

Evaluating the Diversifying Market for and Viability of Rural Tourism Activity in Japan

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Abstract—This paper evaluated diversified rural tourism activities from the perspectives of economic viability and endogenous utilization of rural resources and investigated labour productivity. First, we presented a conceptual framework on how to evaluate economic viability and the endogenous mobilization of rural resources. Second, we empirically evaluated economic viability, the supply shift effect of endogenous utilization of rural resources and labour productivity with regard to rural tourism. The main findings are as follows. First, examination of the three main activities, i.e. accommodation, restaurant operation and direct selling of farm products, showed that both full-time and part-time labour input contribute more effectively to better sales than such labour for farm experience services, which means that these activities are viable whereas other activities that provide farming experience services did not yet clearly show evidence of a viable farm business. Second, we could not confirm the supply shift effect of endogenous innovative use of rural resources. Overall, it was evaluated that rural tourism in this country is undersupplied at a social optimal level. In the long run, institutional conditions for market formation and management skills for endogenous innovation in utilization of rural resources should be more intensely developed as a part of rural resource management policy.

Keywords— rural tourism, rural resources, farm diversification

I. INTRODUCTION

Activities in rural tourism have been diversifying and some of these activities have grown into a firm market. There has been little investigation conceptually and empirically from an economic perspective on the relationship between endogenous utilization of rural resources including agriculture and actual rural tourism activities. However, there have been intensive analyses of farm and rural tourism from various disciplines (Bryden et al. [2] for the British,

French and German cases, Maude and van Rest [10], Hoyland [9], Evans and Ilbery [3, 4, 5] for British, Pevetz [20] and Pichler [21] for Austrian, Oppermann [18] for German, Vanslebrouck et al. [25] for Dutch, Ohe and Ciani [17] for Italian, Ohe [14, 16] for Japanese) and anecdotal reports (Nakamichi [11]).

Rural tourism's endogenous utilization of rural resources increases in importance in this context. Sustainable development of rural tourism depends on how the rural side will be able to appropriately respond to emerging new social demands for recreational and educational functions of agriculture and the rural environment. Exploration of these functions will lead to establishment of new roles for agriculture and the countryside and eventually to diversification of rural tourism activities.

Thus, bearing in mind the characteristic of rural tourism as a labour intensive service activity, which differs from production of traditional farm products. It is necessary to examine the factor input relationship of human resources and utilization of rural resources and to clarify conditions for viable development of new markets for these services. For this purpose, we should evaluate each activity involved in rural tourism, not rural tourism in general. Hall et al. [7] deals with rural tourism from the aspect of sustainable business and Hall and Richards [8] approaches it from community development aspects. Fleischer and Tchetchik [6] take the approach of the production function and Vanslebrouck et al. [25] and Ohe [14, 15] deal with the relationship between multifunctional aspects of farming and rural tourism. Robinson et al. [22] and Pender and Sharpley [19] study management issues. None of these studies, however, have fully addressed the necessity mentioned above.

This paper, thus, firstly conceptually characterizes rural tourism activity in comparison with past farm products resulting from rural resource use and gives a basic framework to conduct an empirical evaluation of

the state of market formation of rural tourism activity in Japan. Secondly, we examine the relationship between utilization of rural resources and rural tourism. Thirdly, we estimate marginal labour productivity of rural tourism activities and examine the formation of the market for rural tourism in connection with utilization of rural resources. Finally, we consider policy implications for the development of rural tourism.

II. CONCEPTUAL CONSIDERATION

Recently, there has been a trend toward rising demand for rural tourism, rural amenities and the educational function of the rural heritage and environment, which are generalized as components of multifunctionality of agriculture (for multifunctionality see OECD [12,13], Brower [1], van Huylenbroeck and Durand [24]). The rural indigenous environment and heritage are reflected in this new demand. This is not the demand for traditional farm products per se, but a different demand emerging as a new market resulting from social development.

The following points explain how new market goods and services differ from past products. First,

these new social demands for recreational and educational purposes have characteristics of service goods in addition to farm processed products. Secondly, these new services have the positive externality typically observed as multifunctionality due to the initial stage of the market formation and partly to its trait of public goods such as maintenance of cultural heritage and bio/cultural diversity and educational effects with regard to these aspects and the rural environment. The woodland and grassland adjacent to agricultural settlements, called “Satoyama” in Japanese, and the terrace paddy are the most typical traditional rural resources that are now attracting increasing attention for this purpose in Japan (Takeuchi et al. [23]). Therefore, we need to position services related to these resources as a new market.

In Figure 1, D symbolizes the social demand line for a rural tourism service and MC the marginal cost line measuring the quantity of farm products by farm and rural resources horizontally and the value vertically. To simplify the discussion here, ceteris paribus, only labour input is considered because these products require intensive labour input. Figure 1 has two kinds of marginal cost lines due to the existence of positive externality; MC represents the farmer’s private marginal cost line and SC represents the social marginal cost line.

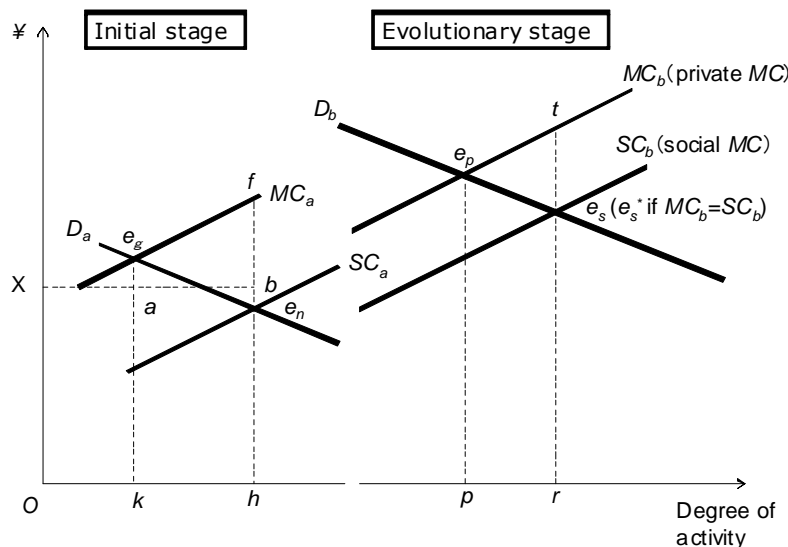


Fig. 1 Diversified markets for rural tourism and market equilibrium

In taking into account the newness of markets, we take up two cases; one is at the initial stage of market formation (initial stage), and in the other case the markets are already formed (evolutionary stage). First, suppose an activity having a market at the initial stage and the market equilibrium is attained at point e_g (activity level ok). The price e_g is low and slightly higher than the break-even level $xo (=ak)$ and the market size is small. If this activity has positive externality to society, then the social optimal point is achieved at e_n . The price at e_n , however, is lower than the break-even price ak . This point, therefore, is not a private optimal point for farmers. A typical example of this case is when farmers provide these services free of charge or only recover the amount of costs for materials. The cause of this phenomenon is considered to result from asymmetric information in that people do not know these services provided by farmers well and thus in general do not recognize these services as an object of payment, but as a kind of free externality. Another reason is that farmers themselves often think of these services as a kind of volunteer activity and the traditional rural mentality tends to avoid talking about the issue of money. In this context, it is considered to be a market wherein the rational factor input relationship to be reflected upon has not yet been established. The activity is not viable and therefore not a sustainable activity. Thus, it is rational for farmers not to be involved on a full-time basis, but on a part-time basis at most.

The evolutionary case is that a market has been formed. Point e_p is a private optimal point if externality does not exist. If externality exists, then the social optimal point is e_s . When farmers are not compensated by society for the externality they produce, e_s is not an optimal point for farmers, but e_p is. Unless farmers are paid for te_s that is, the vertical difference between MC_b and SC_b , the unit of externality they produce, e_s is not optimal for farmers. Thus, in terms of the factor input relationship, farmers' rational choice is to stay at e_p . However, this is not socially an optimal point although the gap between MC_b and SC_b narrows more than that between MC_a and SC_a ($fe_n > te_s$) because some of the externality has already been internalized in the development of the market.

To attain socially optimal resource allocation, a

subsidy such as the direct payment program will be effective for the moment, as implemented in EU countries and Japan. Nevertheless, unless the new activity becomes economically viable, externality is not internalized essentially. This is why it is necessary for farm policy to promote rural tourism by way of internalization of the externality into the farm business.

If farmers try to internalize the externality by their managerial efforts, the MC_b line will shift to the SC_b line. Eventually when MC_b will overlap SC_b , both social optimal and private optimal resource allocations are attained all at once (e_s^*). What is important here is that this process inevitably activates how to utilize rural resources effectively and uniquely. It is safe to say that this is an endogenous innovation in utilization of rural resources. It is an empirical issue to evaluate how these managerial efforts are reflected upon in the outcome of rural tourism activities.

The first point we look at is the factor input relationship to judge whether a market is formed and viable. This is because rural tourism is not a service for which its market is already established. Thus, if we observe the state of a factor input relationship in the market, we then can recognize whether the market is formed and viable. We focus on labour as an input factor because endowment of rural resources and rural culture embodies labour, and rural tourism involves labour intensive services. Also, although capital is an important input, data are not available. However, we cannot recognize the managerial effort of internalization, narrowing the gap between SC and MC , from the estimation results of production elasticity because production elasticity only shows that private optimal behaviour is taken. Thus, we need to consider the second point.

In the second point, we estimate supply shift effects to evaluate the relationship between endogenous utilization of rural resources and rural tourism. What we mainly focus on are internal factors such as labour conditions for agricultural production, richness of traditional food culture and activities for utilization of rural resources, etc. For instance, the value of the terrace paddy, despite having been considered as a low productivity area and often being abandoned, now has been rediscovered and maintained in an innovative way in cooperation with urban habitants who want to enjoy farming and the rural heritage. Newly developed

products processed on the farm, rural cuisine, and a farming experience menu is also included in this category. If we detect any shift effect from these goods and services, we can say that these factors represent managerial efforts by farmers and local residents to narrow the gap between MC and SC . All of these aspects are empirical questions to be tested below.

III. ANALYTICAL MODEL

Keeping in mind the above aspects, we set up a simple analytical model that has two parameters of labour input: W_f , W_t . These parameters basically give information on full-time and part-time labour and the factor input relationship from the level of significance, hence whether a market for each activity is formed or not and the local employment effect. Another parameter is to determine the supply shift effect X .

$$Y = F(X, W_f, W_t) \quad (1)$$

Where, Y = sales of rural tourism activity, X =endogenous innovation of rural resource use, W_f =full-time labour input, W_t =part-time labour input

We interpret the formation of a market from the two parameters of labour input as summarized in Table 1. If neither multicollinearity nor heteroscedasticity exist, the parameters of labour are classified into four types, sequentially indicating the degree of market formation. Case 1 is the case whereby none of the two labour parameters is statistically significant, which indicates that the factor input relationship does not exist. This means that the activity is not viable, which corresponds to point e_n in Figure 1.

In Case 2 and Case 3 only one of the two parameters is significant, meaning that the market is partially formed and viable. In Case 2 only the

parameter of part-time labour is significant, so it can be said that this market is at the part-time stage. Case 3 is the stage at which we observe a factor input relationship only in full-time labour while the market size is not large enough to hire part-time labour. These two cases correspond to point e_g . In contrast, Case 4 has two significant parameters, which indicates that a factor input relationship is formed and viable in both types of labour and consequently indicates that the local employment effect is the highest among the four cases. Case 4 corresponds to point e_p in Figure 1.

In addition to the two parameters with significance, if we observe a significant parameter of the supply shift effect endogenously caused by innovative utilization of rural resources, then externality is internalized resulting in the shift of MC_b to SC_b and the optimal internalization is attained at e_s^* .

IV. Data

We obtained the main data on rural tourism activity from “Data on Survey Results on Socio-economic Activity of Public Green Tourism Facilities”, a survey by the Organization for Urban-Rural Interchange Revitalization in 2003. This survey focused on public facilities and published data are aggregated at the prefectural level, which is a limitation of these data. This does not mean that private activities are omitted in this survey because an activity itself is operated by local residents, including farmers, in public facilities. Surveyed were the amount of sales for each activity, wages paid to full-time and part-time labour, and the number of employees as of 2002. Regarding factor input, no other data than those on labour are available. Although the data constraints are not small, there are no other nationwide data on rural tourism.

Table 1 Relationship between viability of market and statistical significance

Case	Parameter of full-time labour	Parameter of part-time labour	Viability of Market
1	<i>NS</i>	<i>NS</i>	<i>None</i>
2	<i>NS</i>	<i>S</i>	<i>partially yes</i>
3	<i>S</i>	<i>NS</i>	<i>partially yes</i>
4	<i>S</i>	<i>S</i>	<i>Yes</i>

Note: *S*, statistical significance; *NS*, not significant

Specifically, surveyed activities were accommodation, direct selling, restaurant operation, recreation (sports, hot springs, aroma therapy, etc.), appreciation or viewing (visiting rural heritage sites, museums, walking in the country-side, etc.), and three experience services (farming, food processing, craft making). Experience services and appreciation or viewing have an educational function and others have a recreational function. We evaluate these eight activities. Regarding market size, direct selling accounts for nearly half of the total sales from the eight activities and is the largest activity, followed by accommodation (23%) and restaurant operation (16%). These three major activities account for nearly 90% of total sales. The remainder are minor activities, with 8% of sales from recreation, less than 5% from three experience services and 1% from appreciation/viewing.

Data on agricultural conditions were obtained from the Pocket Statistics of Agriculture, Forestry and Fisheries, MAFFJ in 2004. Data on local food culture comes from “Results of Survey on Activities Regarding Succession of Food Culture Including Traditional Food and Utilization of Local Farm Products”, MAFFJ in 2002. Unemployment rates and average per capita income in the prefectures were from the Labour Survey by the Ministry of Internal Affairs and Communications and from “Economic Statistics in the Prefectures” by the Cabinet Office in 2002, respectively.

V. CORRELATION COEFFICIENTS BETWEEN RURAL TOURISM AND UTILIZATION OF RURAL RESOURCES

We examine the relationship between the eight activities and utilization of rural resources. As indicators of the utilization of rural resources, we take into consideration agricultural conditions, local food culture, facilities and conditions of the local economy. Conditions of agriculture and the local economy are not directly connected with the *MC* to *SC* shift in Figure 1, but the local food culture is because local food culture typically represents the richness of rural heritage and cultural diversity of the country, and thus it has multifunctional traits and externality. Table 2 shows partial correlation coefficients between rural tourism and utilization of rural resources. Only

significant coefficients are listed. Variables of activities took the logarithm form to compare the results with those of the model estimation below. Most of the coefficients are around 0.3, which is not high. We mainly look at variables with higher than 5% significance.

Three major activities have conditions of agriculture and factors related to local food culture to a certain extent. There is a correlation between women’s role in agricultural conditions and direct selling and restaurant operation due to the significant role of women in rural tourism.

Accommodation has a positive correlation with village agreement for direct payment and the portion of farm households in the village. These facts indicate that the cohesiveness of the rural community is important for accommodation activity because accommodation activity is often practiced as a community business in rural Japan.

With respect to food culture, as a software aspect, research on how to utilize local farm products has a correlation with the three major activities. Another interesting software aspect that has a connection with restaurant activity is the portion of municipalities where people have a daily habit of eating traditional food. This proves the connection between the local food culture and restaurant activity.

As a hardware aspect, having a traditional Japanese style facility is related to sales by direct selling. Thus, the local food culture has, to a certain extent, a relationship with rural tourism from both software and hardware aspects.

Among conditions of the local economy, average per capita income has a negative correlation with accommodation activity. The reason is considered to be that remote areas tend to have a lower average income and give more importance to accommodation activity than central areas.

To summarize, we could confirm a positive relationship between farm women and rural tourism and between traditional food culture and restaurant activity. These factors could lead to endogenous innovation. Thus, when we control the factor input relationship of labour, how these endogenous factors work needs to be examined as shown below.

Table 2 Partial correlation coefficients between rural tourism activities and variables of rural resources

Variables	Accommodation	Direct selling	Restaurant operation	Recreation	Food processing experience	Craft experience	Farming Experience	Appreciation/viewing
% share of agricultural sales	0.2824*	0.3455**	0.3654**					
Rice share in agricultural sales						0.2751*		
% women in farm population		0.3882***	0.4950***	-0.2872*				-0.2859*
% women in farm work force			0.3349**			0.3206**	0.2943**	
No. village agreements for direct payment	0.3853***							
% farm households in village	0.4443***		0.2431*			0.2567*		
No. local farm products utilized	0.2941**	0.3773***	0.2707*	0.2850*				
Financial support and PR activity for local farm products		0.3179**	0.2624*					
Study on utilization of local farm products	0.3318**	0.2976**	0.3326**					
Facility building for processing and selling		0.3735***	0.3566**	0.3569**				
No. activities utilizing local farm products		0.3219**	0.3202**	0.3057*				
% municipalities where residents have daily habit of eating local traditional food		0.2737*	0.3392**			0.2763*		
Traditional Japanese style facility		0.3111**						
Unemployment rate			-0.2487*					
Average per capita income	-0.3891***							

Source: In addition to data of Table 2, variables of agricultural conditions, local farm products, traditional local food are from MAFFJ, Unemployment rate is from MIAC, and average per capita income from Cabinet Office in 2002.

Note: 1. ***, **, * correspond to $p < 0.01$, $p < 0.05$, $p < 0.1$, respectively.

2. Variables of activity took the logarithm form.

VI. ESTIMATION MODEL OF MARGINAL LABOUR PRODUCTIVITY

Estimation model in activity i ($i=1,\dots,8$) is as follows.

$$Y=e^{c+aX}W_f^\alpha W_t^\beta \quad (2)$$

Taking double logarithm of equation (2), then

$$\ln Y = c + aX + \alpha \ln W_f + \beta \ln W_t + v \quad (3)$$

where,

Y =annual sales of activity (10 000 yen)

X_i =variable i representing the degree of utilization of rural resources

W_f =wage payment of full-time labour (10 000 yen)

W_t =wage payment of part-time labour (10 000 yen)

c =constant

a_i =shift effect by endogenous utilization of rural resources

α =production elasticity of full-time labour

β =production elasticity of part-time labour

v =stochastic error

We look at the eight activities. The explained variable is annual sales for each activity. The two explanatory variables of labour input are W_f , wage payment of full-time labour, and W_t , wage payment of part-time labour. Parameters α and β represent production elasticity of full-time labour and part-time labour, respectively. We must take care to measure the shift effect of revenue instead of the supply shift because it is hard to measure the actual supply shift accurately. If the supply curve, however, is elastic, we can assume a similar shift effect. We take this assumption since rural tourism goods are considered to be more elastic than ordinary farm products.

Another explanatory variable X demonstrates the status of utilization of rural resources. Full sample size was 47 prefectures and the estimation method was ordinary least squares (OLS) except when heteroscedasticity was observed. When it was observed, then the bootstrap method was used.

VI. ESTIMATION RESULTS

A. Evaluation of factor input relationship

Table 3 shows the results of the estimation. Judging from the smallness of vif , there was no

multicollinearity problem. Since heteroscedasticity was observed in appreciation/viewing activity, bootstrap estimation was performed. Parameters of rural resources with statistical significance are only listed. First, let us look at overall results and production elasticity of labour. The results of the three major activities (accommodations, direct selling and restaurant operation) and recreation showed relatively large goodness of fit and the two parameters of labour were both positive and statistically significant, which were the supposed results of a factor input relationship and corresponds to Case 4. Activity-wise, direct selling and accommodation have the larger full-time parameters while restaurant activity has the larger part-time parameter. In service activities such as restaurant operation, since sales will be determined by how to cope with fluctuations in daily or weekly demand, waiters or waitresses will play an important role. This is why restaurant activity has the higher part-time parameter.

To summarize, among the three major activities, direct selling has the highest production elasticity of full-time labour while restaurant activity has the highest that of part-time labour. In any case, these three major activities as well as recreation have a firm factor input relationship, hence these facts prove that the markets for these activities have been established and have a larger employment effect than the other activities. These four activities commonly have a recreational characteristic.

We cannot, however, observe any apparent shift effect caused by software aspects with regard to utilization of rural resources with up to 5% significance. Direct selling has a shift effect by the hardware aspect, indicating that a traditional Japanese style facility is effective in raising sales at direct selling stations. Strictly speaking, however, this is not exactly revitalized or innovative utilization of rural resources.

Thus, we could not observe a noteworthy relationship between sales and rural resources with a high degree of significance. A likely explanation is that even if a region has rich and diverse local resources as well as food culture, the effects of an endogenously innovative way of rural resource use

Table 3 Estimation results of marginal labour productivity of rural tourism

Variables	ln (Sales)							
	Accommodations	Direct selling	Restaurant operation	Recreation	Food processing experience	Farming experience	Craft experience	Appreciation/viewing
ln (Wage payment of full-time labour)	0.4644*** (5.95)	0.6267*** (5.95)	0.3552*** (4.36)	0.4367*** (3.85)	0.3638+ (1.47)	0.4493* (1.86)	0.5959*** (3.55)	1.2810** (2.22)
ln (Wage payment of part-time labour)	0.3079*** (3.44)	0.1815*** (2.75)	0.3770*** (3.49)	0.3131** (2.26)	0.3214* (1.82)	0.3784+ (1.68)	0.1674+ (1.32)	0.1487 (0.26)
No. activities utilizing local farm products (yes=1, no=0)	-	-	-	0.0048* (1.75)	-	-	-	-
Unemployment rate (yes=1, no=0)	-	-	-0.1618** (-2.19)	-	-	-	-	-
Japanese traditional style facility (yes=1, no=0)	-	1.7389** (2.10)	-	-	-	-	-	-
Constant	3.8967*** (8.08)	4.2575*** (5.99)	5.1656*** (5.85)	3.4610*** (3.33)	3.4848** (2.74)	2.3770+ (1.52)	2.3814* (1.99)	-3.0878 (-0.69)
ajstR ²	0.8412	0.7348	0.6909	0.5650	0.3829	0.2699	0.3353	0.3536
Vif	2.68	1.45	1.44	1.26	1.97	1.43	1.05	
Breush-Pagan test	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	
Wald chi ²								7.17**
Method of estimation	ols	ols	ols	ols	ols	ols	ols	bootstrap
Sample size	41	43	42	32	27	33	31	22

Source: Same as Table 3.

Notes: 1. Parenthesis is t static while it is z-value when bootstrap estimation is applied.

2. ***, **, *, +(as reference) correspond to p<0.01, p<0.05, p<0.1, and p<0.2, respectively.

will not be sufficient to create a shift effect that generates internalization of externality even if such a cultural background already has been reflected upon in labour itself to some extent.

The results of other activities show lower goodness of fit and only one of the two labour parameters has significance; only full-time labour parameters have significance in craft and appreciation/viewing and these parameters indicate relatively higher production elasticity. This single parameter with significance means that the market is not large enough for employment of both full-time and part-time labour even if it is not small enough to be managed only by part-time labour. Craft exactly fits this example due to its requirement of specialized techniques. On the contrary, in the case of appreciation/viewing, providing an explanation of the exhibition can be

elastic in terms of acceptance of numbers of visitors so that economy of scale can work easily.

Food processing and farming experiences have neither full-time nor part-time parameters with significance up to the 5% level, but only a 10% level of significance in the part-time parameter of food processing. These two experience services are considered as being provided not as economically viable services, but rather as collateral free services.

In short, the educational function corresponds to Case 2 or Case 3, which indicates a factor input relationship and that markets are partially but not yet fully established.

B. Estimated labour productivity

Calculated marginal labour productivity from the estimation results is shown in Table 4. For instance, in the case of full-time labour, we can obtain marginal labour productivity from the formula below.

$$\alpha = \ln Y / \ln W_f = (W_f / Y) \cdot (dY / dW_f)$$

= (employment coefficient) · (marginal labour productivity)

Production elasticity was obtained by the estimated parameters and the employment coefficient by the average of (full-time or part-time wage payment in each activity / sales in each activity). Marginal labour productivity is greater than unity if dY (marginal revenue) $>$ dW_f (marginal cost) due to the value term evaluation here. If the estimated parameter did not reach the 10% significance level, then we consider that marginal labour productivity is zero.

The difference between the two types of activities, i.e., recreational and educational, is obvious. The three major activities show nearly unity or greater than unity, and direct selling has the highest marginal productivity for both types of labour input. Roughly speaking, labour productivity in every activity of the recreational function is nearly equal to unity or is greater than unity. This means that marginal revenue nearly equals or surpasses marginal cost and that marginal labour productivity in direct selling is the greatest among the eight activities examined.

In contrast, activities with an educational function except for food processing show less than unity in marginal productivity. This means that the marginal revenue of these activities is lower than the marginal

cost, and, therefore, we can say that these activities are not conducted as rational economic behaviour.

VII. DISCUSSION

Now we summarize characteristics of each activity from the estimation results in Table 5. Direct selling, restaurants and accommodations have relatively larger market and factor input relationships and therefore are at least at a private equilibrium point e_p . These major activities have a local employment effect. It is considered that there is still, however, a gap between the private marginal cost and the social marginal cost, thus we cannot say that the social equilibrium point has been attained.

In contrast, recreation has a small market size and is considered as being at a private equilibrium point e_g . Appreciation/viewing and the three experience services have only a partial factor input relationship, and from the estimated marginal productivities even private equilibrium has not been attained and only externality is provided without receiving its full cost. Thus, it is considered to remain at point e_n , the social optimal but not the private optimal point. The market in this state is not viable and thus is not a sustainable situation over the long term.

In short, we can sum up the findings by the following points. The first is that while sizes of certain markets already have been established and viable for those activities with a recreational function, markets of

Table 4 Estimated labour productivity of rural tourism activity

Activity	Full-time labour			Part-time labour		
	Marginal labour productivity	Production elasticity	Employment coefficient	Marginal labour productivity	Production elasticity	Employment coefficient
Accommodation	1.441	0.464	0.322	2.197	0.308	0.140
Direct selling	9.734	0.627	0.064	5.706	0.182	0.032
Restaurant operation	0.989	0.355	0.359	3.159	0.377	0.119
Recreation	1.771	0.437	0.247	0.759	0.313	0.412
Food processing	0	0	0.773	0.979	0.321	0.328
Craft making	0.448	0.596	1.330	0	0	0.313
Farming	0.264	0.450	1.704	0	0	0.296
Appreciation/viewing	0.147	1.281	8.699	0	0	10.836

Notes: Marginal labour productivity=production elasticity/ employment coefficient. Production coefficient is obtained by the estimated parameters with up to 10% significance and employment coefficient by (wage payment/sales). If MR (marginal revenue) $>$ MC (marginal cost) then labour productivity $>$ 1.

Table 5 Relationship between existence of market and statistical significance

Case	Function	Activity	Parameter of full-time labour	Parameter of part-time labour	Viability of Market	Local employment effect	Internalization of externalities	Utilization of rural resources
2	Educational	Food processing	<i>NS</i>	<i>S</i>	<i>Partially yes</i>	<i>Partially yes</i>	<i>Undetectable</i>	<i>Not high enough</i>
3	Educational	Craft, appreciation/viewing, Farming experience	<i>S</i>	<i>NS</i>	<i>Partially yes</i>	<i>Partially yes</i>	<i>Undetectable</i>	<i>Not high enough</i>
4	Recreational	Accommodation, direct selling, restaurant operation	<i>S</i>	<i>S</i>	<i>Yes</i>	<i>Yes</i>	<i>Undetectable</i>	<i>Not high enough</i>

Note: *S*, statistical significance; *NS*, not significant

those with an educational function remain to be fully established and viable. The second is that endogenous innovation in utilizing rural resources remains to be detected.

The most probable reasons that we were not able to confirm this endogenous innovation are the indigenous nature of the utilization of rural resources and the severe constraints on human resources. As a result, we consider the following four specific factors. First, since this innovation is in the form of software, it is often hard to widely grasp the effect, unlike that with the widespread hardware innovation in farming technology. Second, this effect is partly embodied in labour and realized as income for farmers. Third, it has an aspect of demand creation. Fourth, there is difficulty in creating endogenous innovations.

Consequently, it is considered that there is still a gap between private cost and social cost, meaning that externality is not yet internalized. We can say that rural tourism activity in general is undersupplied at an optimal social level. Put differently, the richness of rural resources that originally exist is not reflected in an economic outcome that ensures rural viability yet.

Finally, measures that enable farmers to cover opportunity costs should be undertaken for activities that have a mounting demand. This point is crucial for improvement of service quality, proper social recognition of roles of these services and eventually the sustainable development of the market for these services. It is effective to have policy measures that aim at reducing the information gap between supply and demand sides and an institutional design for market formation. In the long run, an integrated program that induces endogenous innovation for

sustainable utilization of rural resources should receive greater emphasis.

VIII. CONCLUSIONS

Although rural tourism has reached the stage of diversification, there has been little investigation on the viability of these markets for rural tourism. This paper conducted an empirical evaluation of market viability of rural tourism activities in Japan. These are the main points revealed.

Rural tourism is different from the products that used to be produced at these points in that it is service-oriented goods with positive externality and includes activities with different market sizes. Direct selling, restaurant operation and accommodations are the three major activities that account for a large share of sales in rural tourism.

From an empirical evaluation of market formation of each activity and endogenous innovation of rural resource use, the activities of the recreational function have full-time and part-time marginal labour productivity with significance while the activities of the educational function have only partial marginal labour productivity with significance. The markets for these services have not been fully established or have not yet become viable activities.

We could not confirm the supply shift effect of endogenous innovative rural resource use. Overall, it was evaluated that rural tourism in this county has not reached the level of complete internalization of externalities that farmers generate and is undersupplied at a social optimal level.

Therefore, since rural experience services that have educational function attract growing social attention, measures that increase the viability of newly formed markets should be undertaken. These measures should be more intensely developed as a part of rural tourism policy to ease the information gap on rural tourism between the rural supply and urban demand sides and to create institutional conditions for capacity building of farmers to promote endogenous innovation in the utilization of rural resources.

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