

Print ISSN: 1738-3110 / Online ISSN 2093-7717
<http://dx.doi.org/10.15722/jds.15.7.201707.5>

Input-Output Analysis on the Economic Effect of the Korean Traditional Retail Market Supporting Project

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Received: May 12, 2017. Revised: May 22, 2017. Accepted: July 15, 2017.

Abstract

Purpose – This study analyzes an economic effect on the project that Korean government supported for the vitalization of traditional markets using an input-output model. From 2002 to 2013, the government provided 180.8 billion won for a Management Modernization Project and 2.851 trillion won for a Facility Modernization Project for vitalization of traditional markets.

Research design, data, and methodology – The present study conducted inter-industry analysis by matching industries related to the Traditional Market Project for the measurement, and calculated the ripple effect of each project.

Result – The results from the study showed that from 2002 to 2012, the Management Modernization Project and Facility Modernization Project showed a 296.1 billion won effect on production inducement, a 158.7 billion won value-added inducement effect, and a 3,135-person effect on employment inducement in total. From 2002 to 2013, the Facility Modernization Project showed a 6.948 trillion won effect on production inducement, a 2.1109 trillion won effect on value-added inducement, and 40,209-person of effect on employment inducement in total.

Conclusions – This study provided an empirical demonstration of a clear effect of the governmental support to traditional markets on developing regional economies. In particular, this study empirically analyzed and presented that there were a considerable amount of an economic effect by region due to governmental policy support to traditional markets.

Keywords: Input-Output Analysis, Economic Effect, Traditional Retail Market, Distribution Market.

JEL Classifications: D04, C67.

1. Introduction

After Korean distribution market was completely opened in 1996 and property ownership by foreigners was allowed from 1998, traditional markets have been gradually reduced in size as syndicated superstores began to enter the domestic market. Not only has the penetration of superstores acted as an unfavorable factor, but also has that of syndicated supermarkets, activation of e-commerce, and so on in recent years (Nam, 2016). The reduction of purchase base of the traditional markets leads to anxiety for

numerous small-sized merchants and independent businessmen who work in the traditional markets. This also serves to amplify social conflicts. Accordingly, in order to save the traditional markets, the government has conducted a policy of supporting traditional markets, which modernizes facilities that have fallen behind and supports management innovation of merchants. Since the first establishment of the market management supporting center in accordance with Article 43, “Special Law for Activation of Conventional Markets,” in 2005, the government has systematically conducted a Supporting Project for Vitalization of Traditional Markets, which is a basis for the ordinary economy. With the amendment of “Special Law for Activation of Traditional Markets and Shopping Streets” in December 2009, more active Supporting Project was developed by establishing a Small Enterprise and Market Service in 2014. The Main Project by the government is conducting for the support to

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vitalization of traditional markets can be categorized largely into a Facility Modernization Project and Management Modernization Project. In detail, there are consultations, counseling, and guidance on stores; education and training on advanced distribution techniques such as management of merchants in markets and modernization of commerce; and research and study on the Market Vitalization and Market Renewal Project, and the Marketing and Advertising Support Project, for an increase in the number of customers and the amount of sales. Although the amount of turnover is decreasing due to the worsening external environment of traditional markets in the distribution market, this kind of Vitalization Supporting Project is evaluated as minimizing the external shock through enforcement of internal capability.

Some researchers have conducted studies analyzing the economic effect aimed at particular traditional markets (An, 2008; Lee & Song, 2011; Song et al., 2012). In addition, Park et al. (2006) conducted analysis on direct outcomes of the Supporting Project in Vitalization of Traditional Markets. However, an overall analysis on public economic effect of the Project or employment creation effect has not been conducted. Researches related to revitalization of traditional market are conducted by many scholars such as Lee and Kim (2013), Kim and Kim (2013), Kim and Kim (2013). These researches mostly handled on the revitalization of local economy and local cultural tourism business in marketing approach to deal with the economic collapse of local areas. The Korean government has provided financial support about two trillion won for traditional markets to modernize facilities (SMBA, 2015). However, Korean parliament pointed out that the financial support for traditional markets was wasting national budget. So far, the efforts of revitalization of traditional markets are conducted by the Korean government to facility-focused support. But Kim and Kim (2013) indicated that there have been little efficient supports by "selection" or "focus", and there have been few support policies suited to the features of the traditional market. Despite the significance of the economic effect of traditional market supporting project, there is a gap in the previous literature, ignoring the necessity of the economic effect of traditional market.

Accordingly, this study will discuss the effect of the Supporting Project for Vitalization of Traditional Markets by calculating the public economic effect through inter-industry analysis. This study analyzes the economic effect and employment creation effect focusing on the Management Modernization Project and Facility Modernization Project, which are the biggest among Supporting Projects in Vitalization of Traditional Markets and have various ranges in support out of all. Employment creation effect of each Supporting Project on Vitalization of Traditional Markets by region is calculated, applying the results from industrial-related analysis.

2. Literature Review

2.1. Government-supported Management and Facility Modernization Project

The Management Modernization Project can largely be categorized into Management Improvement, Commerce Promotion, Merchant Education, Market Management, and Market Research and Consulting Projects.

<Table 1> Management Modernization Project

Category	Name of project
Management improvement	Modernization of management (logo, packing container), support on joint marketing, support on issuing joint gift cards (coupons), green clean market, performance by university clubs, practical use of empty stores, fostering demonstrative market, market ours, exhibition of good market products, support for disinfected overgarments, demonstrative stores in hygiene cleanness, support for events/ advertising, support for sales at special prices, development of advertisement flyers, and joint project on functional improvement
Commerce promotion	Fostering culture touristic markets, support for activation of commerce
Merchant education	Tailored short-term education, special lectures, merchant university, education on operating the market, workshop, education on informatization.
Market management	Market Manager Project (support for retired personnel), park aid (valet parking).
Market research and consulting	Research and services, consultation, and guidance for stores.

Source: Internal materials from Small Enterprise and Market Service (2013).

The Management Improvement Project is focused on marketing and various kinds of publicity support of traditional markets. Details of the project are as follows. The Joint Marketing Project supports public relations for increasing customers and sales, issuing joint coupons, on sale and giveaway events, and marketing activities. Market tours help consumers in the big city to come into the market more by developing and operating tourism products linked to local cultural tourism resources and special products. Group purchasing and bargain sales aim to build customer recruitment of traditional markets and self-help ability of merchants by selling the main items consumers prefer and cross selling special products among locals. The Local Traditional Market Development Project promotes traditional markets matching local characteristics by utilizing support know-how of local governments. The National Excellent Market Fair encourages changes and promotes good images of traditional markets by offering a vision, awarding a prize to outstanding markets and merchants, and displaying excellent products. Supporting traditional market global public relations encourages changes of traditional markets and advertises the changed images to attract foreign residents in

Korea and foreigners, as well as new customers from overseas. The Excellent Market Product Exhibition promotes information exchange among merchants in the region by advertising excellent products in excellent markets by region. Activation of market product information helps customers visit more traditional markets and promotes changes of merchants by offering information, such as supporting policies for traditional market, best cases, and distribution environment changes, and so on. Business District Development Project is focused on promoting cultural tourism markets and supporting activation of business area. Cultural Tourism Market Development Project aims to create a success model and result diffusion by building traditional culture experience centers, theme tour streets, cultural performing places, and shops selling special products, as well as supporting developing cultural tourism contents and tourism products and building parcel delivery system comprehensively. Supporting activation of business districts is a project of developing the center area to be the main of local economy and community by activating traditional markets and adjacent areas comprehensively. The Merchant Education Project runs various educational and training programs for expanding human capital, which promotes changes such as improving merchant consciousness, service and products, and so on in traditional markets. The Market Management Project is focused on for the Market Manager Project to support retirement personnel, including projects such as parking assistant support. The Market Research and Consulting Project researches the actual condition of traditional markets, such as activating local business areas and traditional markets, branding strategy, and problems with structural changes in business areas based in regional centers. It also provides stores with guidance to achieve

excellence as well as expert consulting for systematic market development.

The history of government support for the Management Modernization Project shows variations by year. However, it was about KRW 24 billion in 2010–2011 and KRW 32.5 billion in 2012, and the total amount of it for the eleven years of 2002–2012 was KRW 180.8 billion. Although the scale of support was not as large as 1 billion won per year before 2005, the annual support level reached nearly 30 billion in 2007 as support for the Traditional Market Management Modernization Project gained traction in 2005. In 2008 and 2009, the size of support temporarily decreased, but the support projects have been active again since 2010.

According to the types of project support for the Management Modernization Project in 2002–2012, the government accounts for 68%, the local cost is 23%, and the private investment is 9%. The scale of government expense is the largest by detailed Project, merchant education is operated only at 100% of it, and business district development is the lowest at 60% of it. The project with the largest private investment ratio is the Management Improvement Project, which is funded by private investors at 16% of the project cost, and its amount is the largest, at 15.1 billion won. The project in which the most local expenses are invested is Business District Development Project, where 39% of working expenses, about KRW 19 billion of local expenses, were met locally. Gyeonggi-do had the highest amount (22.82 billion won) in the Management Modernization Project support in the 11-year period, followed by Chungcheongbuk-do, Busan, and Gangwon-do. The history of the support for the Management and Facility Modernization Project by the projects in detail is as follows.

<Table 2> The History of the Support of the Management Modernization Project (2002-2012)

(Unit: one hundred million)

	2002-2005	2006	2007	2008	2009	2010	2011	2012	Total
Kangwon-do	22.5	22.0	18.2	8.4	3.9	19.7	24.2	30.9	149.8
Kyunggi-do	31.9	52.5	27.1	22.8	13.9	17.0	27.0	36.0	228.2
Kyungsangnam-do	13.1	5.2	40.7	7.5	5.4	9.1	30.1	27.1	138.1
Kyungsangbuk-do	20.0	3.0	18.9	14.4	7.8	11.4	9.2	31.6	116.3
Kwangju City	1.3	17.6	2.6	2.2	2.0	17.2	4.7	3.3	50.9
Daegu City	8.2	13.9	11.8	7.6	5.1	7.3	8.8	18.1	80.7
Daejeon City	2.4	4.8	7.4	3.8	2.4	5.4	4.5	4.4	35.1
Busan City	24.5	12.4	17.3	10.9	8.3	24.6	31.6	27.4	157.0
Seoul City	10.8	4.2	11.0	10.0	10.9	14.5	19.1	29.8	110.2
Wolsan City	1.5	7.7	8.5	4.4	3.7	19.3	10.4	3.2	58.6
Inchon City	4.1	13.3	13.5	10.5	8.1	20.0	5.1	4.6	79.3
Jeonlanam-do	7.3	8.4	23.4	9.8	4.3	21.5	5.7	26.6	106.8
Jeonlabuk-do	3.0	44.7	19.9	7.3	4.9	5.4	4.9	16.2	106.4
Jeju City	7.5	10.6	14.7	6.4	3.1	19.7	10.4	11.2	83.6
Chungchengnam-do	24.6	12.8	10.1	6.1	4.0	20.3	23.4	26.4	127.8
Chungchengbuk-do	27.6	3.4	45.7	13.6	7.4	9.5	29.2	27.2	163.3
Other Country	0.0	2.8	1.9	4.4	1.8	1.9	0.1	2.4	15.4
All nations	210.3	239.4	292.8	150.1	96.9	243.7	248.4	326.0	1,807.6

Source: Internal materials of Small Enterprise and Market Service (2013).

<Table 3> The History of the Support of the Facility Modernization Project (2002-2012)

(Unit: one hundred million)

	2002-2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Kangwon-do	546	250	186	166	173	125	173	165	169	1,954
Kyunggi-do	626	128	230	242	221	224	186	181	158	2,197
Kyungsangnam-do	645	205	242	243	263	229	321	338	250	2,736
Kyungsangbuk-do	597	189	230	385	148	207	175	238	218	2,387
Kwangju City	167	97	83	100	117	83	167	150	73	1,037
Daegu City	336	104	203	242	153	143	175	174	123	1,651
Daejeon City	296	83	87	161	151	161	119	89	69	1,218
Busan City	486	110	108	176	133	167	167	167	192	1,705
Seoul City	445	126	204	236	290	240	156	155	162	2,014
Woolsan City	211	67	98	75	42	84	72	84	97	830
Inchon City	289	72	92	128	158	160	138	92	82	1,211
Jeonlanam-do	561	103	154	329	217	224	233	276	272	2,368
Jeonlabuk-do	464	119	359	414	319	172	193	165	96	2,301
Jeju City	376	43	88	70	54	48	81	79	85	924
Chungchengnam-do	525	286	259	198	316	145	131	166	130	2,155
Chungchengbuk-do	446	139	162	158	203	188	195	185	145	1,821
All nations	7,017	2,119	2,786	3,324	2,959	2,598	2,683	2,703	2,321	28,510

Source: Internal materials of Small Enterprise and Market Service (2013).

Later, it produces a ripple effect such as effect on production inducement and employment inducement based on this history of the project expense support. The Facility Modernization Project is focused on improving old facilities by establishing customer access and convenience facilities: parking lots, entrance roads, and arcades in traditional markets, repairing and maintaining of facilities, and replacement and improvement of electricity, gas, and fire-fighting facilities and so on. Depending on the facilities this project supports, it can be broadly divided into Infrastructure, Convenience Facilities, and Advertisement Facility Support Projects.

<Table 4> Facility Modernization Project

Project category	Name of project
Infrastructure	CCTV, streetlamp, gas facilities, establishment of distribution center, public facilities, others, interior remodeling, heating and cooling, broadcasting facilities, land purchase, water and sewage, fire-fighting facilities, interior lighting, arcade, elevator/escalator, exterior remodeling, electricity, communications facilities, access road, toilets.
Convenience facilities	Customer information center, customer parking lot, customer service area, shopping cart, childcare center, bicycle shed.
Advertisement facilities	Market public billboard, arch/sculpture, event square, themed streets.

Source: Internal materials of Small Enterprise and Market Service (2013).

The Facility Modernization Project aims at registration markets, recognized markets and shopping streets, in accordance with the "Special Law for Fostering Traditional Markets and Shopping Streets" and allows places that have

a merchant organization to submit an application and apply for to the project at city-, Gun- and Gu-levels through the merchant organization. Support is given according to priority as described below. For example, there are preservation of restoration expenses for damages on markets the previous year due to disasters; commerce vitalization district and culture touristic markets, which were designated by mayors, governors and heads of Gus establishing mid-long-term investment plans; modern public markets; and traditional markets that governor, mayor, and chief of Gu have agreed on and are in the process of carrying forward as an annual project; and markets planning an installation of parking lots in areas where procedures of change in city plan are not necessary. According to a breakdown of project expenses for the Facility Modernization Supporting Project, more than 200 billion won has been invested annually since 2005. The total amount of project expenses for the Facility Modernization Supporting Project from 2002 to 2013 reached 2.8510 trillion won. Total project expenses were the largest (332.4 billion won) in 2008, and slightly decreased afterwards; however, it has been increasing again since 2010. The Expenses for Base Facility Supporting Project form the largest part; however, parts in supports to convenience facilities and advertising facilities somewhat increased after the late 2000s.

According to a breakdown of governmental support to traditional markets from 2002 to 2013, the government had focused on modernization of the facilities rather than modernization of the management in the meantime. It is seen that modernization of the facilities, which can improve customer convenience through short-term support to arcades and parking lots, is intensively invested in because modernization of the management, such as innovation of consciousness of the merchants and improvement of

customer loyalty cannot be fostered in a short period. It seems that the direction of governmental support to traditional markets afterwards should be reorganized from expansion of infrastructure to modernization of the management in the center, which can facilitate increased customer loyalty and joint marketing.

According to the composition by categories of project expenses for the Facility Modernization Project from 2002 to 2013, government expenses took the largest, 68% (1.6548 trillion won), followed by regional expenses, taking 38% (1.891 trillion won), and private investment, taking 4% (109.9 billion won). Even by project in detail, the amount of the government expenses was the largest, at 58-62%. In case of support to convenience facilities, the proportion of regional expenses was relatively slightly higher, and in case of support for infrastructure, the proportion of private investment is analyzed as somewhat higher. When looking at the size of project expenses for support of the Modernization of Facilities by region from 2002 to 2013, Gyeongsangnam-do had the largest, with 273.6 billion won, followed by Gyeongbuk and Jeonnam. In contrast to the Management Modernization Project, the sizes of project expenses in Gyeonggi-do and metropolitan cities were similar to those of other regions. Breakdown of support of project expenses by region in each detailed project in the Facility Modernization Project is as follows. The breakdown of support of project expenses for modernization of facilities by region is used in calculating the ripple effects, such as production inducement effect and employment inducement effect of Supporting Projects in Modernization of Facilities, in Chapter 4.

2.2. Previous Research

Studies related to traditional markets are done by many researchers in a very wide field, covering business, economics, society, architecture, and design. However, it can be identified through preceding research that most studies deal with field of business and economics. However, there are barely any studies analyzing the systematic and extensive economic effect of the Governmental Supporting Project toward Traditional Markets, which started in 2002. Therefore, in this Chapter, studies that analyzed the ripple effect of governmental support to traditional markets on regional economy in the meantime will be reviewed.

Park et al. (2006) analyzed the economic effect of conventional markets on regional economies from the side of production and value-added inducement effect, and also proposed a subsequent front-back linkage effect. Park et al. (2006) mentioned that from 2002 to 2005, 73.7 billion won was loaned to 47 markets for Redevelopment and Reconstruction Project of Conventional Markets, 371.9 billion won for Facility Modernization Project, and 24.2 billion won for the Management Modernization Project. They also calculated about the following ripple effect. Park et al. (2006) analyzed the economic effect of governmental policy support

by selecting one conventional market located in each region after a making a regional input-output table targeting five regions (Incheon, Gangwon, Chungnam, Gyeongbuk, & Jeonnam). In terms of production inducement effect analyzed by each market, it is shown that the amount is 24.692 billion won in Incheon Singi market, 20.378 billion won in Chungnam Nonsan Hwaji Market, 33.204 billion won in Gyeongbuk Andong Central New Market, 9.717 billion won in Gangwon Hwaengsung Conventional Market, and 1.485 billion won in Jeongnam Gokseung 5-day Market. Similar to the production inducement effect, the value-added inducement and employment inducement effects also appeared to be higher in Incheon Singi Market and Chungnam Nonsan Hwaji Market compared to other markets. Song et al. (2012) analyzed the economic effect of the Munjeonseongsi Project, which is a Governmental Supporting Project to traditional markets, by applying input-output models between regions. They built their model using a regional input-output table from 2009 for the analysis. Then, they conducted research by running parallel surveys about merchants in traditional markets. According to the results, they argued that, with governmental support to traditional markets, the ripple effect on production is about 1.4 billion won, net value-added ripple effect is about 660 million won, and net ripple effect on employment is appeared to be three. Considering that the amount of governmental support to Bujeon Market in Busan is 500 million won, it is assessed that the economic effect of the Project is positive in the regional economy. Lee and Song (2011) estimated the economic effect of governmental support to traditional markets upon Suyu Town Market in Seoul. They used a regional input-output model to analyze economic effect of the Governmental Supporting Project to a specific market: Suyu Town Market in Seoul. Through the analysis, they concluded that there had been a 780 million won net production ripple effect, 330 million won net value-added ripple effect, and a 123 people net employment ripple effect.

Through analyzing results of existing research that analyzed economic effects of the governmental supporting policy on traditional markets, implications and limitations of existing work have been deduced as follows. First, there are limits in existing researches in that it is difficult to broadly interpret the study results regarding the entire Governmental Supporting Project because each study only analyzed economic effect of only one project or multiple projects supporting only one region (market). Therefore, it pointed that although all the existing analyzed studies indicated positive economic effects of the governmental support to traditional markets, they cannot reflect special conditions of other regions, since the analysis is limited to specific regions. Second, since the Governmental Supporting Project has been done to around 1,500 traditional markets nationwide for a decade and the amount is also over 2.5 trillion won, existing studies have a clear limitation from the side of accuracy of the research results.

3. Methodology of Inter-Industry Analysis

3.1. Concept of Inter-Industry Analysis

Inter-industry analysis is the basic method of analysis assuming interrelationship among industries based on close interdependence among industries of a national economy. The purpose of inter-industry analysis is analyzing the production structure behind the incomes by focusing on the technical interdependence relationship among industries and the ripple effect that the effects of national economy by giving final demand as an exogenous variable at the industrial stage as a proxy for the national economy. Inter-industry analysis analyzes interdependence among industries based on input coefficient, which can be derived from an inter-industry relations table, which shows the whole of the national economic structure in a matrix form. It presents inter-industry transactions of all the goods and services occurring within the national economy and transactions between industry and final demand in accordance with certain principles of recording, for a period of time (usually one year). An inter-industry relation table is divided into endogenous and exogenous sectors. The endogenous sector records transactions between each industry, and the exogenous sector is the other sector excluding it. The column sector includes consumption, final demand of investment, and export, and the row sector includes compensation of employees, operating surplus, consumption of fixed capital, and value added such as net indirect taxes (indirect tax-subsidy), etc. Using this feature of the inter-industry relations table, an input coefficient table can be obtained by dividing the intermediate input of an industry by the total input of the industry. These input coefficients have the characteristics of each industrial production function and refer to technical structure by industry sector.

3.2. Principle of Inter-Industry Analysis

The sum of the intermediate demand and final demand corresponds to a gross amount. Therefore, an equation like formula (1) can be made using a matrix.

$$A^d X + Y = X \quad (1)$$

However, $A^d = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \dots & \dots & \dots & \dots \\ a_{n1} & a_{n2} & \dots & a_{nn} \end{bmatrix}$, $X = \begin{bmatrix} X_1 \\ X_2 \\ \dots \\ X_n \end{bmatrix}$, $Y = \begin{bmatrix} Y_1 \\ Y_2 \\ \dots \\ Y_n \end{bmatrix}$

In Formula (1), refers to domestic insertion coefficient matrix, refers to the gross amount vector, and refers to final demand vector. The columns of the Leontief inverse (input-output) table show the input requirements, both direct

and indirect, on all other producers, generated by one unit of output (OECD, 2017). If in Formula (1) is solved, it can be shown like Formula (2). In Formula (2), is called Leontief inverse, and each element is composed as in Formula(3). In Formula(3), coefficient in Leontief inverse refers to the necessary direct and indirect production to produce 1 unit of the final demand. Given this meaning, it is called the Production Inducement coefficient.

$$X = (I - A^d)^{-1} Y \quad (2)$$

Production Inducement Coefficient

$$= (I - A^d)^{-1} = \begin{bmatrix} \alpha_{11} & \alpha_{12} & \dots & \alpha_{1i} & \dots & \alpha_{1n} \\ \alpha_{21} & \alpha_{22} & \dots & \alpha_{2i} & \dots & \alpha_{2n} \\ \vdots & \vdots & \ddots & \vdots & \ddots & \vdots \\ \alpha_{n1} & \alpha_{n2} & \dots & \alpha_{ni} & \dots & \alpha_{nn} \end{bmatrix} \quad (3)$$

However, $\alpha_{ij} = \frac{\partial X_i}{\partial Y_j}$, i is investment industry, j is demand industry.

When a final demand, such as consumption and exportation of a good or service, occurs, its ripple effect does not stop in producing the corresponding good or service but reaches to producing goods in all related industries. The size of production inducement effect due to this final demand can be measured by the production inducement coefficient, which refers to the level of production that is directly and indirectly brought in each industry in order to satisfy demand where final demand increases by 1 unit in an input-output table. The Leontief inverse in Formula (3) plays a key role in calculating the production inducement coefficient, value-added inducement coefficient, employment inducement coefficient, and inducement coefficient for getting a job (these two differ as described below), which are drawn through inter-industry analysis. Value-added inducement coefficient can be induced like Formula (4) by using Leontief inverse in Formula (3). Like the production inducement effect, value-added inducement coefficient can also be calculated by industry. The coefficient means the increase in the added value that occurs directly or indirectly when final demand of each industry increases by 1 unit.

$$\text{Value-added inducement coefficient} = V(I - A^d)^{-1} \quad (4)$$

However, V is a diagonal matrix of value-added coefficient.

$$V = \begin{bmatrix} V_1 & 0 & \dots & 0 & \dots & 0 \\ 0 & V_2 & \dots & 0 & \dots & 0 \\ \vdots & \vdots & \ddots & \vdots & \ddots & \vdots \\ 0 & 0 & \dots & 0 & \dots & V_n \end{bmatrix}$$

This indicates the amount of the added value directly or indirectly induced from its own field or the other by 1 unit of final demand of a product in an industry. This size can be measured by the value-added inducement coefficient. Since the occurrence of final demand induces domestic production and the added value is created through production activities, it can consequently be said that the occurrence of final demand is the origin of the creation of added value. Increase of final demand by 1 unit induces another production. Based on the effect that the production once again induces a demand of labor, the increase in final demand increases the demand of labor. The employment (getting a job) inducement coefficient is an analysis of this labor inducement effect of production activities. Employment inducement coefficient and inducement coefficient for getting a job differ depending on the coefficient for getting a job and employment coefficient in choosing the labor coefficient. The coefficient for getting a job includes all paid workers, the self-employed and unpaid family workers in the amount of labor, and employment coefficient is a labor coefficient which only includes paid workers in the amount of labor. Formula (5) refers to a diagonal matrix of labor coefficient, and employment (getting a job) inducement coefficient as given in Formula (6) can be found if multiplying labor coefficient by Leontief inverse. When the meaning of Formula (6) is examined, output equal to the production inducement coefficient () is needed in each industry in case of increase of foreign direct investment by 1 unit in industry. This means employment as much as has to be increased in order to produce the necessary output.

$$l_w = L/X \quad (5)$$

$$\text{However, } L_w = [L_1 \ L_2 \ \dots \ L_n]', \quad X = [X_1 \ X_2 \ \dots \ X_n]'$$

L_i is a total amount of labor (amount of employment or getting a job) in industry.

$$\begin{aligned} &\text{Employment (getting a job) inducement coefficient} \\ &= l_w (I - A^d)^{-1} \quad (6) \end{aligned}$$

Production activity in each industry has an interdependent relationship between industry sections by utilizing products in several industry sections as intermediary goods. Therefore, labor demand, an original production element needed in production, is successively induced. In order to analyze the ripple effect of labor using an input-output table, the coefficient for getting a job by industry has to be measured first, then employment inducement coefficient is deduced based on these coefficients for getting a job and production inducement coefficient. Employment inducement effect means direct or indirect amount of labor induced in each industry section due to occurrence of final demand. This size can be measured through inducement coefficient for getting a job. The inducement coefficient for getting a job is a coefficient of the amount of labor put into production activity during a

certain period divided by total output for that period, and means the amount of labor directly taken for one unit of production.

3.3. Method of Inter-Industry Analysis in Supporting Project in Traditional Markets

Since project expense for the Supporting Project in Traditional Markets increases total demand of related industry, inter-industry effect, which derives and occurs from this economic value, can be analyzed. In order to analyze inter-industry effect, detailed projects in each Supporting Project and industries that are directly related are defined as one independent industry. This industry field is separated from 403 parts in the sector category table and is set as the 404th industry. Inter-industry analysis can be conducted by classifying the case of exogenous specifications and the case of not doing so. The former refers to economic spin-off derived from other industries except for its own achievements; the latter includes its own achievements and even economic spin-off derived from other industries. This study will conduct inter-industry analysis that does not conduct exogenous specifications in order to analyze total effect of Supporting Project in traditional markets, and will also examine economic spin-off derived from industries that are different from its own achievement.

The extended input-output table issued by The Bank of Korea in 2011 only classifies into 28 basic sections, and has a limitation in appropriately reflecting characteristics of each detailed project in the Traditional Market Supporting Project. Therefore, the 2009 input-output table is used among input-output tables that were categorized into 403 sections and announced. It is necessary to separate the Supporting Project in Traditional Markets from industries directly related in order to conduct inter-industry analysis. For this procedure, this study matches industries directly related as follows, based on detailed content of each project.

The result of matching each project with industries directly related to each project is used in the analysis. The Management Modernization Project is analyzed based on its five specific projects. Industries related to each one of these five comprise separate industry sectors, which are used for the analysis. The Facility and Management Modernization Project is analyzed likewise based on its three specific projects. In this analysis, the project expenses of the Management Modernization Project and the Facility Modernization Project by region and year are seen as the increments in the final demands of industries related to each project. Based on these expenses, ripple effects, such as economic effect and employment inducement effect, are calculated. Basically, inter-industry analysis can analyze the amount of production inducement, value added, and employment inducement that are occur within the wider

<Table 5> Management Modernization Project of Matching Related Industry

Project in detail	Content of Project	Name of Industry
Management improvement	Management Modernization Project (logo, packing container)	Publication Metal packing container
	Joint Marketing Supporting Project	Advertisement
	Supporting Project for issuing joint gift card (coupon)*	-
	Supporting Project for green clean markets*	-
	Support in performances of university clubs	Educational institution (nonprofit)
	Vacant Store Utilization Project	Cultural service (national)
	Supporting Project in fostering demonstrative market	Market research and consulting on management
	Market Tour Project	Passenger transportation by road
	Exhibition of good market products	Cultural service (national)
	Support for disinfected overgarments	Sanitary services (industrial)
	Demonstrative stores in sanitation	Sanitary services (industrial)
	Supporting Project for events/advertising	Cultural service (national)
	Discount Supporting Project*	-
	Support for development of advertisement flyers	Advertisement Publication
	Joint Project for structure improvement	Market research and consulting on management
Commercial supremacy Promotion	Fostering cultural touristic markets	Market research and consulting on management Cultural service (national)
	Support in vitalization of the commerce	Market research and consulting on management Cultural service (national)
Merchant education	Customized (short-term)	Educational institution (national)
	Customized (special lectures)	Educational institution (national)
	Merchants university	Educational institution (national)
	Education in market management	Market research and consulting on management
	Workshop	Market research and consulting on management
Market management	Education in informatization	Educational institution (national)
	Market Manager Project (supporting retired personnel)	Market research and consulting on management
Market research and consulting	Support in parking aid (valet parking)	Other personal services
	Activation of research and services	Research institution (national)
	Consulting	Market research and consulting on management
	Guidance in stores	Market research and consulting on management

Source: Internal materials of Small Enterprise and Market Service (2013).

Note: As it is difficult to limit the aggregate demand increase to specific industries, the marked projects are excluded from this analysis.

<Table 6> Facility Modernization Project of Matching Related Industry

Project in detail	Content of Project	Name of industry
Infrastructure	CCTV	Other imaging devices and sound equipment
	Street lights	Light bulbs, lamps, and lighting
	Gas facilities	Machinery assembly and installation
	Distribution center construction	Structures other than dwellings
	Buildings	Structures other than dwellings
	Public facilities	Structures other than dwellings
	Others	Structures other than dwellings
	Interior remodeling	Building maintenance
	Air-conditioning and heating facilities	Machinery assembly and installation
	Broadcasting facilities	Communication facilities
	Land purchase	Structures other than dwellings
	Water and sewage	Water and sewage facilities
	Fire-fighting facilities	Machinery assembly and installation
	Indoor lighting	Light bulb lamp and lightings
	Arcade	Structures other than dwellings
	Elevator / escalator	Other machineries for special purpose
	Exterior remodeling	Building maintenance
	Electricity	Power facilities

Project in detail	Content of Project	Name of industry
	Electricity and communication facilities	Power facilities
	Driveways	Road facilities
	Restrooms	Structures other than dwellings
Convenient facilities	Customer information	Structures other than dwellings
	Customer parking lots	Road facilities
	Customer lounges	Structures other than dwellings
	Shopping carts	Bicycle and other transportation equipment
	Daycare centers	Structures other than dwellings
	Bicycle racks	Structures other than dwellings
Promotion facilities	Billboards for common use in the market	Other imaging devices and sound equipment
	Arches / sculptures	Structures other than dwellings
	Event squares	Structures other than dwellings
	Theme streets	Road facilities

economy when the final demand of the industry increases by 100 million won. First, the effect caused by the increase of the final demand of a certain scale such as production inducement coefficients, value added inducement coefficients, and employment inducement coefficients, etc. can be derived by inter-industry analysis. Then, the total ripple effect is calculated by applying the actual final demand increase.

4. Result of Economic Effect

4.1. Result of Inter-Industry Analysis

As the result of inter-industry analysis on the modernization and the supporting projects of the government's traditional market management, it appeared that the effect on production inducement of the Facility Modernization Project is larger than that of the Management Modernization Project. On the other hand, value added and employment inducement effects of the Management Modernization Project are larger than those of the Facility Modernization Project. It appeared that about 22 billion people were hired for the increase of 1 billion won as the employment inducement effect of the Market Management Project (a part of the Management Modernization Project). In addition, it is shown to be the most effective among the analyzed projects. The effect on production inducement of the Management Modernization Project per 100 million won is as follows: the Management Improvement Project 1.7 billion, Business District Development Project 1.6 billion, Merchant Education Project 1.4 billion, the Market Management Project 1.6 billion, and the Market Research and Consulting Project 1.6 billion. The value added inducement effect of the Management Modernization Project per KRW 100 million is analyzed at around 0.8–0.9 by detailed project. The employment inducement effect of the Management Modernization Project per billion won is as follows: the Management Improvement Project 18 people, Business District Development Project 15 people, Merchant

Education Project 19 people, the Market Management Project 22 people, and the Market Research and Consulting Project 18 people. In case of the Facility Modernization Project, the effect on production inducement is relatively large at 2.1–2.2 billion won per 100 million won. The value added inducement effect of it is 70 million won per 100 million won and the employment inducement effect of it is 13–14 people per billion. The industries generated production, value added, and employment inducement in each project can be checked separately by inter-industry analysis.

<Table 7> The result of inter-industry analysis by traditional market support project

business name		inducement effect	inducement effects	inducement effects
Management Modernization	Management improvement	1.694	0.847	17.930
	Commercial supremacy promotion	1.631	0.907	14.964
	Merchant education	1.413	0.928	18.701
	Market management	1.647	0.901	21.623
	Market research and consulting	1.564	0.913	17.592
Facility Modernization	Infrastructure	2.156	0.733	13.904
	Convenient facilities	2.109	0.753	14.440
	Promotion facilities	2.100	0.747	14.320

4.2. Result of Economic Effect

Economic effect is assumed to be a new demand created from the corresponding industry equal to the amount of

project expenses in each detailed project. This is calculated by multiplying the inducement coefficient deduced through inter-industry analysis. As a result of analysis on the economic effect of the Management Modernization Project, from 2002 to 2012, it is shown that in total a 296.1 billion won production inducement effect, a 158.7 billion won of value-added inducement effect, and a 3,135-person

employment inducement effect occurred. By detailed project, the Management Improvement Project showed a total of 1,708 people of employment, which appeared to be the biggest effect. We analyzed ripple effect by region in the Management Modernization Project during the period of 2002–2012.

<Table 8> Production inducement effect of Management Modernization project

(Unit: one hundred million)

	2002-2005	2006	2007	2008	2009	2010	2011	2012	Total
Management improvement	302.6	362.8	423.4	148.0	76.1	130.5	95.3	75.2	1,613.9
Commercial supremacy promotion	0.0	0.0	0.0	0.0	0.0	181.8	229.5	382.1	793.4
Merchant education	5.1	13.9	27.4	46.1	41.4	45.7	46.8	45.3	271.7
Market management	0.0	0.0	0.0	15.4	31.2	30.6	23.8	19.6	120.6
Market research and consulting	43.9	24.0	36.7	32.5	5.9	6.7	5.9	5.3	161.0
	351.6	400.8	487.5	242.0	154.6	395.3	401.4	527.5	2,960.5

<Table 9> Value-added inducement effects of Management Modernization project

(Unit: one hundred million)

	2002-2005	2006	2007	2008	2009	2010	2011	2012	Total
Management improvement	151.3	181.4	211.7	74.0	38.0	65.2	47.7	37.6	806.9
Commercial supremacy promotion	0.0	0.0	0.0	0.0	0.0	101.1	127.6	212.5	441.2
Merchant education	3.3	9.1	18.0	30.3	27.2	30.0	30.7	29.7	178.4
Market management	0.0	0.0	0.0	8.4	17.1	16.7	13.0	10.7	66.0
Market research and consulting	25.6	14.0	21.4	19.0	3.5	3.9	3.5	3.1	94.0
	180.3	204.6	251.1	131.7	85.7	217.0	222.5	293.6	1,586.5

<Table 10> Employment inducement effects of Management Modernization project

(Unit: people)

	2002-2005	2006	2007	2008	2009	2010	2011	2012	Total
Management improvement	320.3	384.0	448.1	156.6	80.5	138.1	100.9	79.6	1,708.2
Commercial supremacy promotion	0.0	0.0	0.0	0.0	0.0	166.8	210.6	350.6	727.9
Merchant education	6.7	18.4	36.3	61.0	54.8	60.5	61.9	59.9	359.6
Market management	0.0	0.0	0.0	20.2	40.9	40.2	31.3	25.7	158.3
Market research and consulting	49.4	27.0	41.3	36.6	6.7	7.6	6.7	5.9	181.1
	376.4	429.5	525.7	274.4	182.9	413.1	411.3	521.8	3,135.1

As a result of analysis, the region where employment, production, and value-added inducement effects were the highest was Gyeonggi-do, while that where they were the lowest was analyzed as Daejeon. Employment inducement effect in Gyeonggi-do appeared to be 401 people and production inducement effect appeared to be 37.5 billion won. Overall, there was somewhat large deviation by region; however, a 100–400-person employment inducement effect is shown in general. This result demonstrates that the ripple effect is much more bigger and extensive than indicated by the analysis done by Park et al. (2006) on the effects of governmental support to conventional markets located in five regions (Incheon, Chungnam, Gyeongbuk, Gangwon, Jeonnam) on regional economies.

As a result of the analysis on the economic effect of Facility Modernization Project during the period between 2002 and 2013, it shows that a 6.0948 trillion won production inducement effect, a 2.1109 trillion won value-added inducement effect, and a 40,209-person employment inducement effect. By detailed project, employment inducement effect of supporting projects in infrastructure was 24,561 people, which was the highest, while supporting projects in convenience facilities and in advertising facilities appeared to elevate employment inducement effect by 14,205 and 1,443 people, respectively.

<Table 11> The ripple effect of Management Modernization project by region

(Unit: one hundred million, people)

	Production inducement effect	Value-added inducement effects	Employment inducement effects
Kangwon-do	246.3	131.9	252.0
Kyunggi-do	375.9	198.8	400.9
Kyungsangnam-do	226.9	121.3	236.6
Kyungsangbuk-do	190.2	101.9	204.4
Kwangju City	83.2	44.8	88.7
Daegu City	132.6	70.3	143.7
Daejeon City	57.4	30.4	64.1
Busan City	257.1	138.4	268.3
Seoul City	177.4	97.7	194.0
Wolsan City	96.1	51.8	100.8
Inchon City	129.8	69.3	141.0
Jeonlanam-do	174.0	94.4	182.6
Jeonlabuk-do	175.1	92.4	188.8
Jeju City	137.9	73.4	142.0
Chungchengnam-do	209.1	113.0	214.7
Chungchengbuk-do	269.6	142.6	283.7
Other areas	21.8	14.3	28.8
All nations	2,960.5	1,586.5	3,135.1

<Table 12> Production inducement effect of Facility Modernization Project

(Unit: one hundred million)

	2002-2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Infrastructure	10,968	3,136	3,842	4,093	3,448	2,977	3,317	3,397	2,906	38,085
Convenient facilities	3,967	1,400	1,915	2,712	2,682	2,094	2,071	2,071	1,834	20,747
Promotion facilities	102	2	203	293	185	470	305	305	216	2,117
	15,038	4,538	5,959	7,099	6,315	5,541	5,773	5,773	4,957	60,948

<Table 13> The Value-added inducement effects of Facility Modernization Project

(Unit: one hundred million)

	2002-2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Infrastructure	3,729	1,066	1,306	1,392	1,172	1,012	1,128	1,155	988	12,948
Convenient facilities	1,416	500	684	968	957	747	740	740	655	7,407
Promotion facilities	36	1	72	104	66	167	121	108	77	753
	5,182	1,567	2,062	2,464	2,196	1,927	1,988	2,003	1,720	21,109

<Table 14> The employment inducement effects of Facility Modernization Project

(Unit: people)

	2002-2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Infrastructure	7,703	2,023	2,477	2,640	2,224	1,920	2,139	2,191	1,874	24,561
Convenient facilities	2,716	958	1,311	1,857	1,836	1,433	1,418	1,418	1,256	14,205
Promotion facilities	70	1	138	200	126	321	232	208	147	1,443
	9,859	2,982	3,927	4,697	4,186	3,674	3,790	3,817	3,277	40,209

For the ripple effect of the Facility Modernization Project by region, Gyeongsangnam-do showed the highest employment inducement effect (3,868 people), followed by Gyeongsangbuk-do (3,356 people). Other metropolitan cities except for Seoul and Daegu and Jeju had a 2,000 person employment inducement effect, which was relatively low

compared to other regions. In addition, in case of production and value-added inducement effect, Gyeongsangnam-do showed 584.2 billion won and 212 billion won, respectively, indicating a very high policy effect.

<Table 15> The ripple effect of Facility Modernization project by region

(Unit: one hundred million, people)

	Production Inducement Effect	Value-added inducement Effects	Employment inducement Effects
Kangwon-do	4,173	1,562	2,761
Kyunggi-do	4,694	1,769	3,100
Kyungsangnam-do	5,842	2,120	3,868
Kyungsangbuk-do	5,111	1,880	3,356
Kwangju City	2,216	777	1,464
Daegu City	3,540	1,286	2,318
Daejeon City	2,590	934	1,734
Busan City	3,662	1,280	2,386
Seoul City	4,316	1,502	2,831
Woolsan City	1,767	707	1,178
Inchon City	2,585	1,006	1,713
Jeonlanam-do	5,078	1,875	3,324
Jeonlabuk-do	4,911	1,966	3,252
Jeju City	1,978	699	1,301
Chungchengnam-do	4,599	1,660	3,049
Chungchengbuk-do	3,886	1,449	2,575
All nations	60,948	22,472	40,209

5. Conclusions and Limitations

For stabilization of people's living and activation of regional economies through vitalization of traditional markets, the government supports Management Modernization and Facility Modernization Projects on Traditional Markets. For the vitalization of traditional markets, from 2002 to 2013, 180.8 billion won of project expenses for management modernization and 2.851 trillion won of project expenses for facility modernization were invested. However, controversy over the effectiveness of the projects has persisted because quantitative measurements on the ripple effect of policy were not done. Therefore, it was necessary to assess the Governmental Supporting Project in a multilateral way through quantitative measurements about whether effects of policy, such as production and employment, which were noted in the meantime, actually existed. Accordingly, this study analyzed project effects with accurate measurements on governmental support to traditional markets through the acquirement of internal sources. Although the sales in traditional markets are constantly decreasing due to weakening positions in distribution markets due to the spread of superstores and e-commerce, the collective projects are shown to have minimized external shock by strengthening internal capability. Achievements in the Supporting Project on Traditional Markets until now have been anecdotal or educated guesses. Driven by the necessity of additional analysis on ripple effect or employment creation effect of the project, this study calculated economic effect of the Supporting Project on Traditional Markets through inter-industry analysis.

For the measurement of economic effects, we first matched industries related to the Supporting Project on

Traditional Markets, then conducted inter-industry analysis and calculated ripple effect of each project. As a result, it was analyzed that the Management Modernization Project and Facility Modernization Project have led to 3,135 and 40,209 people induced to employment, respectively. To be specific, a 296.1 billion won production inducement effect, a 158.7 billion won value-added inducement effect, and a 3,135-person employment inducement effect appeared in the Management Modernization Project during the period between 2002 and 2012. Project in Management Improvement by detailed project and Gyeonggi-do by region were found to have the highest ripple effect. In total, a 6.0948 trillion won production inducement effect, a 2.1109 trillion won value-added inducement effect, and a 40,209 person employment inducement effect appeared in Facility Modernization Project during the period between 2002 and 2013. The Project in Supporting Infrastructure by detailed project and Gyeongsangnam-do by region were analyzed to have the highest ripple effect. The positive effect of effect of governmental support to traditional markets deduced from this study's results is similar to those from studies by Park et al. (2006), Lee and Song (2011), Song et al. (2012), Lee et al. (2014). Despite investment of a considerable amount of assets on vitalization of regional economy through vitalization of traditional markets in the meantime, the government has received many comments from the National Assembly and media that it is a waste of assets because there has been no quantitative indicator for the effects of policy supports. However, this study empirically analyzed and presented that there is a considerable amount of economic effect by region due to governmental policy support to traditional markets. These study results are expected to have many implications in henceforth drafting governmental vitalization policy on traditional markets by region.

Based on our findings, we suggest tentatively ideas that can be helpful to develop the related policies for Korean government. First, the effect of Facility Modernization Project invested big-budget was not larger than that of the Management Modernization Project. That is, Korean government needs to push ahead with a project such as management innovation for revitalizing traditional market if the facility management project of traditional market has done somewhat. Second, the government support has focused on such a region such as Kyungsangnam-do. This result shows that Korean government needs to change its supporting policy for regional balanced development. It tells us that Korean government should do budget allocation to all regions as pointed out by the Korean National Assembly. Lastly, we verified that as the supporting projects of the government's traditional market management and facility, it appeared that employment inducement effects were larger than production and value-added inducement effects. Thus Korean government needs to make strenuous efforts to

creations of jobs in the current economic downturn. In particular, Korean government should consider in terms of the quality and quantity of jobs out of recession.

Nevertheless, this study shows the following limitations. First, the subject and period of analysis applied in this study are limited from 2002 to 2013. Therefore, not all the government support projects were included in the analysis. The government has discovered many new projects such as the Characterization Supporting Project and Supporting Project for the Young Merchants, and has been expending a lot of extra budget on those projects since 2013. As those new projects are excluded from the analysis, the economic effect can be measured to a lesser extent. Second, the analysis using the interregional input-output table, which can reflect characteristics of specific local industrial structures, needs to be tried in the future so as to understand better regional characteristics of the Supporting Project for Traditional Markets in terms of the economic effect.

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