

**A STUDY ON KOREA'S TEXTILE INDUSTRY
AND THE MILAN PROJECT: USING THE DAEGU
REGION'S INPUT-OUTPUT MODEL***

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The objective of this paper is twofold. First, employing the Daegu region's input-output model, this paper investigates the effects of textile industry on that region's industrial structure. While this paper considers more categorized sub-divisions of the textile industry to show possible structural adjustments within that industry, it shows the linkage effects of both forward and backward directions as well as the multiplier effects. Second, this paper also evaluates "the Milan Project" designed to revive the textile industry in Daegu-Kyungbuk area. Then this paper continues to provide policy implications for the local government as well as the central government in Korea.

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I. INTRODUCTION

The textile industry, characterized by the labor intensive one, had been a key

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sector in Korea from the early 1960s through the late 1980s, during which Korea accomplished very rapid economic growth with the help of active industrial and trade policies. Especially, after switching from import substitution to export promotion strategy by the Korean government in the early 1960s, the textile industry in Daegu region had played a significant role in the expansion of the Korean exports and the prosperity of regional economy until the late 1980s. Since then, the region's textile industry began to lose its comparative advantage and the international competitiveness because of the rapid rise in wages and the emergence of Southeast Asian Countries and China.

Very recently the local government with the help of the central government designed and implemented an aspiring large-scale five year project, so called "the Milan Project" (1999-2003) to boost the depressed industry and to revitalize the stagnant regional economy. However, there have been ongoing questions regarding the effectiveness of the project. Then this paper analyses the current situation of the region's textile industry and attempts to evaluate the performances of the project based on the initial plans since the textile industry is still a key industry of Daegu area in terms of both the number of employment and the amount of value added, even though the relative share of that industry in the national economy has drastically decreased.

We employ the input-output model to show the linkage effects of both forward and backward directions and consider more categorized sub-divisions of the textile industry to show possible structural adjustments within that industry. The Milan Project put a great emphasis on the development of fashion and apparel sectors rather than the traditional manufactures of fabrics; that is, structural adjustments are being sought from the middle stream of lower value-added to the downstream of high value-added. Considering these facts, we analyze the linkage effects of both the whole industry and the sub-division industries in relation to the associated industries at the regional and national levels for recovery of the competitiveness in the world market.

The objective of this paper is twofold. First, employing the input-output model, the paper investigates the effects of textile industry on the industrial structure in Daegu, Korea. Second, this paper also evaluates "the Milan Project" designed to revive textile industry in Daegu area since Daegu has been leading that industry in Korea. Then the current paper intends to provide the policy implications for the local government as well as the central government in Korea.

The limitation of the research naturally rises in the reliability of the data associated with the industry in the specific region since we divided the traditional textile industry into four different sub-industries, which are not well established in the regional level. Nevertheless, the current paper will present some fruitful policy implications that would help enhance the international competitiveness of the textile and apparel industry and thus revive the regional economy.

The rest of the paper is organized as follows: Section II describes an overview of Korea's textile industry and the Milan Project. Section III constructs the Daegu region's input-output table, which will be used to figure out the economic structure of the Daegu economy, particularly focusing on the textile industry. In addition, the properties of the textile industry are investigated using the input-output model in terms of both linkage and multiplier effects in section IV. Section V evaluates the Milan Project and provides some policy suggestions for the post Milan Project. Summary and the concluding remarks are given in section VI.

II. KOREA'S TEXTILE INDUSTRY AND THE MILAN PROJECT

The textile industry has been a key sector in Korea since Korea undertook an export-oriented economic development strategy in the early 1960s. In the course of economic development, the textile industry has played a significant role on the expansion of the Korean exports and the prosperity of the Korean economy. From the early 1960s until the late 1980s, Korea has been a major exporting country of textile products, even though it began to lose its comparative advantage and/or international competitiveness in the late 1980s.

[Table 1] Share of Major Exporting Countries in the World Trade (2001)

	World	China	Hong Kong	Italy	U.S.	Germany	Korea
Exports(million \$)	366,555	54,464	35,864	26,467	20,840	19,210	16,063
Market Share (%)	100	14.9	9.8	7.2	5.7	5.2	4.4

Source: WTO, International Trade Statistics, 2002.

[Table 2] Share of Korea's Textile Exports in the World Market

	1985	1990	1995	2000	2001	2002
Exports(100 Million \$)	7.1	14.8	18.7	18.8	16.0	14.2
Market Share(%)	7.0	5.7	5.3	5.2	4.4	4.0

Source: UN Trade statistics; WTO, International Trade Statistics, 2002; KOTIS.

Nowadays Korea's textile exports are ranging from synthetic yarns, synthetic fabrics, and knitted fabrics through made-up textiles and garments. In 2001, Korea was the fifth largest exporting country next to China(including Hong Kong), Italy, the United States, and Germany in terms of market share in the world trade (See Table 1). In 2002, Korea's export was 1.4 billion dollars, which accounted for 4% of the world market, while its market share has been down from 7% in 1985 (See Table 2).

So far, Korea's textile industry still remains one of the key manufacturing industries in terms of the number of firms, employment and exports. Table 3

shows that in 2002 Korea's textile industry accounted for 17.4% of manufacturing industry in terms of the number of firms, 12.9% in terms of employment, 9.6% in terms of exports, even though the relative shares of that industry in the national economy have been gradually decreasing in recent years.

[Table 3] Share of Textile Industry in Korea (1990~2002)

(Unit: 1,000 workers, billion won, billion won, 100 Million \$)

		# of Firms	Employment	Production	Value-Added	Exports
1990	Manufacturing	68,690	3,103	176,439	70,775	6,501.6
	Textile	14,428	595	18,121	7,255	1,476.5
	Share (%)	21.0	19.7	10.3	4.1	22.7
1998	Manufacturing	79,545	2,324	425,008	176,730	1,323.1
	Textile	14,886	340	30,397	13,348	168.6
	Share (%)	18.7	12.6	7.2	7.6	12.7
2000	Manufacturing	98,110	2,653	564,830	219,420	1,722.7
	Textile	18,130	393.8	39,810	17,120	187.8
	Share (%)	18.5	14.9	7.0	7.8	10.9
2002	Manufacturing	110,356	2,696	634,199	242,300	1,624.7
	Textile	19,237	348	37,287	15,103	156.7
	Share (%)	17.4	12.9	5.9	6.2	9.6

Source: National Statistical Agency, Annual Survey.

[Table 4] Trade Performance of Textile Industry: 1980~2003

(unit: 100 million \$)

	1980	1985	1990	1995	1998	2000	2001	2002	2003
Export	51	71	148	187	169	188	161	156	153
Import	5	7	23	52	28	48	49	57	59
Trade Surplus	46	63.6	124.3	134	141	139.1	112	99	94

Source: UN Trade statistics, KOTIS.

In 2002, Korea's textile industry produced 37,287 billion won worth of output and exported about a half of the production. Also, the textile industry had been a major exporting sector in Korea until 2000. Table 4 indicates that Korea's textile industry had been posting trade surplus of more than \$10 billion a year from the late 1980s until 2001. But the situation in 2003 turned somewhat difficult, largely due to lower demand from advanced markets such as the US, Japan and the EU. Import regulations in advanced countries and regional trading blocs also undercut Korea's competitiveness in the world textile market. As China fast emerges as a new textile powerhouse, Korea's status might be

weakened further. Other challenges included cuts in export prices and new trading blocs worldwide.

[Table 5] Share of Textile Industry in Daegu (1990~2002)

	# of Firms			Employment		
	1990	1998	2002	1990	1998	2002
Manufacturing	7,995	10,066	12,613	374,457	308,923	337,858
Textile & Clothing	2,896	3,216	3,633	144,489	86,324	76,513
Share (%)	36.2	31.9	28.8	38.6	27.9	22.6

Source: National Statistical Agency, Annual Survey.

Daegu region has been the largest textile industrial complex in Korea for the past four decades of the economic development. According to Table 5, textile industry still remains a key industry in Daegu area in terms of the number of firms, and employment, though the relative share of that industry in Daegu's manufacturing sector decreased very recently. In 2002, Daegu's textile industry commanded 28.8% of manufacturing sector in terms of the number the of firms and 22.6% in terms of employment. Especially, Daegu-kyungbuk region has been famous for the largest production site of fabrics, polyester and synthetic in Korea. However, according to Table 6, the relative share of Daegu-kyungbuk's textile industry in the national economy has drastically decreased in terms of the number of firms, employment, production, and value-added in recent years.

Since 1997, Daegu City has sought out advanced strategies for its textile industry that could develop the region to a center of the high-tech fashion industries. As a result, in September 1998, the Minister of Commerce, Industry & Energy finally announced an aspiring large-scale five-year project, so called the Milan Project (1999-2003) to boost the depressed textile industry and to revitalize the stagnant regional economy of Daegu.

The Milan Project aims at developing the traditional textile industry in Daegu-Kyungbuk into a high-tech and high value-added textile and fashion industry for the 21st century. That is, the Milan Project puts a great emphasis on the development of fashion and apparel products rather than the traditional manufactures of fabrics and seeks structural advancement from the middle stream of low value-added to the downstream of high value-added.

According to the Milan Project, 680 billion won (567 million U.S. dollars; 1\$ = 1,200 Won) was invested for the 17 specific sectors following the master plan by 2003. The 17 specific investment plans of the Milan Project are summarized as follows: Textile R & D Center, Dyeing & Design Center, Knit Production Center, Fashion Design R & D Center, Fashion Information Office, Korea Textile & Fashion Institute (KOTEFI), Preview in Daegu (PID), etc. The central government shares 54% of the total investment, while private enterprises share

38.5% as well as the local government's 7.5%.

[Table 6] Share of Daegu-Kyungbuk Region's Textile Industry in Korea
(Unit: million won)

		# of Firms	Employment	Production	Value-Added
1962	Kyungbuk (including Daegu)	661 (25.56%)	35,425 (28.70%)	10,397 (30.43%)	4,312 (31.44%)
	Nation	2,586	123,436	34,163	13,714
1970	Kyungbuk (including Daegu)	1,411 (22.07%)	50,920 (19.04%)	48,579 (19.42%)	28,814 (30.73%)
	Nation	6,393	267,479	250,213	93,750
1980	Daegu-Kyungbuk	1,881 (24.48%)	134,548 (21.61%)	1,317,463 (20.28%)	52,803 (22.66%)
	Nation	7,682	622,444	6,495,431	2,311,230
1990	Daegu-Kyungbuk	2,896 (17.81%)	144,489 (21.70%)	4,768,989 (21.88%)	2,038,247 (24.06%)
	Nation	16,261	665,951	21,790,950	8,472,755
1998	Daegu-Kyungbuk	3,216 (21.61%)	86,324 (25.34%)	9,269,853 (30.50%)	4,063,678 (30.45%)
	Nation	14,884	340,652	30,392,600	13,346,653
2002	Daegu-Kyungbuk	3,633 (18.9%)	76,513 (22.0%)	8,341,850 (22.37%)	3,476,030 (23.02%)
	Nation	19,237	347,828	37,286,518	15,103,268

Source: National Statistical Agency, Annual Survey.

III. THE CONSTRUCTION OF THE DAEGU REGION'S INPUT-OUTPUT TABLE

3.1. The Basic Concept of the Input-Output Model

In the input-output framework the complete $n \times n$ system is just given by

$$AX + F - M = X \quad (1)$$

where A is defined as a technical coefficient matrix and X , F and M are column vectors of gross output, final demand and imports. Solving equation (1) for X with letting $Y = F - M$,

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

where I is the identity matrix, and $(I - A)^{-1}$ is the Leontief inverse matrix or

product inducement matrix, which contains multipliers that denote both direct and indirect effects associated with a unit change in the final demand of a certain sector on all the relevant sectors. Thus the input-output model provides a framework within which to assess the economic impacts associated with the introduction of a new industry or a change in the final demand into an economy. Then the impact effects caused by a change in final demand in relation to production are given by

$$\Delta X = (I - A)^{-1} \Delta Y \quad (3)$$

And the corresponding value-added matrix is given by

$$\tilde{A}^v X = V \quad (4)$$

where \tilde{A}^v is the diagonal elements of the value-added input coefficient matrix and V is the column vector of value-added.

Substituting equation (4) into equation (2), then we have

$$\tilde{A}^v (I - A)^{-1} Y = V \quad (5)$$

where $\tilde{A}^v (I - A)^{-1}$ is the matrix of the value-added inducement coefficients. Thus, the relevant model for the value-added inducement effects is:

$$\tilde{A}^v (I - A)^{-1} \Delta Y = \Delta V \quad (6)$$

In addition, introducing the labor-output ratio for the employment inducement effects, $l = L/X$, which is the required amount of labor to produce one unit of output, we get the following relationship with the help of equation (2).

$$L = \lambda (I - A)^{-1} Y \quad (7)$$

Equation (7) gives the employment inducement coefficient matrix, $\lambda (I - A)^{-1}$, which is the multiplication of λ , the diagonal matrix of employment coefficient, and, $(I - A)^{-1}$, the production inducement coefficient matrix. The sum of columns of the employment inducement coefficients matrix means the induced employment in all relevant sectors caused by one unit of increase in the final demand in a specific sector. Then the analytical model for the employment inducement effects is given by:

$$\Delta L = \lambda (I - A)^{-1} \Delta Y \quad (8)$$

To figure out the interdependence among industries, a measure of the strength

of the backward linkage effects (the power of dispersion index) in sector j is given by the sum of the elements in the j th column of the direct and indirect coefficients matrix, $(I-A)^{-1}$. Similarly, a measure of the direct and indirect forward linkage effects (the degree of sensitivity) in sector i is given by the sum of the elements in the i th row of $(I-A)^{-1}$.

Furthermore, the notion of multipliers rests upon the difference between the direct impact effect of an exogenous (final demand) change and the total effects of that change. An output multiplier for sector j is defined as the total value of production in all sectors of the economy that is necessary to satisfy a unit of increase in the final demand for sector j 's output. The value-added (income) and employment multipliers are defined as the impacts of the changes in final-demand spending on the changes in income (employment) received by all households, respectively.

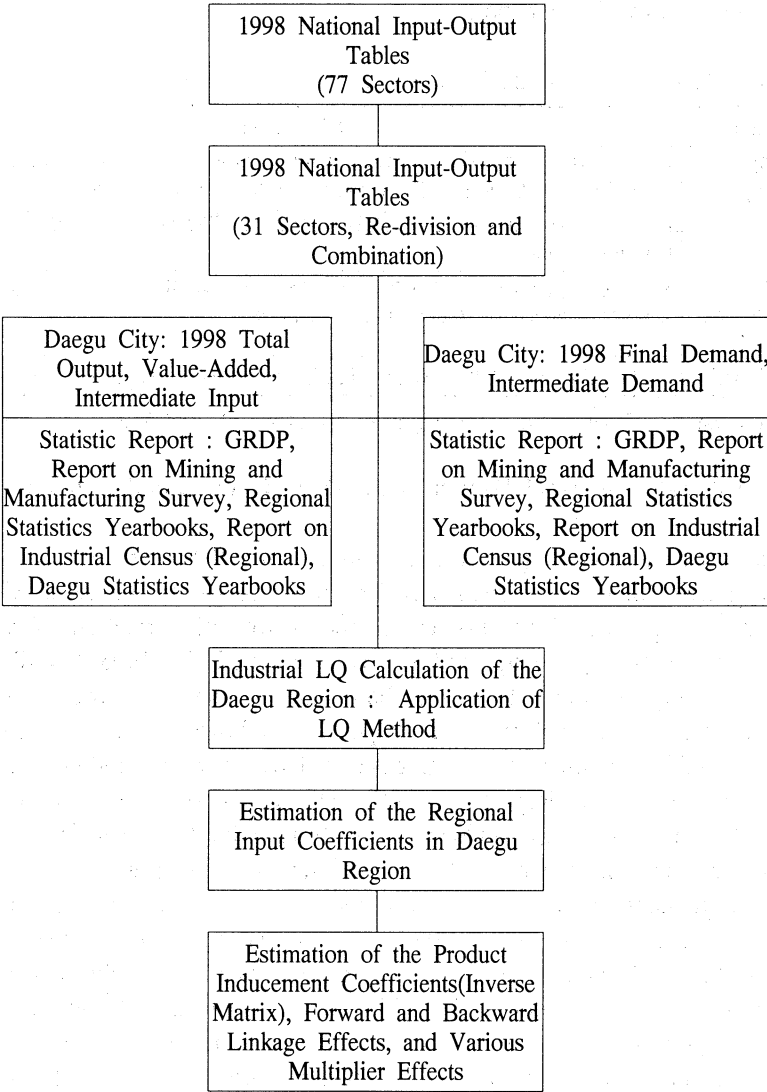
3.2. The Framing Process of Daegu Input-Output Model

The Daegu region's Input-Output table was constructed according to the specified steps shown in Figure 1. Firstly, using the National Input-Output table of 1998 released by the Bank of Korea,¹ which classified 77 industries, we reclassified and modified them into 31 sectors to accommodate the Daegu region's economic structure. That is, differently from the National Input-Output table, the regional table employed the price list of producers together with taking the classification criteria of the national table, the amounts of regional production, value-added, final demand and the characteristics of regional industrial structure, and the region-specific properties of textile industry into consideration.

The textile industry consists of a wide range of sub-divisions. However, here in this paper we classified the industry into four categorized sub-divisions; spinning, weaving of textiles, knitting mills, wearing apparels, and accessories, other textiles, to construct the region's Input-Output table. This classification will later turn out very useful to figure out both the structural interdependence and the linkage effects between the four sub-sectors within the textile industry. Apparently, it makes the present paper different from the previous works and thus enables us to obtain policy implications for the post Milan project. A more detailed classification of the textile industry is given in Table 7.

¹ The anonymous referees raised a possible problem of using the 1998 table. However, there are not substantial problems to use the national input-output table of 1998 instead of the 2000 table released in 2003. Nevertheless, the comments by the two referees on the relative advantages of the 2000 table are highly appreciated.

[Figure 1] The Framing Process of the 1998 Daegu Input-Output Model



Then we calculated the values of the amounts of total outputs, value-added, and intermediate inputs in each industry, utilizing the Gross Regional Domestic Product and Report on Mining and Manufacturing Survey. Based upon these values, we obtained the location quotients(LQ) of each regional industry, and constructed Daegu's Input-quotients table of 1998 by the method of location quotients.

The basic framework of this model is characterized by the single region and static Input-Output model with the type of noncompetitive import. While we couldn't make individual items for both inflow and outflow due to the data

restrictions in the regional level, instead, we treated that inflow is included in imports, and outflow is in exports.

[Table 7] Classification of the Textile Industries

	Sectors	Detailed Sectors
4	Spinning, Weaving of Textiles	Fiber Yarn(Natural Fiber Yarn, Chemical Fiber Yarn), Fiber Fabrics(Natural Fiber Fabrics, Chemical Fiber Fabrics, Other Fiber Fabrics, Fiber Bleaching and Dyeing), Mixed Cotton Yarn, Dyed or otherwise Finished Silk(Cotton).
5	Knitting Mills	Knitting Fabrics
6	Wearing Apparels and Accessories	Wearing Apparels, Suits, Other Accessories, Tanning and Dressing of Leather, Underwear, Outwear, Fur Articles
7	Other Textiles	Textile Products, Other Textile Products, Cordage, Rope and Fishing Nets

Sources: The Bank of Korea, 1998 Input-Output Tables, 2001. 12, pp.298-299

3.3. The Estimates of Total Output, Value-Added, and Final Demand

The amounts of total outputs and value-added in 1998 were calculated by the Gross Regional Domestic Products (GRDP) and Reports on Industrial Census of 1998. For the amounts of value-added in the sectors of agriculture, forestry and fisheries, mining and quarrying, and services, we used the 1998 GRDP. In case of manufacturing sectors, however, both the values of total output and value-added were calculated from the Report on Industrial Census of 1998 since the 1998 GRDP contained the aggregated values only. In addition, the small business section of the Report on Industrial Census of 1998 was utilized to calculate the amounts of value-added of the firms with less than five employees. We used the location quotients of each industry in Daegu area by the method of location quotients in accordance with the amount of total output for making the region's Input-Output table. We had the negative input coefficients of primary metal products and nonmetallic minerals since the residuals were treated by the Stone's negative input method. The region's amounts of total value-added, where the amounts of intermediate inputs were subtracted from the amounts of total output in each industry of the region, are composed of employee's compensation, operation surplus, depreciation of fixed capital and indirect taxes less subsidies.

The industrial linkage analysis equipped with the Input-Output model can be a very useful instrument because it enables us to investigate both the interdependence between industries and the multiplier effects. In particular, the employment and income multipliers are the key indicators for selecting the specific industries as promising ones for the region's economic prosperity. For the sake of the employment multiplier, we need the data on the employee by industry in the region.

We estimated the employees of 1998 by industry using the employment data

[Table 8] Intermediate Input and Intermediate Demand by Industry in Daegu.

	Classification	Total Output(A)	%	Intermediate Input(B)	%	Intermediate Demand(C)	%	B/A	C/A	Value-added	Employee
1	Agriculture, Forestry and Fisheries	219,306	0.67	88,824	0.50	142,115	0.80	40.5	64.8	130,482	162
2	Mining and Quarrying	9,539	0.03	6,905	0.04	57,307	0.32	72.4	600.8	2,634	169
3	Food and Kindred Products	855,436	2.63	563,051	3.19	445,719	2.52	65.8	52.1	292,385	9,368
4	Spinning, Weaving of Textiles	3,537,525	10.89	2,599,896	14.71	2,833,610	16.03	73.5	80.1	937,629	39,360
5	Knitting Mills	133,038	0.41	79,643	0.45	71,444	0.40	59.9	53.7	53,394	6,795
6	Wearing Apparels and Accessories	137,890	0.42	82,948	0.47	6,903	0.04	60.2	5.0	54,942	4,304
7	Other Textiles	224,737	0.69	122,606	0.69	83,483	0.47	54.6	37.1	102,131	8,752
8	Textile Mill Products, Apparel	10,294	0.03	6,584	0.04	4,123	0.02	64.0	40.1	3,710	370
9	Paper and Wood Products	73,524	1.46	315,190	1.78	426,713	2.41	66.6	90.1	158,335	4,712
10	Printing and Publishing	145,335	0.45	83,290	0.47	101,864	0.58	57.3	70.1	62,045	4,709
11	Petroleum, Coal Products and Chemicals	662,808	2.04	447,496	2.53	491,100	2.78	67.5	74.1	215,311	8,022
12	Nonmetallic Minerals	163,110	0.50	94,621	0.54	146,986	0.83	58.0	90.1	68,490	2,279
13	Primary Metal Products	459,210	1.41	330,571	1.87	413,813	2.34	72.0	90.1	128,639	4,626
14	Fabricated Metal Products	613,935	1.89	359,558	2.03	384,126	2.17	58.6	62.6	254,377	13,157
15	General Machinery and Equipment	1,127,001	3.47	707,591	4.00	670,785	3.80	62.8	59.5	419,410	18,619

	Classification	Total Output(A)	%	Intermediate Input(B)	%	Intermediate Demand(C)	%	B/A	C/A	Value-added	Employee
16	Electronic and Other Electric Equipment	505,461	1.56	335,820	1.90	284,299	1.61	66.4	56.2	169,640	8,657
17	Precision Instruments	210,636	0.65	134,340	0.76	158,178	0.90	63.8	75.1	76,297	5,117
18	Transportation Equipment	1,350,017	4.15	880,815	4.98	657,526	3.72	65.2	48.7	469,201	14,033
19	Furniture and Miscellaneous Manufactured Products	129,321	0.40	74,712	0.42	63,903	0.36	57.8	49.4	54,609	4,702
20	Electric, Gas and Water Services	384,001	1.18	204,653	1.16	239,691	1.36	53.3	62.4	179,348	2,406
21	Construction	4,131,577	12.71	2,420,059	13.69	1,649,286	9.33	58.6	39.9	1,711,518	31,003
22	Wholesale and Retail Trade	4,307,334	13.26	2,107,273	11.92	2,027,016	11.47	48.9	47.1	2,200,061	132,871
23	Eating and Drinking Places, and Hotels and Other Lodging Places	1,328,192	4.09	818,031	4.63	713,776	4.04	61.6	53.7	510,161	66,421
24	Transportation and Warehousing	1,060,984	3.27	544,549	3.08	456,802	2.58	51.3	43.1	516,435	35,533
25	Communications and Broadcasting Services	966,175	2.97	372,609	2.11	556,553	3.15	38.6	57.6	593,566	5,192
26	Finance and Insurance	1,791,176	5.51	703,902	3.98	1,067,315	6.04	39.3	59.6	1,087,274	31,163
27	Real Estate and Business Services	3,494,963	10.76	1,180,678	6.68	2,052,700	11.62	33.8	58.7	2,314,285	35,278
28	Public Administration and Defense	773,970	2.38	317,791	1.80	0	0.00	41.1	0.0	456,179	28,420
29	Educational and Health Services	819,614	2.52	239,563	1.36	246,196	1.39	29.2	30.0	580,051	26,289
30	Social and Personal Services	1,764,277	5.43	844,332	4.78	739,013	4.18	47.8	41.9	1,019,945	56,588
31	Others	704,640	2.17	604,600	3.42	480,156	2.72	85.8	68.1	10	15,653
	Total	32,495,026	100	17,672,501	100	17,672,501	100	54.4	54.4	14,833,954	624,730

from the Report on the Census on Basic Characteristics of Establishments of 1998 made by KNSO(Korea National Statistical Office). The value-added (income) multiplier can be obtained from the amounts of value-added by each industry, and in accordance with the amounts of employee's compensation. The amount of intermediate inputs in Daegu is estimated to 17,672.5 billion won (Korea currency), which is 54% of the total outputs. The ratios of intermediate input to the total output by industry are given as follows; 73.4% in fabric and textile, 72.4% in mining and quarrying, 72.0% in primary metal products, 66.4% in electronics and other electric equipment in order.

While the ratio of intermediate demand to the total output shows up to 600.8% in mining and quarrying sector, it is 90.1% each in paper and wood products, nonmetallic minerals, and primary metal products, 80.1% in fabric and textile process, 75.1% in precision instruments, 74.1% in petroleum, coals and chemicals, 70.1% in printing and publishing in order. In case of apparels and others, the ratio of intermediate input is 60.2% but that of intermediate demand is just 5.0%.

3.4. Input Coefficients and Production Inducement Coefficient in Daegu

Since the values of all elements in the input coefficient matrix took the values between 0 and 1, they satisfied the required nature of the input coefficients. And the condition that the values of diagonal elements in the production inducement coefficients matrix are always equal to or greater than one is also satisfied. Then we can test whether the Hawkins-Simon(H-S) condition is met once we get the production inducement coefficient matrix of the region.

Table 9 shows that the H-S condition of the Input-Output model of 1998 in Daegu is satisfied since the values of all industries are less than one. The inducement coefficients of value-added indicate the highest value of 1.9363 in the transportation and warehousing sector, 0.9355 in public administration and defense, 0.8739 in real estate and business services, 0.8619 in education and health services, 0.8415 in printing and publishing in order as reported in Table 9. But the inducement coefficients of value-added in all four categorized sub-divisions of the entire textile industry are less than the average value of 0.6714 in all industries, implying that the textile industry makes lower contribution to the induced value-added.

According to the employment inducement coefficient in Table 13, the knitting mills sector records the highest value of 0.0606, the second highest value of 0.0576 in eating, drinking places, and hotels and other lodging places, 0.0483 in other textile products, 0.0478 in furniture and miscellaneous manufactured products, 0.0470 in printing and publishing, 0.0465 in public administration and defense, 0.0447 in leather products. Despite the relatively high values of textile related products in employment inducement coefficients, the textile industry in

Daegu specializing in spinning, weaving of textile shows a very low value of 0.0190, which is lower than the average value of all industries, implying a small contribution to the employment inducement.

[Table 9] Value-added Inducement Coefficient and Employment Inducement Coefficient.

	Classification	Value-added Inducement Coeff.	Employment Inducement Coeff.	Hawkins-Simon Condition
1	Agriculture, Forestry and Fisheries	0.7687	0.0061	0.0165
2	Mining and Quarrying	0.4642	0.0239	0.0010
3	Food and Kindred Products	0.5474	0.0164	0.0849
4	Spinning, Weaving of Textiles	0.5044	0.0190	0.0804
5	Knitting Mills	0.6309	0.0606	0.0317
6	Wearing Apparels and Accessories	0.6359	0.0435	0.0006
7	Other Textiles	0.6402	0.0483	0.0314
8	Textile Mill Products, Apparel	0.5755	0.0447	0.0094
9	Paper and Wood Products	0.7920	0.0251	0.3985
10	Printing and Publishing	0.8415	0.0470	0.0488
11	Petroleum, Coal Products and Chemicals	0.4663	0.0175	0.0734
12	Nonmetallic Minerals	0.6238	0.0213	0.0525
13	Primary Metal Products	0.4314	0.0154	0.1531
14	Fabricated Metal Products	0.6377	0.0306	0.0964
15	General Machinery and Equipment	0.6935	0.0299	0.2276
16	Electronic and Other Electric Equipment	0.4962	0.0235	0.0787
17	Precision Instruments	0.6659	0.0375	0.1504
18	Transportation Equipment	0.7006	0.0236	0.2352
19	Furniture and Miscellaneous Manufactured Products	0.7217	0.0478	0.0160
20	Electric, Gas and Water Services	0.6112	0.0105	0.0788
21	Construction	0.6688	0.0164	0.0087
22	Wholesale and Retail Trade	0.7672	0.0379	0.0208
23	Eating and Drinking Places, and Hotels and Other Lodging Places	0.5184	0.0576	0.0038
24	Transportation and Warehousing	0.9363	0.0442	0.1344
25	Communications and Broadcasting Services	0.7602	0.0093	0.0675
26	Finance and Insurance	0.7799	0.0229	0.0774
27	Real Estate and Business Services	0.8739	0.0158	0.1254
28	Public Administration and Defense	0.9355	0.0465	0.0000
29	Educational and Health Services	0.8425	0.0378	0.0097
30	Social and Personal Services	0.8619	0.0419	0.0407
31	Others	0.4188	0.0448	0.0169
	Total	0.6714	0.0312	-

IV. THE PROPERTIES OF THE TEXTILE INDUSTRY IN THE INPUT-OUTPUT MODEL

4.1. The Industrial Structure of Daegu and Location Quotient

When the industrial structure of Daegu economy is examined in terms of the amounts of total output, the wholesale and retail trade sector shares the highest

[Table 10] The Location Quotients by Industry in Daegu

	Classification	Nation		Daegu		LQ (D/B)	(C/A)
		Total Output(A)	Weight (B)	Total Output(C)	Weight (D)		
1	Agriculture, Forestry and Fisheries	33,542,592	3.16	219,306	0.67	0.21	0.65
2	Mining and Quarrying	2,539,580	0.24	9,539	0.03	0.12	0.38
3	Food and Kindred Products	53,153,139	5.00	855,436	2.63	0.53	1.61
4	Spinning, Weaving of Textiles	4,294,071	0.40	3,537,525	10.89	26.95	82.38
5	Knitting Mills	15,828,408	1.49	133,038	0.41	0.27	0.84
6	Wearing Apparels and Accessories	14,055,516	1.32	137,890	0.42	0.32	0.98
7	Other Textiles	5,573,152	0.52	224,737	0.69	1.32	4.03
8	Textile Mill Products, Apparel	5,320,779	0.50	10,294	0.03	0.06	0.19
9	Paper and Wood Products	14,368,071	1.35	473,524	1.46	1.08	3.30
10	Printing and Publishing	7,700,446	0.72	145,335	0.45	0.62	1.89
11	Petroleum, Coal Products and Chemicals	107,168,629	10.08	662,808	2.04	0.20	0.62
12	Nonmetallic Minerals	16,763,715	1.58	163,110	0.50	0.32	0.97
13	Primary Metal Products	54,427,447	5.12	459,210	1.41	0.28	0.84
14	Fabricated Metal Products	18,761,683	1.77	613,935	1.89	1.07	3.27
15	General Machinery and Equipment	28,708,463	2.70	1,127,001	3.47	1.28	3.93
16	Electronic and Other Electric Equipment	93,604,275	8.81	505,461	1.56	0.18	0.54
17	Precision Instruments	4,751,873	0.45	210,636	0.65	1.45	4.43
18	Transportation Equipment	48,971,426	4.61	1,350,017	4.15	0.90	2.76
19	Furniture and Miscellaneous Manufactured Products	7,363,442	0.69	129,321	0.40	0.57	1.76
20	Electric, Gas and Water Services	23,398,313	2.20	384,001	1.18	0.54	1.64
21	Construction	97,469,622	9.17	4,131,577	12.71	1.39	4.24
22	Wholesale and Retail Trade	52,330,216	4.92	4,307,334	13.26	2.69	8.23
23	Eating and Drinking Places, and Hotels and Other Lodging Places	9,145,806	0.86	1,328,192	4.09	4.75	14.52
24	Transportation and Warehousing	45,080,007	4.24	1,060,984	3.27	0.77	2.35
25	Communications and Broadcasting Services	19,886,424	1.87	966,175	2.97	1.59	4.86
26	Finance and Insurance	41,855,577	3.94	1,791,176	5.51	1.40	4.28
27	Real Estate and Business Services	102,092,718	9.60	3,494,963	10.76	1.12	3.42
28	Public Administration and Defense	34,665,394	3.26	773,970	2.38	0.73	2.23
29	Educational and Health Services	55,036,636	5.18	819,614	2.52	0.49	1.49
30	Social and Personal Services	20,305,138	1.91	1,764,277	5.43	2.84	8.69
31	Others	24,795,523	2.33	704,640	2.17	0.93	2.84
	Total	1,062,958,081	100.00	32,495,026	100.00	1.00	3.06

weight of 13.26% and the construction sector the next of 12.71%. Table 10 shows 10.89% in the spinning, weaving of textile and other textiles, 10.76% in the real estate and business services, and 5.51% in the finance and insurance. While the spinning, weaving of textile sector shares relatively high weight of 10.89%, which in turn means the sector is a main part of the textile industry in Daegu, the other three textile related sectors show very low values of less than 1%.

The location quotient(LQ) which represents the degree of specialization of a specific industry in the regional economy compared with the national economy in terms of the relative weights in the composition of industries may help to figure out the properties of the region's economic structure. If the location quotient of a certain industry is greater than one, then the region is more specialized in the industry than the nation as a whole, and thus it becomes an ongoing industry, vice versa. That implies the greater the location quotient is, the more specialized in the relevant industry is the region.

Table 10 of the location quotients by industry in Daegu shows the highest value of location quotients, 26.96 in the spinning, weaving of textile sector, followed by 4.75 in the eating, drinking places, and hotels and other lodging places and 2.84 in the social and personal services, 1.40 in the finance and insurance sector. While the spinning and weaving sector has the highest value of location quotient (26.95), the other three subdivisions of the textile industry result in relatively very low values of location quotient: 1.32 in other textile products, 0.32 in the wearing apparels and accessories, and 0.27 in the knitting mills. This means that those subdivision sectors of textile industry are relatively rare in Daegu. The outcome is not so surprising since we knew that the structure of the textile industry was not advanced.

4.2. The Forward and Backward Linkage Effects by Industry

The linkage effect is defined as a bilateral interaction between different industries; the purchasing of goods produced in other industries as intermediate goods is called a backward linkage effect, and selling goods to other industries as intermediate goods is called a forward linkage effect. In order to implement an effective industrial policy, this linkage effect may be used as one of the strategies to select a leading industry. The power of dispersion index indicates backward linkage effects, which measures the degree of interdependence through purchases from other industries. The forward linkage effects can be obtained by considering the degree of sensitivity, which reveals the degree of industrial interdependence through a specific industry's sales to other industries.

As shown in Table 11 of the forward and backward linkage effects by industry in Daegu, the paper and wood products industry indicates the highest value of the power of dispersion, 1.3819, the printing and publishing industry the second highest of 1.2774, and the knitting mills 1.0263. In case of the

degree of sensitivity, the real estate and business services sector shows the highest value of 2.5293 and the paper and wood products industry the second highest value of 1.8388. Considering both the power of dispersion index and the degree of sensitivity index, the general machinery and equipment, transportation and warehousing, and paper and wood products show higher values of both indices than one, which means these industries have a strong potential power for growth in the region.

[Table 11] The Forward and Backward Linkage Effects by Industry in Daegu

	Classification	Backward Linkage Effects	The Forward Linkage Effects
1	Agriculture, Forestry and Fisheries	0.8836	0.8246
2	Mining and Quarrying	0.9059	0.7129
3	Food and Kindred Products	0.9274	1.1197
4	Spinning, Weaving of Textiles	0.9915	0.9200
5	Knitting Mills	1.0263	0.7709
6	Wearing Apparels and Accessories	0.9898	0.6545
7	Other Textiles	0.9336	0.7349
8	Textile Mill Products, Apparel	0.9629	0.6551
9	Paper and Wood Products	1.3819	1.8388
10	Printing and Publishing	1.2774	0.7743
11	Petroleum, Coal Products and Chemicals	0.8585	1.1347
12	Nonmetallic Minerals	0.9319	0.7464
13	Primary Metal Products	0.8997	1.0003
14	Fabricated Metal Products	0.9945	0.9728
15	General Machinery and Equipment	1.1457	1.1723
16	Electronic and Other Electric Equipment	0.8805	0.7814
17	Precision Instruments	1.0709	0.8389
18	Transportation Equipment	1.2042	0.9881
19	Furniture and Miscellaneous Manufactured Products	1.1005	0.7059
20	Electric, Gas and Water Services	0.8525	0.9821
21	Construction	0.9949	0.9002
22	Wholesale and Retail Trade	0.9554	1.2246
23	Eating and Drinking Places, and Hotels and Other Lodging Places	1.0120	0.8714
24	Transportation and Warehousing	1.0042	1.0879
25	Communications and Broadcasting Services	0.8271	1.0177
26	Finance and Insurance	0.8632	1.5673
27	Real Estate and Business Services	0.9166	2.5293
28	Public Administration and Defense	1.0285	0.6464
29	Educational and Health Services	0.8520	0.8009
30	Social and Personal Services	1.0252	0.7673
31	Others	1.3007	1.2571
	Total	1.0000	1.0000

The entire textile industry shows pretty high values of both the degree of

sensitivity index (forward linkage effect) and the power of dispersion index (backward linkage effect), 1.1330 and 1.2460, respectively. Unlike the textile industry as a whole, the categorized subsectors of the textile industry indicate lower values of both effects less than one, except the power of dispersion index of 1.0263 in the knitting mills sector. In particular, there exist apparent differences in linkage effects among textile related sub-sectors. Also, this result reveals that the industrial structure within the textile industry of Daegu region is oriented to low value-added structure. In addition, the backward linkage effect is, in general, shown to be greater than the forward linkage effect in the textile industry of Daegu.

4.3. Multiplier Effects by Industry

(1) Output Multiplier

Let us consider three types of multipliers: output multiplier, employment multiplier and the income multiplier, respectively, using the Input-Output model. These multipliers describe the quantitative effects on other industries associated with a change in final demand in a certain industry both directly and indirectly in the relevant regional economy.

The output multiplier, which is equal to the production inducement coefficient in an individual industry, is composed of direct and indirect effects. Since the power of dispersion index can be obtained by dividing the production inducement coefficients of self-sectors by the average of all those, the output multipliers are changing parallel with the production inducement coefficients, even though the two have different values.

According to the table 12, the output multiplier of the paper and wood products industry is a highest of 2.1376, and that of printing and publishing sector the second of 1.9761. When the output multiplier is divided into the two parts; direct and indirect effects, the paper and wood products industry produces the highest direct effect with the value of 1.5953 and the printing and publishing industry the second highest value of 1.5323. For the indirect effect, the paper and wood products industry also presents the highest value of 0.5423.

However, all four subdivisions of the textile industry does not produce relatively high output multipliers. It is fair to say that judging from the output multiplier, the textile industry is just a mediocre industry. Among four sub-sectors, the knitting mills sector results in the highest value of 1.5875 and the spinning, weaving of textiles the second highest of 1.5338.

(2) Employment Multiplier

This employment multiplier measures the effects on the change in employments in all industries over the region associated with the employment change in a certain industry. Total employment effect is represented by the sum of direct and indirect employment effects and thus the employment multiplier is

[Table 12] Output Multiplier: Direct and Indirect effects

	Classification	Production Multiplier	Direct Effect	Indirect Effect
1	Agriculture, Forestry and Fisheries	1.3669	1.2518	0.1151
2	Mining and Quarrying	1.4014	1.2577	0.1437
3	Food and Kindred Products	1.4347	1.2945	0.1402
4	Spinning, Weaving of Textiles	1.5338	1.3647	0.1691
5	Knitting Mills	1.5875	1.3907	0.1968
6	Wearing Apparels and Accessories	1.5312	1.3422	0.1890
7	Other Textiles	1.4441	1.2913	0.1529
8	Textile Mill Products, Apparel	1.4894	1.3247	0.1647
9	Paper and Wood Products	2.1376	1.5953	0.5423
10	Printing and Publishing	1.9761	1.5323	0.4437
11	Petroleum, Coal Products and Chemicals	1.3281	1.2259	0.1022
12	Nonmetallic Minerals	1.4416	1.2941	0.1474
13	Primary Metal Products	1.3918	1.2749	0.1169
14	Fabricated Metal Products	1.5384	1.3553	0.1831
15	General Machinery and Equipment	1.7724	1.4747	0.2977
16	Electronic and Other Electric Equipment	1.3619	1.2491	0.1129
17	Precision Instruments	1.6565	1.4292	0.2273
18	Transportation Equipment	1.8628	1.5102	0.3526
19	Furniture and Miscellaneous Manufactured Products	1.7024	1.4173	0.2851
20	Electric, Gas and Water Services	1.3188	1.2243	0.0944
21	Construction	1.5391	1.3517	0.1874
22	Wholesale and Retail Trade	1.4779	1.3263	0.1517
23	Eating and Drinking Places, and Hotels and Other Lodging Places	1.5655	1.3881	0.1773
24	Transportation and Warehousing	1.5533	1.3650	0.1883
25	Communications and Broadcasting Services	1.2794	1.1928	0.0866
26	Finance and Insurance	1.3353	1.2255	0.1099
27	Real Estate and Business Services	1.4179	1.2788	0.1391
28	Public Administration and Defense	1.5910	1.3524	0.2386
29	Educational and Health Services	1.3179	1.1983	0.1196
30	Social and Personal Services	1.5858	1.3756	0.2102
31	Others	2.0121	1.6650	0.3470

just the ratio of direct effect to total effect.

When the properties of these employment effects are considered, the labor-intensive industry generates relatively high direct employment effect, but low indirect employment effect. By contrast, the capital-intensive industry generates relatively low direct effect, but high indirect effect, therefore leading to a higher employment multiplier.

Table 13 reports the employment multipliers that are obtained from the number of employees by the region's industry and both direct and indirect employment effects. According to Table 13, the agriculture, forestry and fishery

[Table 13] The Employment Multiplier: Direct and Indirect Effects

	Classification	Employment Multiplier	Total Effect	Direct Effect	Indirect Effect
1	Agriculture, Forestry and Fisheries	8.3450	0.0062	0.0007	0.0054
2	Mining and Quarrying	1.3535	0.0240	0.0177	0.0063
3	Food and Kindred Products	1.5063	0.0165	0.0110	0.0055
4	Spinning, Weaving of Textiles	1.7090	0.0190	0.0111	0.0079
5	Knitting Mills	1.1865	0.0606	0.0511	0.0095
6	Wearing Apparels and Accessories	1.3953	0.0436	0.0312	0.0123
7	Other Textiles	1.2403	0.0483	0.0389	0.0094
8	Textile Mill Products, Apparel	1.2456	0.0448	0.0359	0.0088
9	Paper and Wood Products	2.5239	0.0251	0.0100	0.0152
10	Printing and Publishing	1.4516	0.0470	0.0324	0.0146
11	Petroleum, Coal Products and Chemicals	1.4450	0.0175	0.0121	0.0054
12	Nonmetallic Minerals	1.5290	0.0214	0.0140	0.0074
13	Primary Metal Products	1.5323	0.0154	0.0101	0.0054
14	Fabricated Metal Products	1.4280	0.0306	0.0214	0.0092
15	General Machinery and Equipment	1.8139	0.0300	0.0165	0.0134
16	Electronic and Other Electric Equipment	1.3744	0.0235	0.0171	0.0064
17	Precision Instruments	1.5469	0.0376	0.0243	0.0133
18	Transportation Equipment	2.2799	0.0237	0.0104	0.0133
19	Furniture and Miscellaneous Manufactured Products	1.3171	0.0479	0.0364	0.0115
20	Electric, Gas and Water Services	1.6853	0.0106	0.0063	0.0043
21	Construction	2.1894	0.0164	0.0075	0.0089
22	Wholesale and Retail Trade	1.2296	0.0379	0.0308	0.0071
23	Eating and Drinking Places, and Hotels and Other Lodging Places	1.1530	0.0577	0.0500	0.0077
24	Transportation and Warehousing	1.3198	0.0442	0.0335	0.0107
25	Communications and Broadcasting Services	1.7373	0.0093	0.0054	0.0040
26	Finance and Insurance	1.3159	0.0229	0.0174	0.0055
27	Real Estate and Business Services	1.5709	0.0159	0.0101	0.0058
28	Public Administration and Defense	1.2674	0.0465	0.0367	0.0098
29	Educational and Health Services	1.1794	0.0378	0.0321	0.0058
30	Social and Personal Services	1.3077	0.0419	0.0321	0.0099
31	Others	2.0192	0.0449	0.0222	0.0226

industry shows the highest employment multiplier of 8.3450, followed by 2.5239 in the paper and wood products and 1.7090 in the spinning, weaving of textiles sector. For direct employment effects, the knitting mills sector takes the first place at 0.0511, and the eating and drinking places, hotels and other lodging places sector ranks at the second at 0.0500. This outcome shows that the relatively labor-intensive industry generates high values of direct employment effects. In contrast to the direct employment effects, the capital-intensive industry results in relatively high indirect employment effects; 0.0152 in the paper and wood products sector and 0.0146 in the printing and publishing sector. In the

case of the textile-related industry, the spinning, weaving of textiles sector produces relatively high employment multiplier, but other sectors do a medium level of effects.

[Table 14] The Value-added Multiplier: Direct and Indirect Effects

	Classification	Value-added Multiplier	Total Effect	Direct Effect	Indirect Effect
1	Agriculture, Forestry and Fisheries	1.2921	0.7688	0.5950	0.1738
2	Mining and Quarrying	1.6811	0.4642	0.2761	0.1881
3	Food and Kindred Products	1.6017	0.5474	0.3418	0.2057
4	Spinning, Weaving of Textiles	1.9032	0.5044	0.2651	0.2394
5	Knitting Mills	1.5720	0.6309	0.4013	0.2296
6	Wearing Apparels and Accessories	1.5959	0.6359	0.3984	0.2375
7	Other Textiles	1.4088	0.6402	0.4544	0.1858
8	Textile Mill Products, Apparel	1.5971	0.5756	0.3604	0.2152
9	Paper and Wood Products	2.3686	0.7920	0.3344	0.4576
10	Printing and Publishing	1.9713	0.8416	0.4269	0.4147
11	Petroleum, Coal Products and Chemicals	1.4356	0.4664	0.3248	0.1415
12	Nonmetallic Minerals	1.4856	0.6238	0.4199	0.2039
13	Primary Metal Products	1.5401	0.4314	0.2801	0.1513
14	Fabricated Metal Products	1.5391	0.6377	0.4143	0.2234
15	General Machinery and Equipment	1.8637	0.6936	0.3721	0.3214
16	Electronic and Other Electric Equipment	1.4787	0.4963	0.3356	0.1606
17	Precision Instruments	1.8386	0.6660	0.3622	0.3038
18	Transportation Equipment	2.0158	0.7006	0.3476	0.3531
19	Furniture and Miscellaneous Manufactured Products	1.7091	0.7217	0.4223	0.2995
20	Electric, Gas and Water Services	1.3088	0.6113	0.4671	0.1442
21	Construction	1.6146	0.6688	0.4143	0.2546
22	Wholesale and Retail Trade	1.5021	0.7672	0.5108	0.2565
23	Eating and Drinking Places, and Hotels and Other Lodging Places	2.5027	0.5184	0.2072	0.3112
24	Transportation and Warehousing	1.4705	0.9363	0.6367	0.2996
25	Communications and Broadcasting Services	1.2375	0.7603	0.6143	0.1459
26	Finance and Insurance	1.2849	0.7799	0.6070	0.1729
27	Real Estate and Business Services	1.3199	0.8740	0.6622	0.2118
28	Public Administration and Defense	1.3322	0.9355	0.7022	0.2333
29	Educational and Health Services	1.1905	0.8425	0.7077	0.1348
30	Social and Personal Services	1.4911	0.8620	0.5781	0.2839
31	Others	-	0.4189	0.0000	0.4189

(3) The Value-Added Multiplier

The value-added(income) multiplier is defined as the ratio of the amount of direct value-added to the amount of total value-added in all related industries incurred by one unit of change in the value-added of a certain industry. Total amount of value-added is the sum of the amounts of direct value-added and

indirect value-added and the direct value-added amounts to the rate of employees' wages to the value of a unit of output.

As reported in Table 14, the eating and drinking places, hotel and other lodging places sector gives the highest value of the value-added multiplier, 2.5027, and the next highest multiplier is 2.3686 in the paper and wood products sector, 1.9032 in the spinning, weaving of textiles sector, and 1.6146 in the construction sector. The direct value-added effects are relatively high in the following sectors: education and health, public administration and defense, real estate and business services, and transportation and warehousing sector. Rather, paper and wood products, printing and publishing, eating, drinking places and hotels sectors show relatively high indirect value-added effects.

Among the four subdivisions, the spinning, weaving of textiles sector generates fairly high value-added multiplier, but the other three sub-sectors fail to create relatively high value-added. The value-added multiplier in the spinning, weaving of textiles sector is 1.9032, which indicates that one unit of increase in terms of value-added in the relevant sector raises 1.9032 times of the increase of the value-added across all related industries. This multiplier is equal to the ratio of total value-added effect (0.5044) to the direct value-added effect (0.2651), since the total value-added effect is the sum of the direct value-added effect (0.2651) and the indirect value-added effect (0.2394).

V. THE EVALUATION OF THE MILAN PROJECT AND SOME POLICY SUGGESTIONS

5.1 The Impacts of the Milan Project and Implications for Textile Industry

In the previous sections, we have constructed the Daegu region's Input-Output model to figure out the properties of the region's economic structure particularly focusing on the textile industry. The textile industry has long been the key sector in Daegu economy as well as in the Korean economy during the fast growing period. However, the region's textile industry has begun to lose its comparative advantage and competitiveness since the late 1980s.

In order to boost this declining industry and to revitalize the stagnant regional economy, the Daegu city government had implemented the Milan Project (1999~2003) with the help of the central government. The Milan project was a large-scale investment of 680 billion won with 17 sub-projects. However, there have been questions about the effectiveness of the Milan project since the launching stage of the project. Then it is apparently meaningful to investigate the impacts of the Milan project.

The impacts of the Milan project obtained from the input-output analysis are as follows: the estimated value of the production inducement effect is 1,044 billion won, and the employment and value-added inducement effects amount to 10,336 employees and 399 billion won, respectively. In addition, we could figure

out the nature and degree of interdependence among the related sectors, particularly focusing on the four sub-sectors of the textile industry in terms of linkage effects and the relevant multipliers.

Both the spinning and weaving and knitting mills sectors generate quite significant linkage effects on the related industries, but the wearing apparels and accessories sector has little effects on the other related sectors. This outcome may be interpreted as the region's textile industry has a very weak industrial structure. That is, the region's textile industry is specialized in the middle stream such as spinning and weaving sector, which generally creates low value-added, while the downstream of the industry such as high value-added sub-sectors of fashion, apparels, and design are merely less-developed.

5.2. The Policy Suggestions for the Post Milan Project

As already mentioned above on the analysis of four categorized sub-sectors of the textile industry, except that the knitting mills sector's power of dispersion index is greater than one, the indices are less than one in the remaining three sectors. As long as the whole textile industry is concerned, both the power of dispersion and the degree of sensitivity indices are greater than one, 1.1330 and 1.2460, respectively. This contrast implies that the structure of the textile industry in Daegu is biased to the up or middle stream away from the down stream (fashion, apparels and designs).

Thus, the local government of Daegu needs to invest more in the down stream for boosting the depressed leading industry in the region. For this purpose, the Milan Project put much emphasis on fashion, design and apparels rather than on fabrics and dying to shift the Daegu region's industrial structure from the low value-added to high value-added, thus transforming the policy of "few items and mass production system" into "diverse items and small production system".

Now let us provide some policy suggestions for the post (or 2nd) Milan Project as the 1st project already completed in 2003 was evaluated in the previous section. First, the post project should continuously emphasize the textile equipments and fashion and apparel sectors, therefore leading to produce higher value-added and to resolve trade deficits in that sub-sectors. While structural improvements should be immediately made to help upgrading traditional sub-sector of spinning and weaving, considerable efforts are continuously made to further foster the fashion and apparel sector in Daegu.

Second, the software in the textile industry such as operation procedure, marketing, both overseas and domestic, and R&D should be considered prior to the additional investment in infrastructure. In fact, enough infrastructure such as Textile Development Center, Fashion Information Office, Fashion & Textile Polytechnic Institute, etc had been already built during the 1999~2003 period of the Milan Project. Now it is the right time that new management skills such as

supply-chain management (SCM), IT-based global marketing, Quick-Response(QR) logistics, etc be developed and relevantly implemented for the region's textile industry.

Third, it is necessary to nurture top-class brands comparable with world-renowned ones such as Prada, Gucci and Benneton. In addition, the systematic education and training programs are needed to cultivate capable fashion designers. These kinds of effort should be highly appreciated because brand and fashion will create a great amount of value-added for the region's textile industry.

Fourth, Daegu should pay more attention to the exhibition and convention industries to help bringing up local textile firms' own brand and overseas marketing power, thus enhancing the international competitiveness of the regional industry. Also, the business services industry should be further developed to support the important business functions of the Daegu-Kyungbuk region. With the development of business services and the exhibition and convention industries, the textile industry, especially apparel and fashion sector, can be further advanced along the post Milan project.

VI. SUMMARY AND THE CONCLUDING REMARKS

This paper built and analyzed the Input-Output model of Daegu to characterize the properties of the regional economy in terms of production inducement effect, forward and backward linkage effect, and three types of multipliers. This paper particularly focuses on the textile industry, the region's key leading sector, in order for providing some policy suggestions towards both the expected structural reform of the regional economy and the structural adjustments among the sub-sectors within the textile industry.

Based upon the above analysis, we can summarize the following policy implications for the structural adjustments of the textile industry. First, the textile industry, which has long been the key sector in Daegu and is yet a dominating sector in terms of the total output, though depressed today, so that the industry should be advanced further with the incorporation of the region's comparative advantages. Therefore, structural improvements should be immediately made to help upgrading traditional sub-sector of spinning and weaving.

Second, considerable efforts are continuously made to further foster the fashion and apparel sector in Daegu. Following the 1st Milan project, the post (or 2nd) project should continuously emphasize the textile equipments and fashion and apparel sectors, therefore leading to produce higher value-added textile products and apparels.

This paper still has some limitations of industrial analysis, as utilizing a regional input-output model. If this paper had employed a multi-regional input-output (MRIO) model, it could consider feedback effects among regions. In addition, this paper employed a national Input-Output table of 1998 in spite of

the relative advantages of the 2000 table released in 2003. Therefore, one will analyze the impacts of the Milan project again, using the later version of Input-Output table. The further research is warranted.

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