The effect of the rural development project on non-farm income in South Korea: Application of extended decomposition method

Lee, Seong Woo (seonglee@snu.ac.kr)

&

Hwang, Jae Hee (jessieh@snu.ac.kr)

Dept. of Agricultural Economics and Rural Development

Seoul National University

Seoul, Korea, 08826

A Very Preliminary Draft Not Ready for citation

Abstract

There have been growing concerns regarding the massive government investment and demands regarding whether the rural policy achieves the intended outcomes in Korea. This concern leads to the conclusion that evaluation study of rural policies lacks the empirical evidence to prove the effectiveness of the policy. This study constructs a quantitative model based on the extended decomposition method to conduct an ex-post evaluation on the outcomes after the termination of Rural Traditional Theme Village program. This study adopts farm households' non-farm income as an ex-post quantifiable indicator and assesses the impact of the Program on this indicator. We found that the effect of the Program is evaluated positively and effectively in both the cross-sectional and longitudinal perspectives. If there had been no government intervention, the program-implemented areas could have difficulties in making non-farm income due to the lack of internal competitiveness and the deterioration of its own human resources.

Keywords : Rural tourism; Non-farm income, Ex-post evaluation; Extended decomposition method; South Korea

1. Introduction

The rapid economic development in South Korea (hereafter "Korea") over the past five decades has been deservedly hailed as globally unmatched. Concomitant with this national growth has come an increase in both agricultural production and farmer income. However, the rural and agricultural environment of Korea has undergone rapid change over the past fifty years. In particular, the trend toward urbanization, which has been accelerating since the mid-1970s, has resulted in decreasing relative competitiveness of rural areas, which today suffer disproportionately from such problems as an aging population, collapse of basic industry and lack of social overhead capital, which affect the living conditions of rural residents. The phenomena of rural decay in Korea has been thoroughly documented in the literature (e.g., Lee & Kim, 2010; OECD, 2008); thus, we will not reiterate these points here.

The current rural policy discourse has converted into a viewpoint that emphasizes the spatial value of rural areas by putting rural areas on a par with the agricultural sector (Woods, 2005). This policy also transforms functions of the space from rural areas that are limited to food production to areas that attract experience- and leisure-oriented external consumers. However, although the increase in governmental investment can be justified by the multi-functionality of rural places, the limited budget and duality of rural policies require an objective and ex-post evaluation of the agricultural and rural programs (Lee & Yun, 2008; Leeuw & Vaessen, 2009; Walker et al., 2010). In addition, when program effects are demonstrated through ex-post program evaluation, it is possible to consolidate the validity of political investments.

Nevertheless, agricultural and rural policies have been relatively free from rigorous evaluation measurements, with an emphasis on characteristics of the public property of agriculture and rural places. For these reasons, although not incorporated in the policy evaluation process, these characteristics have expanded only the appearance of the policy without verifying the logic and the effectiveness of the program. Some groups raise the moral hazard problem and distrust the policies (Lee & Kim, 2010) and even draw questions about the effectiveness of the policies (Wang & Xu, 2011).

In this context, this study begins to fill the academic and practical vacuum with one major research hypothesis: Does a public program that has been implemented in rural areas contribute to intended outcomes? Two sequential questions arise to satisfy the hypothesis. The first question is related to the "evaluation of what?" This paper evaluates Rural Traditional Theme Village (RTTV) program, which, arguably, reflects the transition in the rural policy paradigm in Korea and is regarded as a representative rural tourism program. This program was driven as a project to increase the non-farm income of farmers from 2002 to 2009. The other question is the "evaluation that is based on what?" Previous research has tended to focus on the evaluation of the implementation process, which includes the budget, financial effectiveness, or human resources. In contrast, this study maintains an ex-post evaluation that is based on the outputs and the outcomes after the termination of the program. This study

applies binary logit model and extended decomposition method to evaluate the efficacy of the program.

The present study is primarily concerned with formulating a robust quantitative evaluation of the impacts of government policies in rural areas to help resolve the debate and inform continued planning for rural revitalization projects. The remainder of the paper will proceed as follows. Section 2 presents the background of this study. Section 3 addresses and explains relevant methodologies. Section 4 discusses the data and variables taken into account. Section 5 demonstrates the statistical results of this study, and Section 6 summarizes our findings and outlines the limitations and policy implications of this study.

2. Background

2.1. Rural tourism and rural policy

Rural tourism is one of major components to represent the transition from an economy of production to an economy based on consumption in rural area (Woods, 2005: 172). It has brought a considerable change of rural identity, which is the transition from a place for food production to the consumption of rural amenities. It is widely accepted that the rural tourism is a composite of agricultural products, eco-products, cultural resources and spatial amenities, which includes diverse functions, such as economic, social, educational, environmental, recreational, therapeutic activities, etc (Lee & Kim, 2010).

Rural tourism may facilitate rediscovering the values of rural resources that have hitherto been disregarded in the modernization process of world economy. It provides insights to both farmers and policymakers to adopt a wider perspective than to only focus on the agricultural product. In this sense, rural tourism generally encompasses such holistic rural activities as agricultural production, lifestyle and rural amenities to attract people from both urban and rural areas. In this regard, historic building and traditional rural folklore as well as nature and landscape conservation in rural area are receiving more attention than before. It also offers diverse implications for farm-based rural businesses and sustainable rural development plans (Lane, 1994).

There exists a fundamental debate about the driving agency of rural tourism, however, common understandings are converging to accentuate the importance of public sector (Devine & Devine, 2011). Rural tourism, also called eco-tourism or agro-tourism, has been adopted by many countries in the world as one of major rural policies to generate rural vitality (Brandth & Haugen, 2011; Cawley et al., 2009; Cawley & Gillmor, 2008; Kannan & Singh, 2006; Liu, 2006; Logar, 2010; Ohe, 2006; Getz & Page, 1997; Sharpley & Vass, 2006). Nonetheless, policy implication of the boundary and application of rural tourism could be ambiguous because this program includes a multi-functionality of rural areas and is conducted in a variety of forms (Liu, 2006; Ohe, 2007).

In this line of reasoning, Fleischer & Felsenstein (2000) and Sharpley (2002) argued that rural

tourism needs to overcome ongoing major challenges because diverse rural tourism practices are remained invalid or as political rhetoric. Skeptical proponents of rural tourism maintain a position that rural tourism is a form of governmental intervention against market failure of rural areas and it has failed to meet proper goal accomplishment such as creating job opportunities, favorable employment conditions, and new revenue sources. Although it appears that rural tourism is not a panacea for rural renaissance and still a controversial entity, the rural tourism policy can be arguably considered as a way to revitalize rural society in the world (Devine & Devine, 2011; Knowd, 2001; Sharpley, 2002).

2.2. The program logic model and rural tourism policy

This study adopts the Rural Traditional Theme Village program (hereafter, RTTV) as an example of Korean rural tourism policy and applies this program to the evaluation stage. Initially, before evaluating the program, a distinction regarding what the program describes is required. The program logic model of the RTTV provides a framework for clarifying inputs to intended outputs by category. It also would be a stepping stone to understand the program and its evaluation mechanism[1] and make a well-structured shared space between policymakers, evaluators, and readers (Leeuw, 2003; McDavid & Hawthorn, 2006).

Figure 1 shows the program logic model of the RTTV. The theory that is embedded in the model is that the RTTV, which is based on traditional amenities and distinctive resources of each rural area, improves the rural settlement environment and promotes rural-urban interaction, which consequentially contributes to an increase in the non-farm income for farming households. The model consists of six specific phases. In the process of program enforcement, the sections are aggregated into implementation and intended outcomes. Program implementation began with deploying inputs, which invested approximately 178,000 USD in each rural village for 2 years and operated the program in 163 villages for 8 years, from 2002 to 2009. Based on the inputs, the program components were performed, which included quantitative activities, such as technical and physical intervention, as well as qualitative activities, such as consultation, education, and the encouragement of community participation. The primary purpose of the implementation was to promote economic opportunities in rural regions. As indicators to verify whether the implementation objectives that were assumed in the policy design stage have been obtained, outputs should be evaluated by the level of non-farm income, the number of new and renovated buildings or offices, surveys regarding residents' and visitors' perceptions, and by urban to rural trip data. The outcomes include a connection between program outputs and outcomes, specifically, the linking constructs that are shown in Figure 1. Consequently, the adherence of the linking constructs is connected to the attainment of short-term outcomes through which the program

---

[1] According to McDavid & Hawthorn (2006), the program logic model facilitates the understanding of the program itself, as well as the implementation process for evaluation and performance measurements.

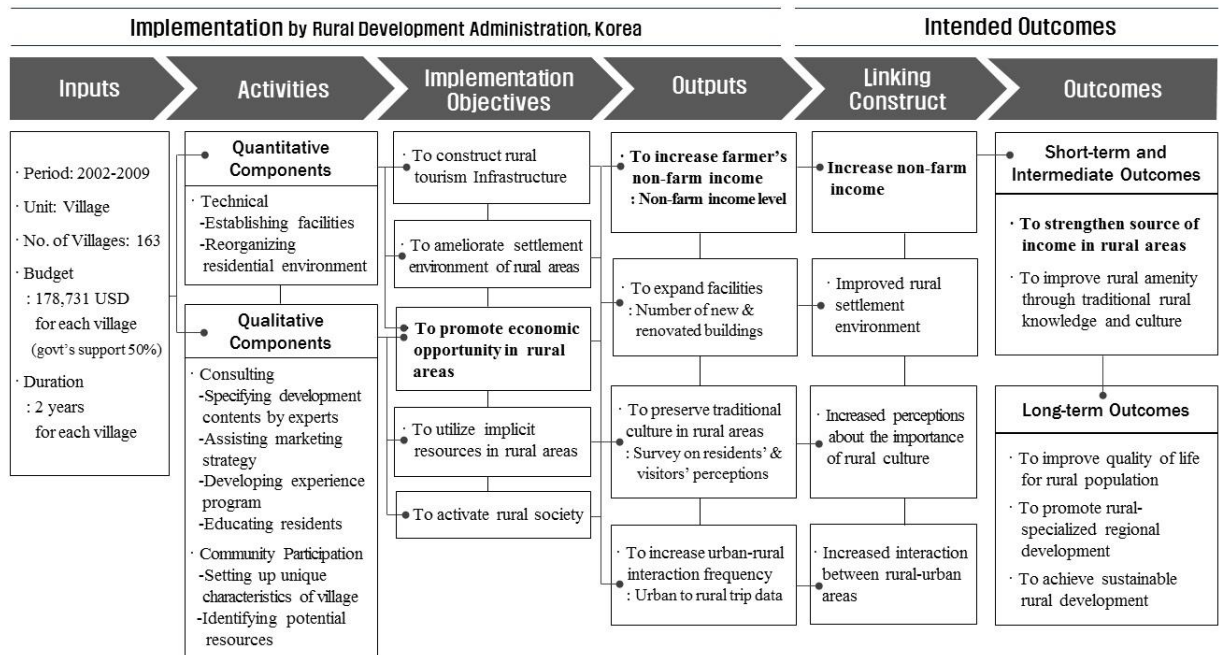achieves the ultimate goal from a long-term perspective.

Fig. 1. Program logic model for Rural Traditional Theme Village (RTTV) program.

After taking the existing research and the program characteristics into consideration, the RTTV is expected to improve an opportunity to obtain non-farm income as a means of diversifying rural income source. However, to date, there have been few studies examining the current evaluation demands of the program logic model. This shortage is largely because policymakers put more emphasis on policy-making itself and on organizational and political legitimacy rather than a rigorous post-hoc evaluation. Little attention, thus far, has been paid to quantitative methods and to ex-post empirical approaches to measuring program influences in rural policy; this lack of policy evaluations is also true for other countries (Leeuw & Vaessen, 2009; Walker et al., 2010). This study incorporates the quantitative ex-post evaluation, which focuses particularly on short term impacts from the program logic model of the RTTV in Korea.

2.3. Ex-post evaluation and quantitative application

Evaluation is the science of valuing beyond philosophical musings (Shadish et al., 1991). The process argues which values must be included, measures values, prioritizes these values, and synthesizes the results. Accordingly, assigning and assessing values that are associated with the program involve investigating how the program has affected the values and philosophies constituting the society. Then, why does the evaluation of values from the RTTV have to be conducted using a quantitative approach to an ex-post design? The reason is that by clarifying the factors of success or

failure and then analyzing the sustainability of outputs and impacts through objective and retrospective perspective, then the evaluation results are able to provide implications for policy-making processes in the future. In addition, this evaluation not only examines the newly formulated policy paradigm for agricultural and rural development but also contributes to balanced urban-rural development policies and social cohesion in Korea from a long-term perspective.

Currently, although there have been growing concerns regarding the massive government investment and demands regarding whether the program achieves the intended outcomes, the evaluation study of rural policies lacks the empirical evidence to prove the program's effectiveness. In this regard, an additional challenge originates from the demand to incorporate an ex-post empirical approach and quantitative methods to recent rural policies (Kaitibie et al., 2010; Khandker et al., 2010; Leeuw & Vaessen, 2009; Walker et al., 2010).

These concerns are true for Korea, in spite of some studies that challenge the imminent issue in Korea (Choi, 2001; Kim, 2008). Nonetheless, these studies still overlooked the decent quantitative application of the ex-post evaluation in Korea. First, the previous program evaluation inclined toward the assessment of ex-ante impacts rather than toward the ex-post evaluation. Deficiencies in understanding the effectiveness of the program make constructing an evaluation model difficult. In addition, due to "the politics of the budgetary processes,[2]" a preliminary feasibility study regarding whether to inject budgetary investments may stand against program outputs, particularly in agricultural and rural fields. Although the ex-ante assessment that is delivered before the program is initiated provides prior information about the program deliberation and prediction results, the assessment may reveal a fundamental deficit because it is impossible to reflect the empirical outputs of the program after the program has actually been undertaken. In contrast, ex-post evaluation examines the actual program impact, which is based on a retrospective design. By doing so, evaluators and policy-makers are able to draw conclusions, which may trigger additional programs in the future. This intuition implies that an ex-post evaluation, which is based on empirical data from the RTTV, contributes to the establishment and development of further programs in the current agricultural and rural policy paradigm in Korea.

Second, the qualitative analysis of the program output has been dominant in the entire process of rural policy evaluation in Korea (Lee & Kim, 2011; Lee & Yun, 2008). This domination is because agricultural and rural policies have been executed as part of the social responsibility for dilapidated rural areas. In addition to tendency of the policy-making society to avoid a quantitative assessment that is based on strict criteria (Bovens & Hart, 2012; Jae, 2009), because the majority of programs set comprehensive goals, such as environmental improvement, sustainable development or the

---

[2] This quotation is inspired by the name of the book, 「The New Politics of the Budgetary Process」 written by Wildavsky A. & Caiden N. in 1988.

improvement of the quality of life based on an extensive concept, non-econometric methods have been primarily used for the evaluation. Of course, qualitative assessment should not be ignored because there is an increasing interest in combining quantitative and qualitative assessments, which would allow planners and policy-makers to consider more valuable feedback (Maredia et al., 2000).

If the quantification of indicators to evaluate program effectiveness is possible, then quantitative methods that are based on econometric analysis could be more effectively utilized in the program evaluation (Jae, 2009; Sadoulet & Janvry, 1995; Walker, 2000; Zapata et al., 2007). A quantitative approach that is based on empirical data and analytical insight is clearly and publicly visible, and the re-production and verification of the results are possible as well. Further, the evaluation using the quantitative method can be employed as a useful and persuasive means for estimating the analytic values of the program effects. Nevertheless, even in the applications of more advanced forms of statistical techniques that have been recently published (Feiock & Stream, 2001; Lacombe, 2004; McNamara, 1999; Zapata et al., 2007), it remains unclear how the changes that are triggered by the net effect of the policy would be estimated. We believe that further investigations are required to identify these changes and to distinguish these changes from endowed resources of policy-implemented regions and maturation effects over time.

By an ex-post and quantitative approach, this paper examines the role of the RTTV in Korea as a determinant of the propensity to improve the primary indicator, which is the non-farm income. Based on the existing arguments regarding rural tourism and multi-functionality in agriculture, the present study is expected to give two major anticipated outputs. One is the program effect which directly affects an increase of non-farm income. The other is the program effect which indirectly promotes the opportunity of non-farm income increase in spite of changes in endowment resources and time differences. Even though these two expected outputs sound analogous, this study employs a binary logit model and decomposition method to investigate the program impact on farmers' non-farm income and separate the program net effect from the observed program impact.

3. Methodology

3.1 Extended decomposition method

The policy evaluation that policy-making groups expect could include causal analysis of input to output. However, can one policy satisfy causal inference conditions and effect social values? A single policy is rarely possible because there are many variables beyond the policy. Public values also change through unquantifiable mechanisms that are inherent in society. In reality, this situation causes intangible and intricate program-working mechanisms. How then can the impacts of a policy be assessed with limited variables? Identifying causal effect through a quasi-experimental method is one

possible approach (Campbell & Stanley, 1963; Guba & Lincoln, 1981). In this sense, the present study conducts an econometric analysis and simulations between an experimental group and a comparison group by using the binary logit model and the extended decomposition technique (See Figure 2).
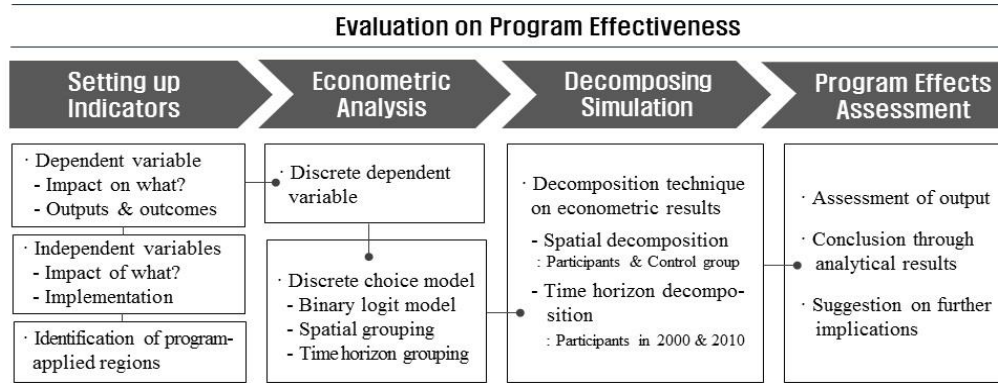

Fig. 2. Methodological flow.

The binary logit model is one of the frequently used discrete choice models when the dependent variable is dichotomous (Lee et al., 2005). As mentioned above, the non-farm income of farm households is postulated for the evaluation index to analyze ex-post and short-term outcomes in this study. The dependent variable is, therefore, the discrete type that describes whether non-farm income exists in farm households. In this study, the binary logit model is applied and focuses on identifying the correlation between non-farm income and other controlled variables as quantitative indicators. The following equation of the binary logit model is employed:

$$Log\left(\frac{(Prob\ (y=1))}{(Prob\ (y=0))}\right) = \sum_{k=1}^{K} \beta_k x_k \tag{1}$$

$$where\ Y: non\text{-}farm\ income\ reported\ (=1), otherwise\ (=0)$$
$$X: n \times k\ Independent\ Variable\ Matix$$
$$\beta: k \times 1\ Model\ Parameters\ Vector$$

Using equation (1), this study applies the extended decomposition method[3], paying special attention to the application of the maximum likelihood estimation (Fairlie, 2005; Fairlie & Robb, 2017). Detailed explanation about the extended decomposition method is in Fairlie (2005, Pp. 306-309), so we

---

[3] The decomposition technique that is applied in this paper is an adaptation of the Blinder-Oxcaca method (Blinder, 1973; Oaxaca, 1973), which has been employed in diverse disparity studies in the maximum likelihood estimation (Ault et al., 1991; Jackson & Lindley, 1989; Wachter & Megbolugbe, 1992; Ha & Lee, 2001a; Ha & Lee, 2001b).

will not reiterate these points here. In a cross-sectional analysis, control group is the sample from the area where the program had been implemented, and treatment group is the sample from the area where the program had not been implemented. In contrast, in a longitudinal perspective, control group is the sample in the area after the program had been implemented, and treatment group is the sample in the area before the program had been implemented.

3.1 Data and variables

The data for the analysis are drawn from the 100% Korea Agricultural Census of the two different years, 2000, when the RTTV was not enforced, and 2015, six years past after the program had been completed. The data that were generated from the census contain a set of individual and household characteristics at the micro-level, which allow us to discern whether the observations are in the regions where the program had been implemented.

The original census data consist of 1,383,468 farm households in 2000 and of 1,235,561 farm households in 2015. The data maintain the principle of complete enumeration survey, and the data of the present study is confined to 150 local villages that are located within the Eup and Myeon level administrative districts[4], where the RTTV had been implemented from 2002 to 2009. In the longitudinal study, sample sizes are 129,648 and 138,261 for before and after the project implementation, respectively. In the cross-sectional study, sample size for the participated area is 138,261 and that for the non-participated area is 1,096,300 in 2015.

We selected the probable determinants to affect non-farm income, which were based on the previous literature and on information available in the census. Table 1 displays an explanation of dependent and independent variables for our regression models.

The construction of variables can be divided into two parts. One is determining the dependent variable as the evaluation index regarding the "impact on what?" As illustrated in the previous section, since the RTTV focuses mainly on tourism-related means to improve the rural living standard through an increase in the non-farm income, this study utilizes non-farm income of farm households as a primary indicator of evaluation. Furthermore, this selection is because discrete characteristic of non-farm income is not only quantifiable variable in hand but also because non-farm income plays a crucial role in the evaluation of the program's effectiveness. Furthermore, this indicator is a top priority of the intended outcomes of the program, as explained in Figure 1. Because there is no linear information

---

[4] This study excludes the farm households that are in the level of Dong districts from the samples. In the Korean *administrative system,* Eup, Myeon, and Dong are the smallest and are primarily administrative areas. Generally, Eup and Myeon units are distributed in rural regions; in contrast, Dong is an administrative unit that is distributed in urban areas.

regarding non-farm income in the Korean Agricultural Census due to the protection of personal information by law, the variable simply reflects whether there has been non-farm income for farming households in the year before the census. Inevitably, we position this study as an investigation of activating farm households to obtain non-farm income (yes-no) as the dependent variable.

<Table 1> Explanation of Variables

Variable		Description
Dep.		Non-farm income reported (=1), otherwise (=0)
Policy		Implemented=1, Non-implemented=0
		After Policy=1, Before Policy=0
Age		Age (year)
Gender		Male=1, Female=0
No. of HH Members		Number of Household Members (person)
Education Level	Edu1	Below HS Diploma=1, Otherwise=0, (ref.)
	Edu2	High-school Diploma=1, , Otherwise=0
	Edu3	Above High-school Diploma=1, Otherwise=0
Career on Agriculture		Career on Agriculture (years)
Asset	Computer	Possession of Computer=0, Otherwise=0
	Truck +	Possession of Truck or Full-sized Car =0, Otherwise=0
Major Crop	Vegetable/Upland Crop	Vegetable/Upland Crop=1, Otherwise=0 (ref.)
	Fruit/Flower	Fruit/Flower=1, Otherwise=0
	Livestock/Etc.	Livestock/Etc.=1, Otherwise=0
	Rice	Rice=1, Otherwise=0
Rurality		Eup (More modernized part in rural area)=1, Myeon (Less modernized part in rural area)=0

The other part of constructing variables is postulating independent variables to identify the "impact of what?" By grasping which properties of a household would positively affect the increase in non-farm income, it is possible to interpret causal effects of the program and to provide future indications to policies that are aimed at boosting rural income. In particular, based on the estimated coefficients, decomposition results can be calculated. In this sense, unlike monitoring processes that addresses implementation- and performance-related indicators, this evaluation procedure incorporates several characteristics of the household and householder. All the independent variables in this analysis can be divided into three categories: demographic, socio-economic, and regional/agricultural variables,

as explained in Table 1.

4.   Results

4.1. Regression Results

The regression result of the longitudinal analysis in the first column in Table 2 describes the causal effect of independent variables on the probability of earning non-farm income among farm households in the longitudinal perspective. The results of the probability of earning non-farm income models, which were estimated for before- and after-program implementation, are acceptable with respect to efficiency and direction of the controlled independent variables. The regression result in the second column in Table 2 indicates the causality of independent variables to non-farm income for farm households in the cross-sectional perspective. The interpretation of the coefficients is used to determine the causal effect on non-farm income in program-implemented regions and not-implemented regions.

Most independent variables in both models that affect non-farm income are satisfied with our expectation and are statistically significant at $p < 0.01$ (Table 2). The results of the independent variables are exactly identical for both models except one crop variable (Rice). The likelihoods of non-farm income are higher for the after-implemented samples in the longitudinal analysis and the program implemented samples in the cross-sectional analysis than those in the counterparts (Policy). The probability of non-farm income decreases as the householder's age (Age) and length (in years) of the agricultural career of the householder (Career) increases, regardless of program implementation. The propensity to earn non-farm income is lower when the household head is male (Gender). The larger the number of family members (HHnumber), the higher the non-farm income would be. This variable implies that more family members represent a more diverse division of labor to incur additional income for the farm households. The coefficients for two education variables (Edu1, Edu2) show that the probability of the non-farm income is higher for the more educated farmers than the less educated farmers.

Computer usage (Computer) has a positive effect on non-farm income, which is parallel to the previous finding (Hwang and Lee, 2015). The chance of earning non-farm income other than agricultural products is also augmented by computer usage because the capability of a computer enlarges the chance of getting a job outside of the agricultural sector. In general, the application of a computer via internet communication is a vital instrument to connect farmers' agricultural products directly with urban consumers. However, the capability also enlarges the chance of earning from other resources as well. The ownership of large vehicle (Truck) shows a negative sign to trigger non-farm income because the vehicle is primarily used to transport agricultural products and is less related to generating non-farm income.

12

Because agricultural income is, on average, high for such crops as fruit and flower (Type2) and livestock (Type 3) in Korea, the probability of obtaining non-farm income is much less for the farmers who are primarily engaged in non-profitable crops, such as vegetables. However, the probability of non-farm income for farmers who cultivate rice (Rice) is less for the post-implemented sample and higher for the non-implemented samples. The district (Eup) also shows a positive association with the probability of non-farm income because more urbanized areas provide better job opportunities than less urbanized areas (called, Myun) in rural districts outside of the agricultural sector (cf. Rurality).

<Table 2> Results of Binary Logit Regression

		(1) Longitudinal Comparison : 2000 and 2015		(2) Cross-sectional Comparison : Program-implemented regions and Not	
Intercept		0.7952	***	1.8189	***
Policy		0.9083	***	0.2060	***
Age		-0.0229	***	-0.0435	***
Gender		-0.1718	***	-0.1095	***
No. of HH Members		0.4203	***	0.5094	***
Education Level	Edu2 -	0.0380	***	0.0143	**
	Edu3	0.0953	***	0.0359	***
Career on Agriculture		-0.0135	***	-0.0101	***
Asset	Computer	0.3069	***	0.3356	***
	Truck +	-0.0932	***	-0.1058	***
Major Crop	Fruit/Flower	-0.2215	***	-0.2769	***
	Livestock/Etc.	-0.3189	***	-0.4272	***
	Rice	-0.0030	*	0.0428	***
Rurality		0.0760	***	0.2570	***
	N	267,909		1,234,561	
	-2LL	349,357		1,606,783	
	AIC	349,359		1,606,785	
	SC	349,369		1,606,797	

Note: $p<0.01$ ***, $p<0.05$ ***, $p<0.10$ ***

4.2. Decomposition on earning non-farm income

Table 3 shows the observed difference, the endowment effect, and the residual difference,

which are modified in accordance with coefficient estimates of the logit models that are shown in Table 2. Our computations indicate that the observed values of earning non-farm income are higher for the post-implemented sample (38.23%) than for the pre-implemented sample (33.12%), and the implemented areas (38.23%) than for the not-implemented areas (35.20%), respectively.

The results of the first column shows the decomposition of the total difference (0.0511) between the post-implemented sample and pre-implemented sample into the endowment effect (-0.1322) and the residual difference (0.1833). The results of the second column show the decomposition of the total difference (0.0303) between implemented areas and not-implemented areas into the endowment effect (-0.0089) and the residual effect (0.0392). These results imply that the contribution of endowed resources of our independent variables to earn non-farm income is negative, which is explained by the different characteristics of independent variables between the groups for both models

A negative endowment effect implies that characteristics of independent variables to earn non-farm income for post-implemented sample are less favorable than those characteristics of the pre-implemented sample. In contrast, the positive residual effect may represent direct and indirect program effects to enhance the chance of earning non-farm income (358.40%) for the post-implemented sample. This result may provide evidence to evaluate the impact of the policy positively because the program had been practiced in the areas that lack endowed human and physical resources and had generated a positive net effect on earning non-farm income.

The differences in independent variables for two samples can be interpreted as a maturation effect over time. However, our finding indicates that if the government intervention had been implemented in 2000 for the program-implemented areas, the positive causal effect to increase non-farm income between independent variables and dependent variable would be higher. In this regard, the negative judgment regarding the endowment effect does not originate from the maturation effect of regional endowed resources. Rather, environmental and structural factors of the implemented areas could have been deteriorated over time. This observation could also be associated with the fact that the living environment in rural areas has been worsened; furthermore, coupled with changes in the external agricultural environment, such as FTA and UR, the competitiveness in rural areas has been vanished. Therefore, it is expected that the probability of increasing non-farm income would be noticeably lower, had the program not been implemented during the actual implementation period.

<Table > Results of Extended Decomposition Method

			(1) Longitudinal Comparison	(2) Cross-sectional Comparison
			: 2000 and 2015	: Program-implemented regions and Not
Participants (A)			**0.3823**	**0.3823**
Non-participants (B)			**0.3312**	**0.3520**
Difference, (A)-(B)			**0.0511**	**0.0303**
			100.00%	**100.00%**
Contribution				
	Residual Effect		**0.1833**	**0.0392**
			358.40%	**129.31%**
	Endowment Effect		**-0.1322**	**-0.0089**
			-258.40%	**-29.31%**
		Age	-0.0523	-0.0006
			0.0000	0.0002
			-102.16%	**-1.92%**
		Gender	0.0056	-0.0002
			0.0000	0.0000
			11.00%	**-0.72%**
		No. of Household Members	-0.0809	-0.0039
			0.0000	0.0003
			-158.11%	**-12.81%**
		Education Level	0.0000	0.0000
			0.0000	0.0000
			-0.03%	**0.08%**
		Career on Agriculture	-0.0078	-0.0011
			0.0000	0.0001
			-15.18%	**-3.77%**
		Asset	0.0050	-0.0007
			0.0000	0.0001
			9.76%	**-2.36%**
		Major Crop	-0.0018	0.0029
			0.0000	0.0001
			-3.60%	**9.56%**
		Level of Rurality (Eup/Myeon)	0.0000	-0.0053
			0.0000	0.0001
			-0.07%	**-17.36%**

A negative endowment effect implies that characteristics of independent variables to earn non-farm income for the implemented areas are less favorable than those characteristics of the not-implemented areas. The results also imply that endowed resources of the control group would produce a higher interaction effect with the program implementation. Specifically, the hypothetical estimate would have been higher than the expected probability of non-farm income in program-implemented areas, had the program been enforced in the areas where program had not been implemented. In contrast, the positive residual effect may represent direct and indirect program effects that enhance the chance of making non-farm income (129.31%) in the program-implemented areas. Beyond the blind obedience of efficiency, this result may provide evidence to evaluate the impact of the policy positively because the program had been practiced in the areas lacking endowed human and physical resources and had generated a positive net effect on earning non-farm income. In summary, from a cross-section perspective, the policy to enhance the chance of earning non-farm income has much more positive and effective influence on farmers who reside in the program-implemented areas with less competent characteristics of making non-farm income.

Along with this assessment, the results of the longitudinal analysis that are presented in Table 3 make it possible to determine that the timing of the program implementation and the selection of implementation areas are quite appropriate. If there had been no government intervention, such as the RTTV, then the program-implemented areas could have difficulties in promoting economic opportunities, such as earning non-farm income, due to a lack of competitiveness against other areas and a deterioration of its own income conditions.

5. Discussion and key conclusions

Public programs are designed to achieve given objectives and outcomes, and ascertaining whether the program accomplishes the intended goals is one of the key factors for guaranteeing public welfare (Bovens and Hart, 2012). In this sense, an increasing demand for social benefits necessitates an evaluation of intended outcomes and institutionalization of program assessment that emphasizes ex-post evaluation and feedback processes. Moreover, the period of developmental dictatorship produced challenges in spatial policy by widening rural-urban disparity. The imbalances yielded a dichotomous perception that described urban and rural areas and still is a barrier for the efficient use of resources and social integration. The newly developed agricultural and rural policy paradigm appeared in such an environment to revitalize the rural society to achieve social cohesion. The RTTV program in Korea stands as the exemplary component of the policy paradigm. In this sense, there has been increasing interest in the incisive evaluation of this program to consolidate the validity of political investment and to investigate the effectiveness of the new policy paradigm.

This study conducts an ex-post evaluation on the outcomes after the termination of the program.

This study constructs a quantitative model that is based on the program logic model, which is a stepping-stone to understand the program and its evaluation mechanism. This study adopts farm households' non-farm income as an ex-post quantifiable indicator and then assesses the impact of the program on this indicator. The effect of the RTTV, which was enforced by the Korean central government, is evaluated positively and effectively in both the cross-sectional and longitudinal perspectives. The findings of this study can be summarized as follows.

In a cross-sectional analysis that compares the program-implemented areas with the not-implemented areas, the chance of earning non-farm income is slightly higher for the program-implemented areas than for the not-implemented areas. Decomposing the total difference (0.0303) in the probability of non-farm income between program-implemented areas and not-implemented areas, the endowment effect is explained by -0.0089, and the residual effect is 0.0303. This result implies that the contribution of endowed resources of our independent variables to earn non-farm income is negative (-29.31%), which is explained by the different characteristics of independent variables between the groups. A negative endowment effect implies that characteristics of independent variables to earn non-farm income for the implemented areas are less favorable than those characteristics of the not-implemented areas. The results also imply that endowed resources of control group would produce a higher interaction effect with the program implementation. In contrast, the positive residual effect may represent direct and indirect program effects that enhance the chance of earning non-farm income in the program-implemented areas. The results may provide evidence to evaluate the impact of the policy positively because the program had been practiced in areas lacking endowed human and physical resources and had generated a positive net effect on earning non-farm income.

In a longitudinal perspective, this study found that the observed value of earning non-farm income is much higher for the post-implemented sample than for the pre-implemented sample. The estimated values of non-farm income for both samples are slightly different from the observed values, which, again, confirm the construction validity of our regression models. When decomposing the total difference (0.0511) between the post-implemented sample and the pre-implemented sample, we found that -258.40% is attributable to endowment effect and 358.40% is explained by residual difference between the samples. A negative endowment effect implies that characteristics of independent variables to earn non-farm income for post-implemented sample are less favorable than those characteristics of the pre-implemented sample. In contrast, the positive residual effect may represent direct and indirect program effects that enhance the chance of earning non-farm income for the post-implemented sample. This result may provide an evidence to positively evaluate the impact of the policy because the program had been practiced in areas lacking endowed human and physical resources and had generated a positive net effect on earning non-farm income.

Based on the results of our analysis, we concluded that the effect of the RTTV is positive. This

result should be an encouraging one for the policymakers who designed the program, and it confirms the important role rural policy can play in improving living conditions in rural areas. In light of the fact that disparity between urban and rural areas in Korea has been increasing, efforts to reduce poverty in rural areas must continue. While improved access to capital via government subsidies such as the RTTV can help spark economic vitality in rural areas, rural communities can also use local cultural and historical amenities to shape development strategies. Recently, Korea has successfully promoted some traditionally poor regions as tourist and retirement destinations driven largely by diverse government programs.

The Korean government has also initiated programs promoting the more tangible products that emerge from its rural commodities. The incumbent regime in Korea propagates so-called "creative economies" to restructure the national economy and champions the potential of such industries in contributing to rural economic development strategies. However, the lack of a neutral evaluation system may result in deviation from the intended objectives of government policy. Government must therefore be aware that impact evaluations of policies can provide an objective basis for understanding problems and guide future directions for existing policy. Thus, institutionalized establishment of an objective policy evaluation process based on quantitative methods is necessary, as exemplified by a diversity of international agencies (Walker et al., 2010; Winters et al., 2011; World Bank, 2010).

References

Ault, R. W., Ekelund, R., Jackson, J., Saba, S., & Daurman D. (1991). Smoking and absenteeism. *Applied Economics*, 23(4), 743-754.

Blinder, A. (1973). Wage discrimination: reduced form and structural estimates. Journal of Human Resources, 8(4), 436-455.

Bovens, M., & Hart, P. (2012). Assessing policy outcomes: social and political biases. 291-319. *Public policy*, (eds.) Hupe, P., & Hill, M. 3. Sage.

Brandth, B., & M. S. Haugen. (2011). Farm diversification into tourism: implications for social identity. *Journal of Rural Studies*, 27(1), 35-44.

Campbell, D. T., Stanley, J. C., & Gage, N. L. (1963). *Experimental and quasi-experimental designs for research* (pp. 171-246). Boston: Houghton Mifflin.

Cave, J., Gupta, K., & Locke, S. (2009). Supply-side investments: an international analysis of the return and risk relationship in the travel & leisure sector. *Tourism Management*, 30(5), 665-673.

Cawley, M., & Gillmor, D. A. (2008). Integrated rural tourism: concepts and practice. *Annals of Tourism Research*, 35(2), 316-337.

Cawley, M., Halseth, G., Markey, S., & Bruce, D. (2009). Adding value locally through integrated rural tourism: lessons from Ireland. *The next rural economies: constructing rural place in global economies*, 89-101.

Choi, K. H. (2001). Future direction of non-farm income policy: focused on industrial complex of agriculture. *Journal of Rural Development*, 24(2), 119-137. Korea Rural Economic Institute. (In Korean)

Devine, A., & Devine, F. (2011). Planning and developing tourism within a public sector quagmire: lessons from and for small countries. *Tourism Management*, 32(6), 1253-1261.

Fairlie, R. W. (2005). An extension of the Blinder-Oaxaca decomposition technique to logit and probit models. *Journal of Economic and Social Measurement*, 30, 305-316.

Fairlie, R. W. & Robb, A. M. (2017). Why are Black-owned businesses less successful than White-owned businesses? The role of families, inheritances, and business human capital. *Journal of Labor Economics*, 25(2), 289-323.

Feiock, R. C., & Stream, C. (2001). Environmental protection versus economic development: a false trade-off?. *Public Administration Review*, 61(3), 313-321.

Fleischer, A., & Felsenstein, D. (2000). Support for rural tourism: does it make a difference?. *Annals of Tourism Research*, 27(4), 1007-1024.

Getz, D., & Page, S. J. (1997). Conclusions and implications for rural business development. 191-205. *The business of rural tourism: international perspectives*, (Eds.) Page, S., & Getz, D. Cengage Learning EMEA.

Guba, E. G., & Lincoln, Y. S. (1981). Effective evaluation: improving the effectiveness of evaluation results through responsive and naturalistic approaches. *California: Sage Publications*.

Ha, S. K., & Lee, S. W. (2001a). The effects of lop-sided regional policy and social prejudice on homeownership disparities in Seoul, Korea. *Journal of the Korean Regional Development Association*, 13(2), 33-56. (In Korean)

Ha, S. K., & Lee, S. W. (2001b). IMF and the crisis of the marginalized urban sector in Korea. *Journal of Contemporary Asia*, 31(2), 196-213.

Hwang, J. H. & Lee, S. W. (2015). The effect of the rural tourism policy on non-farm income in South Korea. *Tourism Management*, 46, 501-513.

Jackson, J. D., & Lindley, T. J. (1989). Measuring the extent of wage discrimination: a statistical test and a caveat. *Applied Economics*, 21(4), 515-540.

Jae, G. D. (2009). Integrating levels of analysis on evaluation research: association between micro and macro level. *Korean Journal of Policy Analysis and Evaluation*, 19(4), 15-41. (In Korean)

Kaitibie, S., Omore, A., Rich, K., & Kristjanson, P. (2010). Kenyan dairy policy change: influence pathways and economic impacts. *World Development*, 38(10), 1494-1505.

Kannan, D., & Singh, V. (2006). Management for successful agro-tourism in India. *Paper presented at the Asian Productivity Organization Seminar,* 20-27, Taiwan, ROC.

Khandker, S. R., Koolwal, G. B., & Samad, H. A. (2010). *Handbook on impact evaluation: quantitative methods and practices*. World Bank Publications.

Kim, H. B. (2008). Balanced national development policy on participatory government. *Korean Public Administration Review*, 42(3), 313-332. (In Korean)

Knowd, I. (2001). Rural tourism: panacea and paradox exploring the phenomenon of rural tourism and tourism's interaction with host rural communities. *Geography Teachers' Curriculum Workshop*.

Lacombe, D. J. (2004). Does econometric methodology matter? an analysis of public policy using spatial econometric techniques. *Geographical Analysis*, 36(2), 105-118.

Lane, B. (1994). What is rural tourism?. *Journal of Sustainable Tourism*, 2(1-2), 7-21.

Lee, H. J. (2009). Changes in rural policy paradigm and rural development project in Korea - a study based on 'integrated rural village development project. *Rural Society*. 19(1).,7-47. (In Korean)

Lee, S. W., & Kim, H. J. (2010). Agricultural transition and rural tourism in Korea: experiences of the last forty years. 37-64. *Agricultural Transition in Asia* (eds.) Thapa, G. B., Viswanathan, P. K., Routray, J. K., & Ahmad. Bangkok, M. M. Thailand.

Lee, S. W., & Kim, H. J. (2011). The effects of rural settlement projects on the living environment in Korea. *Harvard Asia Quarterly*, 13(3), 6-13.

Lee, S. W., & Yun, S. D. (2008). Quantitative approaches for agricultural and rural policy evaluation. *Journal of Korean Society of Rural Planning*, 14(4), 97-108. (In Korean)

Lee, S. W., Park, J. Y., Min, S. H., & Yoon, S. D. (2005). *Practices of logit and probit models*. Parkyoungsa. Seoul, Korea. (In Korean)

Leeuw, F. L. (2003). Reconstructing program theories: methods available and problems to be solved. *American Journal of Evaluation*, 24(1), 5-20.

Leeuw, F. L., & Vaessen, J. (2009). *Impact evaluations and development: NONIE guidance on impact evaluation*. Network of networks on impact evaluation.

Liu, A. (2006). Tourism in rural areas: Kedah, Malaysia. *Tourism Management,* 27(5), 878-889.

Logar, I. (2010). Sustainable tourism management in Crikvenica, Croatia: an assessment of policy instruments. *Tourism Management*, 31(1), 125-135.

Maredia, M., Byerlee, D., & Anderson, J. R. (2000). *Ex post evaluation of economic impact of agricultural research programs: a tour of good paradise*.

McDavid, J. C., & Hawthorn, L.R. (Eds.). (2006). *Program evaluation and performance measurement: an introduction to practice*. Sage.

McNamara, P. E. (1999). Welfare effects of rural hospital closures: a nested logit analysis of the demand for rural hospital services. *American Journal of Agricultural Economics*, 81(3), 686-691.

Oaxaca, R. (1973). Male-female wage differentials in urban labor markets. *International Economic Review,* 14(3), 693-709.

Ohe, Y. (2006). On the relationship between multifunctionality and hamlet activities as a rural institution. *The Japanese Journal of Rural Economics,* 8, 41-57.

Ohe, Y. (2007). Multifunctionality and rural tourism: a perspective on farm diversification. *Journal of International Farm Management*, 4(1), 18-40.

Park, D. B., & Yoon, Y. S. (2009). Segmentation by motivation in rural tourism: a Korean case study. *Tourism Management,* 30, 99-108.

Park, J. D. (2005). *WTO and agricultural policy reform*. Hanul. (In Korean)

Ryu, S., Cho, J., & Lee, S. W. (2006). The impact of computer applications on the improvement of farm household income. *Korean Journal of Policy Analysis and Evaluation*, 12(3), 81-95. Korean Association for Policy Analysis and Evaluation. (In Korean)

Sadoulet, E., & De Janvry, A. (1995). *Quantitative development policy analysis* (pp.112-139). Baltimore: Johns Hopkins University Press.

Seong, J. G., Cho, L. H., Lee, T. H., & Min, S. K. (2004). *New agricultural policies of Korea: proposal to change the paradigm*. Samsung Economic Research Institute. (In Korean)

Shadish, W. R., Cook, T. D., & Leviton, L. C. (1991). *Foundations of program evaluation: theories of practice*. Sage.

Sharpley, R. (2002). Rural tourism and the challenge of tourism diversification: the case of Cyprus. *Tourism Management*, 23(3), 233-244.

Sharpley, R., & Vass, A. (2006). Tourism, farming and diversification: an attitudinal study. *Tourism Management,* 27(5), 1040-1052.

Vedung, E. O. (1995). *Public policy and program evaluation*. Transaction Publishers.

Wachter, S. M., & Megbolugbe, I. F. (1992). Impacts of housing and mortgage market discrimination racial and ethnic disparities in homeownership. *Housing Policy Debate*, 3(2), 332-370.

Walker, T., Ryan, J., & Kelly, T. (2010). Impact assessment of policy-oriented international agricultural research: evidence and insights from case studies. *World Development,* 38(10), 1453-1461.

Walker, W. E. (2000). Policy analysis: a systematic approach to supporting policymaking in the public sector. *Journal of multi-criteria decision analysis,* 9(1-3), 11-27.

Wang, C., & Xu, H. (2011). Government intervention in investment by Chinese listed companies that have diversified into tourism. *Tourism Management,* 32(6), 1371-1380.

Winters, P., Maffioli, A., Salazar, L., 2011. Introduction to the special feature: Evaluating the impact of agricultural projects in developing countries. Journal of Agricultural Economics 62(2), 393-402.

Woods, M. 2005. Rural Geography. Thousand Oaks, USA, Sage Publications.

World Bank, 2010. Handbook on Impact Evaluation: Quantitative Methods and Practices. Washington D.C., The World Bank.

World Bank, 2009. World Development Report: Reshaping Economic Geography. Washington D.C., The World Bank.

Yang, N. J. (2009). A policy implementation analysis on the care voucher for the age: focusing on choice and competition. *Korean Journal of Social Welfare,* 61(3), 77-101. (In Korean)

Zapata, H. O., Sambidi, P. R., & Dufour, E. A. (2007). Choice models in policy analysis. In *Southern Agricultural Economics Association Annual Meetings, February, Mobile, AL.*