reputation will also contributing to lowering $T_{rM}^h$ and $T_{rF}^h$.

These transport policies apply to both “shipping-to products” and “shopping-for products.” However, establishing Michino Eki (highway stations) and Satono Eki (village stations) are most effective in reducing $T_{rM}^h$ and $T_{rF}^h$ for shopping-for products such as local tourism and restaurants as well as those products sold at the stations. Furthermore, cooperation (as well as mutual differentiation) among nearby Michino Eki stations will also effectively reduce $T_{rM}^h$ by attracting more “shopping-for people” to the region.

Furthermore, as we can see from Figure 3, for the sustained development of brand agriculture in the peripheral regions, it is essential to gradually upgrade the products from type 1 to type 2 and then to type 3 by continual refinement of existing products and the introduction of new unique products. Finally, for the nationwide promotion of brand agriculture, it may be useful to introduce appropriate commercial laws protecting regional brands on agrarian products (while keeping in mind that such protective laws may also cause some negative effects in the long-run.)

**Evolution of Brand Agriculture in Japan: One Village One Product Movement and Michinoeki**

**OVOP in Japan**

Figure 4. Designated OVOP Projects in Oita Prefecture in 2000

Figure 5. Development of OVOP in Oita Prefecture (specialty products)

Figure 6. Relative Growth of Per Capita GDP in Oita vs. Japanese Average

Figure 7. Location of Irodori Project (Color Project) at Kamikatsu Village, Tokushima Prefecture, Japan; and the COE of Irodori Project

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8 For example, a new trademark law was recently introduced in Japan, which permits trademarks with a combination of regional name and product / service name. This is both for the protection of well recognized regional products and for encouraging the development of new regional products. Although the law is rather restrictive, permitted only to regional groups (not individual producers), the Japanese Patent Office estimates that there exist more than 10,000 products potentially applicable for regional trademarks (Nihon Keizai Shinbun, 3 April 2006).
Figure 8. Irodori Project in action

**Michino Eki in Japan**

Figure 9. The Conceptual Picture of a Michino Eki (Roadside Station)
Figure 10. The Functions and Concepts of Michino Eki
Figure 11. Michino Eki Tomiura / Loquat Club (Chiba Prefecture)
Figure 12. Several dozens of products from loquats
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Figure 15. Cultural activities at the adjacent Cultural Center

**Promotion of Brand Agriculture in Developing Countries**

**OVOP Initiatives in Thailand**

Figure 16. Location of Selected OVOP Initiatives in Thailand and the Exhibition of OTOP products at Bangkok International Gift Fair 2003
Figure 17.
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**Michino Eki / Tourism Promotion for Industrial Village in Thailand**

Figure 20. Michino Eki / Community Center at Ban Wat Yang Thong, Thailand
Figure 21. Michino Eki / Community Center at Ban Na Ta Pho, Thailand

**Policy Implications**

(TBA)
Appendix: Potential Function Approach to the Location of Brand Agriculture

Here, we explain the derivation of equation (1) in the text, and prepare us for the location analysis of brand agriculture in a partial equilibrium framework. Please refer to Fujita and Hamaguchi (2006) for the study of the location of brand agriculture in a general equilibrium context.

Let \( h = 1, 2, \ldots, H \) represent each type of differentiated agrarian goods or brand agrarian products (\( B \) products). Each type of \( B \) products is characterized by the combination of consumers’ tastes, transport costs, and production technology.

Utility and Demand

Let \( B_h \) represent all possible agrarian products belonging to type \( h \). For mathematical convenience, \( B_h \) is assumed to consist of a continuum of an infinite set of varieties, which are potentially available. Each \( i \in B_h \) represents a specific variety of type \( h \).

All consumers of the economy share the same tastes, or subutility function, on \( B_h \)–products given by

\[
U_h = \left[ \int_0^{n_h} x(i)^{\rho_h} di \right]^{1/\rho_h} \quad (0 < \rho_h < 1)
\]

where \( n_h \) is the range of \( B_h \)–varieties produced in the economy, or the “number” of varieties actually available, and \( x(i) \) the quantity of variety \( i \) consumed. The parameter \( \rho_h \) represents the intensity of the preference for variety in type \( h \) products. When \( \rho_h \) is close to 1, differentiated products are nearly perfect substitutes for each other; as \( \rho_h \) decreases towards 0, the desire to consumer a greater variety of type-\( h \) products increases. If we set

\[
\sigma_h = \frac{1}{1 - \rho_h} \quad (1 < \sigma_h < \infty)
\]

then \( \sigma_h \) represents the elasticity of substitution between any two varieties in type \( h \).

Given income \( Y \) and the share \( \alpha^h \) of income \( Y \) to be spent on type \( h \) products, the budget constraint of the consumer for type \( h \) products is

\[
\int_0^{n_h} p^h(i)x(i)di = \alpha^h Y.
\]

where \( p^h(i) \) is the price of variety \( i \) in type \( h \). Here, we consider \( \alpha^h \) to be a given parameter. Then, maximizing the subutility (A.1) subject to the budget (A.3) yields the consumer’s demand \( x(i) \) on each variety \( i \in \left[ 0, n_h \right] \) as

\[
x(i) = \alpha^h Y p^h(i)^{-\sigma_h} (P^h)^{\sigma_h - 1}
\]

where \( P^h \) is the price index of type-\( h \) products, given by
\[ P^h = \left[ \int_0^{a^h} p^h(i)^{-(\sigma_{\gamma} - 1)} \, di \right]^{-1/(\sigma_{\gamma} - 1)} \]  

(A.5)

**Location and Transport Costs**

Let \( r = 1, 2, \ldots, N \) represent each region in the economy (possibly including overseas). Let \( Y_r \) be the income of region \( r \), and \( \alpha_r^h \) the share of region \( r \)'s income to be spent on type \( h \) products (both \( Y_r \) and \( \alpha_r^h \) are treated here as given parameters).

Concerning the transportation of products, to avoid modeling a separate transport industry, we assume the “iceberg” form of transport costs introduced by von Thünen and Paul Samuelson (1952). Specifically, if a unit of any variety in type \( h \) is shipped from a region \( r \) to another region \( s \), only a fraction, \( 1/T_{rs}^h \), of the original unit actually arrives; the rest perishes away en route. The constant \( T_{rs}^h \) represents the amount of a type \( h \) product dispatched per unit received, where \( T_{rs}^h > 1 \) for \( r \neq s \). We call each \( T_{rs}^h \) a transport parameter. A larger \( T_{rs}^h \) means a higher transport cost for type \( h \) product from region \( r \) to region \( s \).

Let \( p_r^h \) be the (f.o.b.) price of a type \( h \) variety produced in region \( r \) (which turns out to be the same all type \( h \) products produced in region \( r \)). Then, the transport technology implies that the delivered (c.i.f.) price, \( p_{rs}^h \), of that variety at each consumption region \( s \) is given by

\[ p_{rs}^h = p_r^h T_{rs}^h \]  

(A.6)

Let \( n_r^h \) be the number of type \( h \) products produced in region \( r \). Then, using (A.5), the price index of type \( h \) products in region \( r \) is obtained as

\[ P_r^h = \left[ \sum_{s=1}^{N} (T_{rs}^h)^{-(\gamma_{\alpha} - 1)} n_s^h (P_s^h)^{-(\gamma_{\sigma} - 1)} \right]^{-1/(\gamma_{\sigma} - 1)} \]  

(A.7)

Thus, using (A.4) and (A.6), the consumption demand in region \( s \) for a product produced in region \( r \) is given by

\[ \alpha_r^h Y_s (p_r^h T_{rs}^h)^{-\sigma_s} (P_r^h)^{\sigma_s-1} \]  

(A.8)

This gives the consumption in region \( s \), but to supply this level of consumption, \( T_{rs}^h \) times of this amount has to be shipped. Summing across \( N \) regions in which the product is sold, the total sales of a variety produced in region \( r \), denoted \( x_r^h \), therefore amount to

\[ x_r^h = \sum_{s=1}^{N} \alpha_r^h Y_s (p_r^h T_{rs}^h)^{-\sigma_s} (P_r^h)^{\sigma_s-1} T_{rs}^h \]  

\[ = (p_r^h)^{-\sigma_r} \sum_{s=1}^{N} \frac{\alpha_r^h Y_s (P_r^h)^{\sigma_s-1}}{(T_{rs}^h)^{\sigma_s-1}} \]  

(A.9)
In this expression, the term \((P^h_s)^{\sigma_s-1}\) in the numerator represents the inverse measure of the severeness of competition in the market of type \(h\) products in region \(s\); higher price index \(P^h_s\) means a weaker competition in region \(s\), thus easier to sell a type \(h\) product in that market.

**Production of B-products**

Suppose that each variety of type \(h\) is produced by a single farm located in a specific region. In a given region, the production technology is the same for all type \(h\) varieties, which involves the economies of scale. These economies of scale arise at the level of variety. (Economies of scope are discussed later in the text.) Specifically, in region \(r\), each marginal input of the composite of one unit of land and \(c_h\) units of labor yields \(b_r^h\) units of a type \(h\) variety; in addition, fixed \(f_r^h\) units of the same composite of inputs are required for the production of any variety. (Here, subscript \(r\) on parameters \(b_r^h\) and \(f_r^h\) is introduced in order to discuss later the impact of infrastructure improvement in each region.) As is well-known, fixed inputs \(f_r^h\) lead to scale economies.

Let \(w_r\) be the wage rate of farm-workers and \(R_r\) the land rent in region \(r\). Then, with a f.o.b. price \(p_r^b\), the profit of the farm producing a type \(h\) variety in region \(r\) is given by

\[
\pi_r^h = p_r^h x_r^h - \frac{c_h w_r + R_r}{b_r^h} x_r^h - (c_h w_r + R_r) f_r^h
\]  
\[\text{A.10}\]

where \(x_r^h\) represents the sales level of the farm’s product, given by (A.9). We assume that the farm takes each price index \(P^h_s\) in (A.9) as given, and chooses monopolistically the f.o.b. price \(p_r^b\) so as to maximize (A.10), which yields

\[
p_r^b = \frac{c_h w_r + R_r}{b_r^h \rho_h}
\]  
\[\text{A.11}\]

This price is the same for all type \(h\) varieties produced in region \(r\). Since the marginal cost is \((c_h w_r + R_r) / b_r^h\), equation (A.11) means that each farm uses a relative mark up equal to \(1 / \rho_h\). Smaller \(\rho_h\) (i.e., smaller \(\sigma_h\)) means a higher degree of product differentiation in type \(h\) products, leading to a higher mark up.

Substituting (A.11) into (A.9) yields

\[
\bar{x}_r^h = \frac{(b_r^h \rho_h)^{\sigma_h}}{(c_h w_r + R_r)^{\sigma_h}} \cdot \frac{\alpha_r^h Y_r (P^h)^{\sigma_s-1}}{(T_r^h)^{\sigma_s-1}}
\]  
\[\text{A.12}\]

which represents the total sales of the farm under the equilibrium price (A.11).

**The Potential Function**
Substituting (A.11) into (A.10) and using (A.2) yields
\[ \pi_r^h = \frac{c_h w_r + R_r}{b_r^h (\sigma_h - 1)} \left( x_r^h - (\sigma_h - 1)b_r^h f_r^h \right) \]  
(A.13)

If we assume free entry and exist in response to profits or losses, in the long-run, the equilibrium profit becomes zero. Thus, setting \( \pi_r^h = 0 \) in (A.13), the equilibrium output of each active farm producing a type \( h \) variety in region \( r \) is
\[ x_r^{h*} = (\sigma_h - 1)b_r^h f_r^h \]  
(A.14)
and the associated equilibrium labor input, \( l_r^{h*} \), and land input, \( g_r^{h*} \), are respectively
\[ l_r^{h*} = c_h x_r^{h*} / b_r^h + c_h f_r^h = c_h \sigma_h f_r^h \]
(A.15)
\[ g_r^{h*} = \sigma_h f_r^h \]  
(A.16)

In practice, however, reaching the equilibrium will take a time. Hence, the actual sales \( \tilde{x}_r^h \), given by (A.12), of a farm producing a type \( h \) variety in region \( r \) is not necessarily the same as the equilibrium output given by (A.14). In order to examine how appropriate is region \( r \) for the production of type \( h \) products, we take the ratio of the actual sales \( \tilde{x}_r^h \) over the equilibrium sales \( x_r^{h*} \), and define
\[ \Omega_r^h \equiv \frac{\tilde{x}_r^h}{x_r^{h*}} = \frac{\tilde{x}_r^h}{(\sigma_h - 1)b_r^h f_r^h} \]  
(A.17)
which we call the potential function of type-\( h \) brand agriculture in region \( r \) \((r=1,2,\ldots,N)\). It is obvious by definition that
\[ \pi_r^h \geq 0 \quad \text{as} \quad \Omega_r^h \geq 1 \]  
(A.18)
Hence, when the potential \( \Omega_r^h \) is greater than 1 (resp., less than 1), type-\( h \) brand agriculture is profitable (resp., non-profitable) in region \( r \), and hence it will grow (resp., decline) there. Therefore, by examining how close to 1 is the value of potential \( \Omega_r^h \) in region \( r \), we can judge the appropriateness of each type of brand agriculture in region \( r \).

To be explicit, substituting (A.12) into (A.17) and using (A.2), we have
\[ \Omega_r^h = \frac{K_r^h}{(c_h w_r + R_r)^{\alpha_h}} \cdot \sum_{s=1}^{N} \alpha_s \hat{Y}_s (P_r^h)^{\alpha_r - 1} (T_s^h)^{\alpha_s - 1} \]  
(A.19)
where \( K_r^h \) is a region-specific constant given by
\[ K_r^h \equiv \frac{(\sigma_h - 1)^{\alpha_h - 1}}{\sigma^{\alpha_h}} \cdot \frac{(b_r^h)^{\alpha_r - 1}}{f_r^h} \]  
(A.20)
Thus, using this potential function, we can investigate for each type of brand agriculture the region in which it is the most appropriate. Furthermore, notice that each parameter, \( b_r^h \) (productivity parameter), \( f_r^h \) (fixed costs parameter) and \( T_s^h \)
(transport parameter), will be affected differently by various infrastructure projects. Thus, we can also investigate the possible infrastructure policy for improving the conditions for each type of brand agriculture in each region.

To do such location and policy analyses, however, the potential function (A.19) is too general. Thus, we introduce below a more specific case assuming a simple spatial structure of the economy, which we use in the text.

**Specification of the Spatial Structure**

To be specific, let us consider an economy which has a one-dimensional landscape as represented by the bottom horizontal axis in Figure 3 (in the text). The entire economy consists of the foreign and the domestic. The foreign economy locates at point $F$, whereas the domestic economy extends from point $M$ to the right hand side along the horizontal axis $r$. The major market of the domestic economy is concentrated at point $M$ (metropolis), while small regions of about the same size (in terms of area and income) locate contiguously along the axis $r$. The focus of our analysis is the possible location of each type of brand agriculture inside the domestic economy along the axis.

In the calculation of the potential function $\Omega^h_r$ for each region $r$, we divide the entire markets of the economy (at which the products of region $r$ are to be sold) into the following four:

- $F$: the foreign market
- $M$: the metropolitan market
- $r$: the local market of region $r$
- $r_-$: the rest of all regional markets

In the definition of $r$ (and hence $r_-$), we assume that the “local market” of region $r$ has been appropriately determined already, which includes region $r$ itself and an appropriate set of regions adjacent to region $r$.

In this geographical context, we rewrite the potential function (A.19) as follows:

$$\Omega^h_r = \frac{K_r^h}{(c_h w_r + R_h) \sigma_r} \left\{ \frac{\alpha^h_y Y_F (P_{rF}^h)^{\sigma_r - 1}}{(T_{rF}^h)^{\sigma_r - 1}} + \frac{\alpha^h_y Y_M (P_{rM}^h)^{\sigma_r - 1}}{(T_{rM}^h)^{\sigma_r - 1}} + \frac{\alpha^h_y Y_r (P_{r}^h)^{\sigma_r - 1}}{(T_{r}^h)^{\sigma_r - 1}} + \varepsilon^h_{rF} \right\}$$ (A.21)

In this expression, each component in the third term in the braces (related to $r$) are assumed to have been calculated by taking appropriate means. In particular, $T_{rF}^h$ represent the “average transport cost” from region $r$ to $r$. The last term $\varepsilon^h_{rF}$ is assumed to be negligibly small, and hence we mostly neglect this term in the rest of analysis.

For convenience, let us disaggregate the transport cost parameter $T_{rF}^h$ (from region
\( r \) to region \( F \) as follows,
\[
T^h_{rF} = T^h_{rM} T^h_{MF}
\]
which is always possible mathematically. Then, we can rewrite the potential function (A.21) as
\[
\Omega^h_r = \frac{K^h_r}{(c^h w^r + R^r)^\sigma_h} \left[ \frac{\alpha^h_Y Y_M (P^h_M)^\alpha_{Y-1} + \alpha^h_Y Y_F (P^h_F)^\alpha_{Y-1} / (T^h_{MF})^\alpha_{Y-1}}{(T^h_{rM})^\alpha_{Y-1}} + \frac{\alpha^h_Y (P^h_Y)^\alpha_{Y-1} / (T^h_{rF})^\alpha_{Y-1} + \epsilon_{rF}^h}{(T^h_{rF})^\alpha_{Y-1}} \right]
\]
(A.23)
where the term \( \epsilon_{rF}^h \) has been neglected. In this expression, after discounted by \( 1/(T^h_{MF})^\sigma_{Y-1} \), the foreign market is put together with the metropolitan market.

To simplify the expression of function (A.23), let us define
\[
D^h_M = \alpha^h_Y Y_M (P^h_M)^\alpha_{Y-1} + \alpha^h_Y Y_F (P^h_F)^\alpha_{Y-1} / (T^h_{MF})^\alpha_{Y-1}
\]
(A.24)
\[
D^h_F = \alpha^h_Y (P^h_Y)^\alpha_{Y-1} / (T^h_{MF})^\alpha_{Y-1}
\]
(A.25)
In these expressions, \( D^h_M \) represents the "potential demand" for a type \( h \) variety at the metropolis (including the discounted "potential demand" of the foreign market), and \( D^h_F \) that of local market \( \bar{r} \). Then, the potential function (A.23) can be restated as
\[
\Omega^h_r = \frac{K^h_r}{(c^h w^r + R^r)^\sigma_h} \left[ \frac{D^h_M}{(T^h_{rM})^\alpha_{Y-1}} + \frac{D^h_F}{(T^h_{rF})^\alpha_{Y-1}} \right]
\]
(A.26)
which gives the equation (4) in the text.
References


Figure 1. Rural Population Share in Selected Countries

Data Source: World Bank, World Development Indicators (2005)

Figure 2. Evolution of Brand Agriculture through Double-Loop Processes
Figure 3. Potential Curves for the Three Types of Brand Agriculture

Figure 4. Designated OVOP Projects in Oita Prefecture in 2000

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</table>

Source: Oita OVOP Survey (2000)
Figure 5. Development of OVOP in Oita Prefecture (specialty products)

Figure 6. Relative Growth of Per Capita GDP in Oita vs. Japanese Average
Figure 7. Location of Irodori Project (Color Project) at Kamikatsu Village, Tokushima Prefecture, Japan; and the COE of Irodori Project

(a) Road to the village

(b) Kamikatsu Village in deep mountain

(c) Houses surrounded by plants

(d) Plants for the business

(e) COE of Irodori Project (now)

(f) COE of Irodori Project (then)
Figure 8. Irodori Project in action

(a) Taking leaves

(b) Packing

(c) Watching market information

(d) Sending to the airport by special truck

(e) Special keyboard and big mouse

(f) Coloring plates in Japanese restaurant
Figure 9. The Conceptual Picture of a Michino Eki (Roadside Station)

Source: From the Guideline by the Ministry of Land Infrastructure and Transportation

Figure 10. The Functions and Concepts of Michino Eki

Source: Management office of Michino Eki Tomiura / Loquat Club
Figure 11. Michino Eki Tomiura / Loquat Club (Chiba Prefecture)

(a) Michino Eki Tomiura looking from the stream

(b) Michino Eki looking from the back field

(c) Michino Eki Tomiura from the front

(d) The loquat, the central local resource
Figure 12. Several dozens of products from loquats

Figure 13. Loquat products
Figure 14. The Michino Eki Tomiura shop: everywhere loquat products

Figure 15. Cultural activities at the adjacent Cultural Center
Figure 16. Location of Selected OVOP Initiatives in Thailand and the Exhibition of OTOP products at Bangkok International Gift Fair 2003

Figure 17.
Figure 20. Michino Eki / Community Center at Ban Wat Yang Thong, Thailand

(a) Community Center  
(b) Inside of Community Center

(c) Inside of Community Center  
(d) Management meeting

Figure 21. Michino Eki / Community Center at Ban Na Ta Pho, Thailand
Figure 22. The Map of Japan with Cited Locations