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Industrial Structure in Myanmar using a new Estimated Input–Output Table (2000–2001)

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In most Asian countries, input–output tables have successfully complied for every five years. In Myanmar, the last input–output table was constructed in (1994–95). The investigation of industrial structure of Myanmar economy by using input–output analysis is not fully documented yet. This study illustrates the full current picture of sectoral development of Myanmar economy by using input–output model with the help of newly estimated input–output table of Myanmar. The results of this study have revealed that agricultural sector and processing & manufacturing sector are the two most important sectors for the extension of primary inputs market and enhancing GDP and export of Myanmar.

Keywords: Input–output model, newly estimated input–output table, industrial structure, important sectors, Myanmar economy

INTRODUCTION

It is very important for national planning of policy maker to understand the situation of the sectoral development and the flow of goods and services within the national economy. The input–output analysis was pioneered by professor Wassily. W. Leontief in the early 1930 and it is the popular means of analyzing regional economic structure and assisting local economic development decision making. Input–output analysis describes and explains the level of output of a given national economy in terms of its relationships to the corresponding level of activities in all the other sectors. In input–output analysis, the economy is classified into sectors (or industries) and the flow of goods and services among sectors or industries is registered to indicate systematically the relations among them. These relations are called input–output relations because they tell us what inputs a sector needs to produce its output.

The application of input–output analysis required the preparation of input–output table of the economy. An input–output table permits us to analyze the interrelationship and to determine the effects on all industries of a change in the demand for any one of them. Input–output table provide the varieties of useful information [Deller 1990]: It is descriptive tool showing the existing structure of regional economy: It provides information on individual economic sectors: the linkage between them and how they co–vary: It can show the relative important of individual sector to overall economy: It can predict local response to changing economic conditions.

In Myanmar, the first input–output table was constructed by Professor Tun Thin, Professor Sun drum and U Aye Hlaing in (1952–53). The second table was built by U Nyunt Maung, Ministry of National Planning, and U Than Nyunt, Institute of Economics in (1964–65). The third table was drawn by Daw Tin Tin Yu in (1969–70). The fourth table was constructed by Daw Cho Cho Myint in (1989–90). The last table was built by Daw Tin Tin Yu in (1994–95). Apart from (1989–90) and (1994–95) tables, the remaining tables were drawn base on the twelve sectors.

Now, in many developed countries as well as in developing countries, the construction and the use of input–output table in empirical analysis have become a common practice. In Asian region, most of the countries have successfully compiled the table for every five years. In Myanmar, the last input–output table was constructed in 1994–95. So we have no up–to date input–output table that was constructed after the last table. In the previous studies, the investigation of industrial structure of Myanmar economy by using input–output analysis is not fully documented yet. It is required to develop up–to–date and comprehensive input–output table for the recent year and to analyze this new table to understand the full current picture of sectoral development of Myanmar's economy.

The main objective of this study is to investigate the characteristics of industrial structure of Myanmar economy (2000–2001) by using input–output technique. It is essential to draw up a new input–output table for Myanmar in that period. So the specific objective of this study is to estimate new input–output table of Myanmar (2000–2001).

In this study, non surveys (secondary data) were used for updating, estimating and analyzing the table. Input–output table for Myanmar (2000–2001) was prepared with the help of (1985–86) input–output table as a base and the existing sources of information from SNA (System of National Account) of Myanmar. On the account of

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limitation in situation, (2000–2001) input–output table was constructed (13×13) matrix as same as (1985–86) base table.

This paper illustrates the characteristics of industrial structure of Myanmar economy with the help of new estimated input–output table (2000–2001). The present table was built five years after the last input–output table. This table has presented the situation of industrial structure of Myanmar economy base on thirteen economic sectors. Moreover, the comparison between input–output tables of Myanmar and Japan was made in every step for recognizing the differences in sectoral activities between developed and developing country.

AN ESTIMATION Of NEW INPUT–OUTPUT TABLE

Method of estimation

Input–output model and basic table

In this paper, Leontief's input–output model was used to estimate new input–output table of Myanmar (2000–2001). Our estimation was based on input–output table of Myanmar (1985 – 86) and the secondary data from SNA (System of National Account). Leontief's input–output model was briefly explained by the hypothetical input–output transaction table as shown in table (1).

Gross outputs (sale) = Intermediate demand + final demand

$$X_i = \sum_{j=1}^{n} x_{ij} + (C_i + I_i + E_i)$$

Gross inputs (purchase) = Intermediate inputs + primary inputs

$$X_j = \sum_{i=1}^{n} x_{ij} + (V_j + M_j)$$

Where,

x_{ij} = the amount of the product of industry (sector) i absorbed annually as an intermediate input by industry j, X_i =total output of i^{th} sector, E =export of i^{th} sector, C_i =household's consumption of product of i^{th} sector, I_i =i^{th} sector investment, V_j = value added in sector j, M_j =imports for j^{th} sector, For i, j = 1, 2, . . . , n assuming that there are n sector.

In the above table, rows represent input and columns designate output. Therefore, each sector is both a user of inputs and the producer of outputs. The total outputs of each sector are divided into intermediate demand and final demand for its goods and services. Also, the total inputs of each sector are divided into intermediate supply and value added, which represent the supply of primary inputs or factors of production needed by sector. The necessary condition of input–output table is the total output must be equal to total inputs.

$$X_i = X_j$$

$$Since, \sum_{i=1}^{n} x_{ij} = \sum_{j=1}^{n} x_{ij}$$

$$V + M = C + I + E$$

$$V = C + I + (E - M)$$

That is, the sum of the total income generated by the production system of economy is equal to the total value of finished goods and services purchased by the final sectors for consumption, investment and net exports.

Updating and balancing new table

The transaction method under input–output model was used for updating new input–output table of Myanmar. In this method, base period inter–industry transactions are made proportion to the base period value added. We can calculate input coefficient matrix of base year induced by value added of this year by following:

$$a_{ij}\,(1985-86) = x_{ij}\,(1985-86)/V_j\,(1985-86)$$

Where, a_{ij} is input coefficient matrix, x_{ij} is the intermediate items and V_j is the value added of (1985–86).

Table 1. Hypothetical input–output transaction table

Producing Sector (Outputs)	Intermediate use columns 1 , 2 . . . j . .n	Using sector (inputs) Final Use			Total Output
		Consumption	Investment	Export	
Rows 1	$x_{11}\ x_{12} \ldots x_{1j} \ldots x_{1n}$	C_1	I_1	E_1	X_1
2	$x_{21}\ x_{22} \ldots x_{2j} \ldots x_{2n}$	C_2	I_2	E_2	X_2
.	. . . . .	.	.	.	.
.	. . . . .	.	.	.	.
.	. . . . .	.	.	.	.
i	$x_{i1}\ x_{i2} \ldots x_{ij} \ldots x_{in}$	C_i	I_i	E_i	X_i
.	. . . . .	.	.	.	.
.	. . . . .	.	.	.	.
n	$x_{n1}\ x_{n2} \ldots x_{nj} \ldots x_{nn}$	C_n	I_n	E_n	X_n
Value Added	$V_1\ V_2 \ldots V_j \ldots V_n$	V_c	V_I	V_E	V
Imports	$M_1\ M_2 \ldots M_j \ldots M_n$	M_c	M_I	M_E	M
Total Inputs	$X_1\ X_2 \ldots X_j \ldots X_n$	C	I	X_E	X

This matrix of proportions is multiplied by the diagonal matrix of the value added for the predicted year to form the transaction matrix of that year. It can be defined as

$$x_{ij}\ (2000-01) = a_{ij}\ (1985-86) \times V_j (2000-01)$$

Here, x_{ij} is the new needed transaction matrix of (2000–2001).

In the case of the final demand items for the future table, the base year final demand items are divided by final demand total of base period. This proportion is multiplied by total final demand of target year is defined by

$$F_{il}{}'\ (1985-86) = F_{il}\ (1985-86)/F_{it}(1985-86)$$

$$F_{il}\ (2000-01) = F_{il}{}'\ (1985-86) \times F_{it}(2000-01)$$

Here F_{it} is total final demand items and F_{il} is the individual final demand of consumption, investment, government expenditure and export.

The estimated table obtained by using Leontief's input–output model was unbalanced where the row and column sum did not match. So RAS method proposed by Richard Stone in 1960 was used for balancing the new estimated table. The estimated new table was adjusted to sum to the given row and column totals for the updated year, by successive prorating of the rows and columns until consistency is achieved by the following;

$$r_i^{(1)def} = y_i / \sum_j x_{ij}$$

Table 2. New estimated input–output table of Myanmar for the year (2000–2001) (million kyat)

No	Sector	1	2	3	4	5	6	7	8	9	10	11	12	13	Total Intermediate Use (14)
1	Agricultural	80,858	7,639	116	0	592,189	0	0	186	0	0	0	70	0	681,058
2	Livestock & Fishery	18,352	2,077	60	0	4,980	0	0	858	0	0	0	12	0	26,339
3	Forestry	387	203	0	0	3,772	0	1,864					83	0	6,309
4	Mining	0	0	0	26	1,909	1,086	1,854	0	0	0	0	0	0	4,875
5	Processing & Manufacturing	21,232	84,747	5,860	6,056	65,186	219	60,975	39,070	1,012	1,486	23,987	3,248	97,420	410,498
6	Power	0	80	18	19	1,210	27	133	169	32	2	119	11	96	1,916
7	Construction	6,357	275	73	76	3,393	1,811	0	47,543	44	6	6,611	222	25,675	92,086
8	Transportation	10,149	14,207	677	714	120,628	296	16,376	4,151	175	22	1,785	472	81,251	250,903
9	Communication	154	270	60	63	1,466	46	224	427	54	7	551	72	4,998	8,392
10	Financial Sector	454	70	0	0	451	0	0	0	0	0	0	0	0	975
11	Social & Administrative Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Rental & Other Services	0	0	0	0	0	0	0	0	0	0	110	43	1,990	2,143
13	Trade	45,073	21,176	445	184	44,689	86	21,898	12,076	8	95	2,329	1,980	4,911	154,950
14	Total Purchase	183,016	130,744	7,309	7,138	839,873	3,571	103,324	104,480	1,325	1,618	35,492	6,213	216,341	1,640,444
15	Imports	1,087	87	0	2	3,078	4	605	117	0	0	31	31	92	5,134
16	Labor Cost	593,239	22,454	11,247	4,143	70,054	1,460	44,728	88,802	5,808	172	39,247	4,635	96,345	982,334
17	Depreciation	159,186	3,793	133	3,799	16,839	2,652	974	36,321	611	10	31	11,909	4,308	240,567
18	Taxes (indirect)	21,389	2,326	2,556	745	18,648	447	292	10,409	34	8	77	1,899	149,147	207,977
19	Surplus (profit or Losses)	471,624	172,806	398	1,508	77,355	3,724	49	10,773	611	2,451	0	16,672	363,885	1,121,855
20	Value added	1,245,438	201,379	14,333	10,194	182,897	8,283	46,044	146,305	7,065	2,641	39,354	35,114	613,686	2,552,733
21	Total inputs	1,429,541	332,210	21,642	17,334	1,025,848	11,858	149,972	250,902	8,390	4,259	74,877	41,358	830,119	4,198,309

No	Sector	Final Use (Demand)				Total Output
		Consumption	Investment	Export	Total Final Demand	
1	Agricultural	666,319	74,837	7,327	748,483	1,429,541
2	Livestock &Fishery	293,252	12,213	407	305,872	332,210
3	Forestry	5,624	7,282	2,426	15,332	21,642
4	Mining	5,357	6,762	341	12,460	17,334
5	Processing & Manufacturing	539,239	74,771	1,339	615,349	1,025,848
6	Power	2,187	7,755	0	9,942	11,858
7	Construction	3,273	54,614	0	57,887	149,972
8	Transportation	0	0	0	0	250,902
9	Communication	0	0	0	0	8,390
10	Financial	3,246	38	0	3,284	4,259
11	Social & Administrative Services	63,835	11,042	0	74,877	74,877
12	Rental & Other Services	39,214	0	0	39,214	41,358
13	Trade	608,415	65,954	799	675,168	830,119
14	Total Purchase	2,229,961	315,268	12,639	2,557,868	4,198,310
15	Imports	7,517	2,422	0	9,939	15,073

(*kyat represents Myanmar currency)

$$s^{(1)def} = z_j / \sum_i x_{ij}$$

$$R^{(1)} = \max_i \{| r_i^{(1)} - 1 |\}$$

$$S^{(1)} = \max_j \{| s_j^{(1)} - 1 |\}$$

$$x_{ij}^{(2)} = r_i^{(1)} x_{ij} s_j^{(1)}$$

The above notation show the first step of adjusting where r is the ratio of given total outputs and computed total outputs and s is the ratio of a given total inputs and computed total inputs. And also R is the maximum absolute value of vector r^i and unit vector and S is the maximum absolute value of vector s^i and unit vector. To reach the necessary condition of input–output table that total inputs must be equal total output, we need to calculate until k^{th} step where $R^{(k)}$ and $S^{(k)}$ less than zero tolerance.

Results of estimation

New Input–output table of Myanmar (2000–2001)

According to the specific objective, the new and balance input–output table of Myanmar (2000–2001) can be successfully estimated with the help of secondary data by using Leontief's input–output model and RAS method. It was shown in table (2)

Technical coefficient

From the new input–output table of Myanmar (2000–2001), we can estimate technical coefficient also called input coefficient of that year. That can be expressed by the following equation.

$$a_{ij} = \frac{x_{ij}}{X_j} \quad i = 1, 2, 3 \ldots 13, \quad j=1, 2, 3 \ldots 13$$

Where a_{ij} is the technical coefficient of the production of each sector which indicates how many unit of output of i^{th} sector needed to produce one unit of the output of j^{th} sector. The input coefficient shown under any endogenous sector column represents the relative importance of the output of the sector indicated by each sector row. This amount of output is the amount of the input absorbed by each sector. We will now examine the magnitudes of the input coefficient for each sector in table (3).

Most economic sectors use inputs from at least six economic sectors whereas processing & manufacturing sector applies inputs from eleven economic sectors. It can be interpreted that processing & manufacturing sector is an essential sector for the input market of our country. The input coefficient of agricultural sector row under the column of processing and manufacturing sector (0.5772) and it is the largest of the entire input coefficient. This coefficient shows that the processing and manufacturing sector uses the largest inputs from agricultural sector. This is because of processing and manufacturing sector includes a large number of the small scale agriculture based industries.

The second, the third and the fourth largest technical coefficient are (0.4065), (0.3493) and (0.3489) respectively. These are the technical coefficient of the row of processing & manufacturing sector under the column of construction sector, mining sector and financial sector respectively. It shows that processing & manufacturing sector produce the largest input requirements of our economy.

ANALYSIS AND RESULTS USING ESTIMATED TABLE

The second step of this paper is to analyze the industrial sector of Myanmar economy by using the new estimated input–output table that is the result of the first section. In the method of analysis, induced domestic product, one sector exogenous model, power and sensitivity of dispersion of sectors were applied for fulfilling the main objective of the study. In addition to this, the comparison between input–output table of Myanmar and Japan were also made in this section.

Comparative analysis of induced domestic product between Myanmar and Japan

Induced domestic product mean the domestic pro-

Table 3. Input coefficient matrix of Myanmar (2000–2001)

No.	1	2	3	4	5	6	7	8	9	10	11	12	13
1	0.0565	0.0229	0.0053	0	0.5772	0	0	0.0007	0	0	0	0.0016	0
2	0.0128	0.0062	0.0027	0	0.0048	0	0	0.0034	0	0	0	0.0002	0
3	0.0002	0.0006	0	0	0.0036	0	0.0124	0	0	0	0	0.0020	0
4	0	0	0	0.0015	0.0018	0.0915	0.0123	0	0	0	0	0	0
5	0.0148	0.2551	0.2707	0.3493	0.0635	0.0184	0.4065	0.1557	0.1206	0.3489	0.3203	0.0785	0.1173
6	0	0.0002	0.0008	0.0010	0.00118	0.0022	0.0008	0.0006	0.0038	0.0004	0.0015	0.0002	0.0001
7	0.0044	0.0008	0.0033	0.0043	0.0033	0.1527	0	0.1894	0.0052	0.0014	0.0882	0.0053	0.0309
8	0.0070	0.0427	0.0312	0.0411	0.1175	0.0249	0.1091	0.0165	0.02085	0.0051	0.0238	0.0114	0.0978
9	0.0001	0.0008	0.0027	0.0036	0.0014	0.0038	0.0014	0.0017	0.0064	0.0010	0.0073	0.0017	0.0060
10	0.0003	0.0002	0	0	0.0004	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0.0014	0.0010	0.0023
13	0.0315	0.0637	0.0205	0.0106	0.0435	0.00725	0.1460	0.0481	0.0009	0.0223	0.0311	0.0478	0.0059

(Number 1–13 represent thirteen economic sectors of Myanmar economy.)

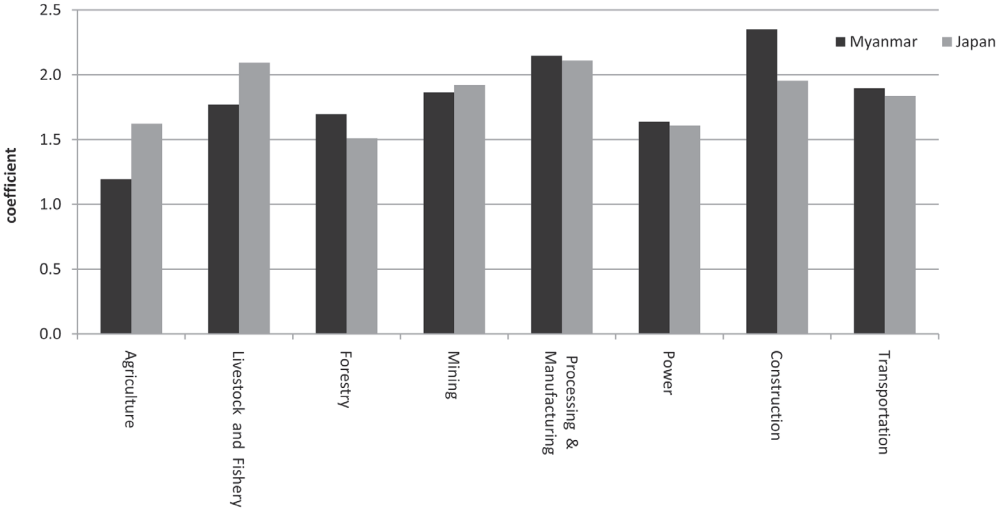
duction of every industry induced by individual final demand items which are consumption expenditures outside of household, consumption expenditures of households, consumption expenditures of government, gross domestic fixed capital formation, increases in stocks and exports. In this study, only two items of final demand (total final demand and export) were used to analyze the situation of Myanmar's industrial structure in 2000–2001. That can be expressed as $X = [I–A]^{-1}F$ (where X = induced domestic product, $[I–A]^{-1}$ = inverse matrix and F = final demand) and $X_E = [I–A]^{-1}E$ (where X_E = induced domestic product by export and E = export)

Figure (1) and (2) indicate the comparison of induced domestic product by total final demand item and export item of Myanmar and Japan. The index of the domestic product induced by total final demand items of construction sector is the highest among thirteen economic sectors in Myanmar economy in 2000–2001. Although Myanmar is an agricultural country, the index of induced domestic

Table 4. Comparative induced domestic product coefficient by final demand item between Myanmar (2000–2001) and Japan (2000)

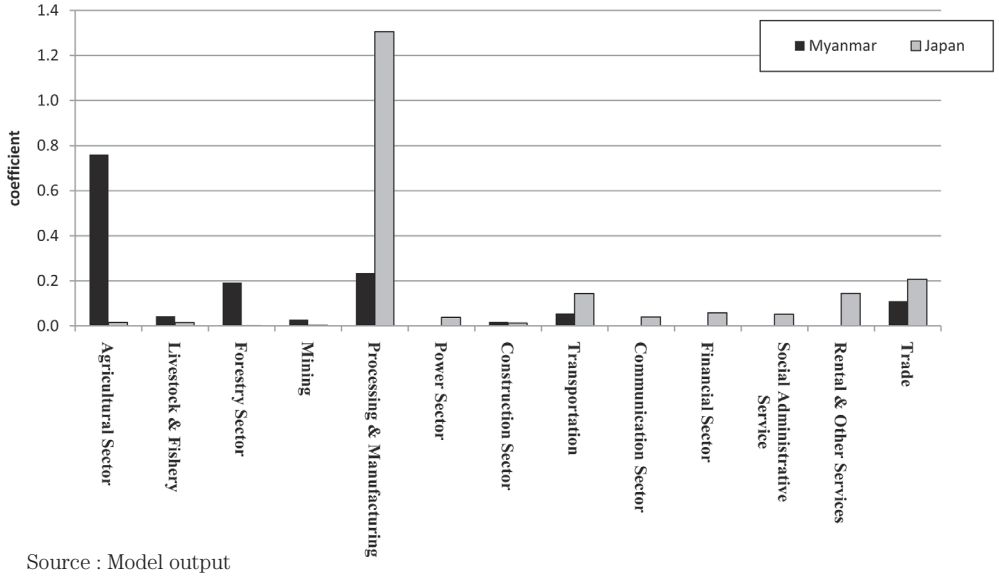
No	Sector	Myanmar	Japan
1	Agriculture	1.20	1.62
2	Livestock & fishery	1.77	2.09
3	Forestry	1.70	1.51
4	Mining	1.86	2.92
5	Processing & manufacturing	2.15	2.11
6	Power	1.64	1.61
7	Construction	2.35	1.95
8	Transportation	1.90	1.83
9	Communication	1.33	1.63
10	Financial	1.80	1.50
11	Social & administrative	2.00	1.52
12	Rental & other services	1.29	1.55
13	Trade	1.53	1.47

Source : Model output



Source : Model output

Figure 1. Comparative induced domestic product by final demand item between Myanmar (2000–2001) and Japan (2000).



Source : Model output

Figure 2. Comparative induced domestic product by export of Myanmar (2000–2001) and Japan (2000).

product by total final demand of agricultural sector is the lowest among thirteen economic sectors and it is lowers than non agricultural country, Japan in the same period. In that case, the index of that of other sectors are negligible amount. So the expression of those sectors were omitted in this paper. But when we see the domestic product induced by export point of view, the index of agricultural sector is the highest of all industrial sectors in Myanmar's economy in (2000–2001). It can be interpreted that agricultural sector play the most important role for increasing export of our economy.

Analysis of multiplicative effect of sectors: Power of dispersion and Sensitivity of dispersion

Analysis of multiplicative effect of sector consists of the investigation of power of dispersion and sensitivity of dispersion of individual sector of the economy. It can also display the relative important of each sector of the economy. In this paper, we compare the characteristics of each sector of Myanmar's economy and Japan's economy in 2000–2001.

Power of dispersion of sector can be calculated by dividing the vertical sum of every column sector of inverse matrix coefficient matrix and the mean value of vertical sum. It gives the multiplicative effect of unit final demand of every column sector on all industries. It can be shown as, $\alpha_j / \bar{\alpha}$.

Where $\alpha_j = \sum_{i=1}^{n} b_{ij}$ and it is the vertical sum of inverse matrix, $\bar{\alpha} = \frac{\sum_j \alpha_j}{n}$, n is the number of sectors in the economy.

The horizontal sum of every row sector of the inverse matrix coefficient divided by the mean value of horizontal sum is called "sensitivity of dispersion by sector". It gives the multiplicative effect of unit demand about all column sector on every row sector and express as, $\beta_i / \bar{\beta}$.

Table 5. Comparative induced domestic product coefficient by export item of Myanmar (2000–2001) and Japan (2000)

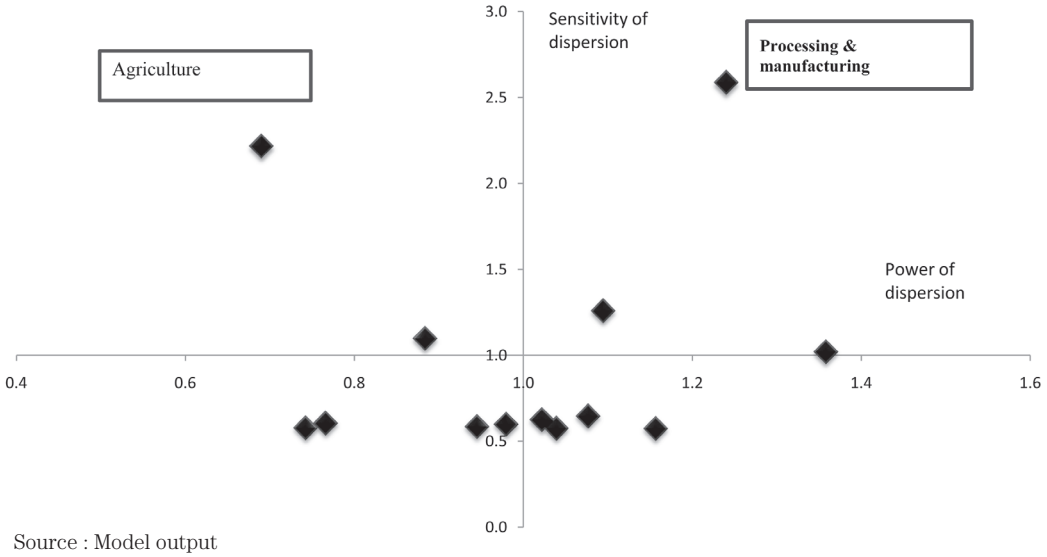
No	Sector	Myanmar	Japan
1	Agriculture	0.7607	0.0180
2	Livestock & fishery	0.0441	0.0163
3	Forestry	0.1933	0.0019
4	Mining	0.0277	0.0032
5	Processing & manufacturing	0.2354	0.3392
6	Power	0.0006	0.0402
7	Construction	0.0191	0.0137
8	Transportation	0.0561	0.1370
9	Communication	0.0019	0.0188
10	Financial	0.0004	0.0557
11	Social & administrative	0.0000	0.0495
12	Rental & other services	0.0003	0.1617
13	Trade	0.1107	0.1641

Source : Model output

Table 6. Multiplicative effect of sectors in Myanmar (2000–2001)

No	Sector	Power of dispersion	Sensitivity of dispersion
1	Agriculture	0.691	2.214
2	Livestock & fishery	1.022	0.629
3	Forestry	0.980	0.602
4	Mining	1.077	0.650
5	Processing &manufacturing	1.240	2.584
6	Power	0.946	0.589
7	Construction	1.358	1.022
8	Transportation	1.094	1.260
9	Communication	0.766	0.608
10	Financial	1.039	0.579
11	Social & administrative services	1.156	0.577
12	Rental & other services	0.743	0.582
13	Trade	0.884	1.099

Source : Model output



Source : Model output

Figure 3. Multiplicative effect of sectors in Myanmar (2000–2001).

Where, $\beta_i = \sum_{j=1}^{n} b_{ij}$ and it is the horizontal sum of row sector of inverse matrix, $\bar{\beta} = \sum_i \beta_i / n$.

The results of power of dispersion of sector can tell the effect of the growth of certain column sector upon all industries and that of sensitivity of dispersion determine the effect of the growth of all industries upon certain row sector. The above figures [figure (3) and figure (4)] show the result of multiplicative effect of each sector in Myanmar and Japan in (2000–2001). These results present that the processing & manufacturing sector is high in both power and sensitivity of dispersion in Myanmar economy and Japan economy. It can be concluded that the growth of that sector can stimulate not only on the growth of economy but also on that of other sectors. In Myanmar economy, agricultural sector is high in sensitivity of dispersion only. In the case of Japan, agricultural sector is low in power and sensitivity of dispersion than other sector. This is because the activities of food processing industry is not play the main role in Japan economy and that of food processing industry play the important role in Myanmar economy.

Table 7. Multiplicative effect of sectors in Japan (2000)

No	Sector	Power of dispersion	Sensitivity of dispersion
1	Agriculture	0.944	0.711
2	Livestock & fishery	1.219	0.664
3	Forestry	0.879	0.677
4	Mining	1.119	0.597
5	Processing &manufacturing	1.229	2.448
6	Power	0.936	0.818
7	Construction	1.138	0.710
8	Transportation	1.070	1.179
9	Communication	0.949	0.803
10	Financial	0.873	1.025
11	Social & administrative services	0.885	0.722
12	Rental & other services	0.905	1.662
13	Trade	0.855	1.985

Source : Model output

One sector exogenous model: the effect of 10% changes in production of each sector upon GDP (Yoshida 1990)

One sector exogenous model assumes one of the sectors in the economy as an exogenous sector while other sectors are endogenous sectors and analyze the effect of changes in production of each exogenous sector upon GDP of the country. In this study, we assume all the thirteen economic sectors be exogenous sector alternatively and change in production be 10%.

This model consists of input–output model with demand and supply identity. That is, $AX + F = X \longrightarrow (I - A)\, X = F$.

Where, A = Technical coefficient, X = Gross output of each sector, F = Final demand of each sector, I = Identity matrix

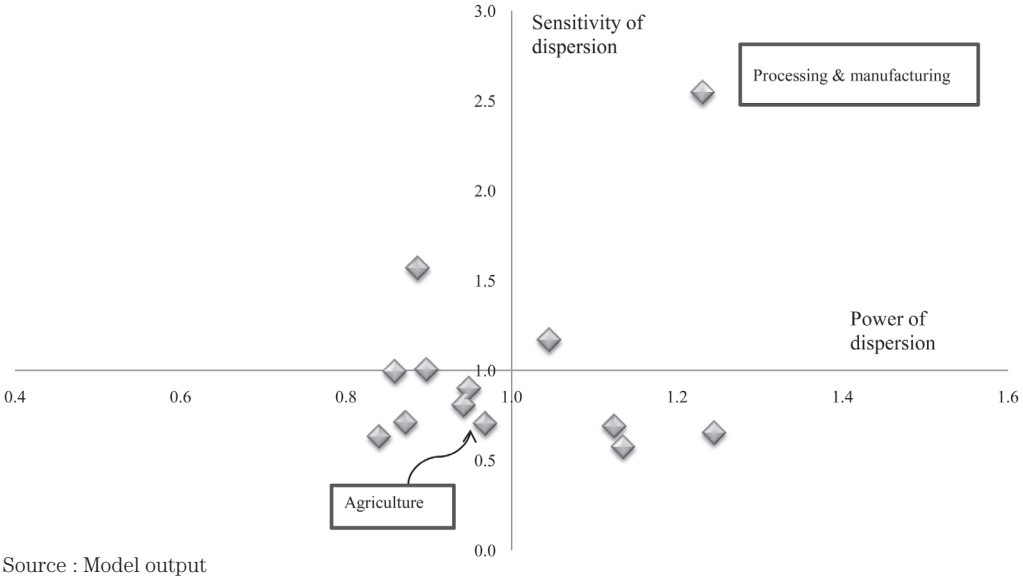
Assuming that (I – A) = D, 'G' be exogenous sector and 'N' be endogenous sectors and can be defined as follow; $\Delta X_N = (-D_{NN}^{(-1)} D_{NG}) \Delta X_G$

Where ΔX_N is the change in production of endogenous sectors and ΔX_G is the change in production of exogenous sector.

In here, the part of effect of change in GDP with respect to change in production of one exogenous sector can be defined as ;

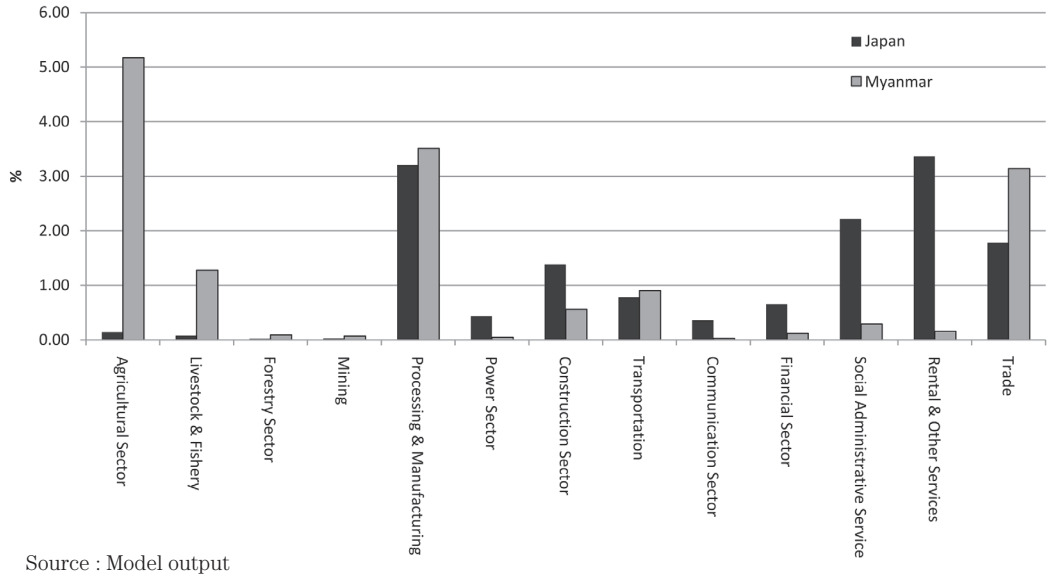
$$\Delta GDP = \hat{V} \begin{bmatrix} \Delta X_G \\ \Delta X_N \end{bmatrix}$$

Where, $\hat{V} = \begin{bmatrix} v_1 & & 0 \\ & \ddots & \\ 0 & & v_n \end{bmatrix}$ and it is the diagonal matrix of



Source : Model output

Figure 4. Multiplicative effect of sectors in Japan (2000).



Source : Model output

Figure 5. Comparison between the effect of 10% changes in production of each sector upon GDP of Myanmar and Japan.

Table 8. Comparison between the effect of 10% changes in production of each sector upon GDP of Myanmar and Japan (The results of one sector exogenous model)

No	Sector	Myanmar (%)	Japan (%)
1	Agricultural sector	5.17	0.14
2	Livestock & Fishery sector	1.28	0.07
3	Forestry sector	0.09	0.02
4	Mining sector	0.07	0.03
5	Processing & Manufacturing sector	3.51	3.20
6	Power sector	0.05	0.43
7	Construction sector	0.56	1.38
8	Transportation sector	0.90	0.73
9	Communication sector	0.03	0.36
10	Financial sector	0.12	0.65
11	Social & Administrative services sector	0.29	2.21
12	Rental & other services sector	0.16	3.36
13	Trade sector	3.14	1.78

Source : Model output

value added ratio.

Table (8) and figure (5) designate the results of one sector exogenous model and explained that the effect of change in production of agricultural sector is 5.2% and it is the largest among thirteen economic sectors in Myanmar economy. From this facts it can be said that the production of agricultural sector is the most important for increasing GDP of Myanmar's economy. After that, the production of trade sector and that of processing & manufacturing sector is the second and third important for increasing country's GDP. In the case of developed country, Japan, the production of rental & other services sector is the most important and that of processing & manufacturing sector and social & administrative services sector are the second and the third respectively for enlargement of country's GDP.

CONCLUSION AND RECOMMENDATION

This study comprised two parts, one is the estimation of new input–output table of Myanmar (2000–2001) and the second is the analysis of characteristics of industrial structure of Myanmar's economy in that period. Leontief's input–output model and RAS method were used to construct the new and balance input–output table. Induced domestic product, one sector exogenous model and multiplicative effect of sector were applied to analyze the feature of industrial sector of the economy. In addition, the comparison between the input–output table of Myanmar and Japan was made for showing the differences in sectoral activities between developed and developing country.

According to the result of construction of new input–output table of Myanmar, it can be concluded that almost all economic sectors require inputs from at least six different sectors. The processing & manufacturing sector needs inputs from eleven economic sectors. This indicates that this sector has the highest dependency to the other entire sector. The largest input use of processing & manufacturing sector is from agricultural sector. This is because this sector includes a large number of small scale agricultural based industries.

Although some results of analysis showed that the production of agricultural sector is greatly influenced for increasing GDP and export of our country, induced domestic product by total final demand item of agricultural sector is relatively small compared with non agricultural country, Japan. Base on these results, we can suggest to the policy makers to emphasize more on the domestic production of agricultural sector. The result of multiplicative effect of sector showed that the growth of processing & manufacturing sector can motivate that of other industries and vice–versa. The growth of all industries can stimulate that of agricultural sector in Myanmar econ-

omy. In Japan economy, the development of other sector cannot motivate that of agricultural sector. It can be interpreted that it is essential to encourage the improvement of other sectors especially processing & manufacturing sector for upgrading agricultural sector of Myanmar economy.

Eventually, most of the results of this study have revealed that agricultural sector and processing & manufacturing sector are the two most important sectors for the development of our economy. It is recommended that our government should pay attention on those two sectors by giving the policy priority and invest priority on those two sectors. It is essential to increase the production of these two main sectors for the extension of primary inputs market and enhancing GDP and export of Myanmar.

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Appendix: Input–output table of Japan for the year (2000) (13 sectors aggregated table) (Billion yen)

No	Sector	1	2	3	4	5	6	7	8	9	10	11	12	13	Total Intermediate Use (14)
1	Agricultural	484.4	368.8	1.4	0.0	3431.9	0.0	139.6	1.6	0.0	0.0	131.6	577.5	8.6	5,145.5
2	Livestock &Fishery	52.4	339.4	2.5	0.0	3163.6	0.0	0.0	0.4	0.0	0.0	77.1	350.4	0.0	3,985.9
3	Forestry	2.3	1.2	190.2	0.5	355.5	0.0	11.8	0.0	0.0	0.0	2.7	25.5	0.0	589.7
4	Mining	0.0	0.0	0.2	3.3	635.6	55.3	670.7	0.0	0.0	0.0	3.1	1.0	0.0	1,369.3
5	Processing & Manufacturing	1032.2	1196.6	80.7	89.2	109106.4	1533.7	20428.0	5,620.3	451.6	1,243.8	12,409.9	16,987.0	3,121.1	173,300.5
6	Power	49.1	34.5	8.3	43.1	6338.3	1623.3	539.3	888.3	318.3	225.8	3,458.9	3,347.5	1,226.2	18,100.9
7	Construction	51.2	26.7	3.1	9.1	1287.1	1258.7	199.0	479.1	173.9	150.3	1,324.4	3,468.4	548.2	8,979.2
8	Transportation	305.7	237.8	74.0	378.9	8136.5	710.1	3985.9	3,733.5	483.0	713.5	2,460.7	3,112.6	4,533.5	28,865.8
9	Communication	2.0	8.6	1.3	9.0	1114.6	142.0	937.0	359.7	2,583.3	825.7	1,357.2	4,226.9	2,513.2	14,080.4
10	Financial Sector	319.2	166.0	17.2	65.9	4013.7	761.1	863.4	2,920.9	503.0	2,667.9	1,031.0	9,152.3	4,926.3	27,407.9
11	Social & Administrative Services	6.0	6.7	3.3	4.9	10408.9	429.9	273.8	134.3	338.3	96.7	898.3	1,326.0	196.9	14,124.1
12	Rental & Other Services	162.7	97.2	17.9	87.8	14643.1	2624.3	6450.5	7,384.2	3,615.8	5,573.9	8,504.2	17,499.1	9,354.5	76,015.4
13	Trade	353.3	282.8	29.7	23.3	16255.9	391.9	4942.9	1,644.9	95.7	190.9	3,475.9	5,468.4	735.7	33,891.4
14	Total Purchase	2820.5	2766.4	429.9	714.9	178891.2	9530.3	39442.0	23,167.4	8,563.0	11,688.4	35,135.0	65,542.5	27,164.3	405,855.9
15	Imports	114.4	160.3	3.4	7.1	22639.1	2185.3	1410.3	1,847.1	285.3	434.8	1,074.9	2,239.9	1,146.7	33,548.7
16	Labor Cost	570.1	409.5	295.8	248.8	53108.7	4715.4	26795.5	14,807.6	5,859.8	12,493.1	63,994.0	45,034.2	47,256.8	275,589.1
17	Depreciation	1054.0	394.3	48.9	123.8	16676.9	5030.6	4059.1	3,046.2	3,809.6	3,432.4	16,349.1	34,523.4	4,801.8	93,350.0
18	Taxes (indirect)	408.7	146.5	–20.9	58.8	14377.4	1491.5	2915.0	1,432.3	720.4	–170.8	–240.3	9,473.0	4,256.2	34,847.8
19	Surplus (profit or Losses)	3207.7	894.8	665.4	225.2	22468.0	4051.3	2688.7	3,606.3	2,901.3	10,271.5	4,445.4	47,947.4	12,321.9	115,694.9
20	Value added	5240.4	1845.1	989.3	656.6	106630.9	15288.8	36458.2	22,892.4	13,291.2	26,026.2	84,548.2	136,978.0	68,636.7	519,481.9
21	Total inputs	8175.4	4771.8	1442.6	1378.7	308161.2	27004.4	77310.5	47,906.9	22,139.5	38,149.5	120,758.1	204,760.4	96,947.6	958,886.5

No	Sector	Final Use (Demand)				Total Output
		Consumption	Investment	Export	Total Final Demand	
1	Agricultural	2,955.7	61.8	12.5	3,029.9	8,175.4
2	Livestock &Fishery	524.7	203.2	58.0	785.9	4,771.8
3	Forestry	152.5	678.7	1.6	832.8	1,422.6
4	Mining	–7.1	5.6	10.9	9.4	1,378.7
5	Processing & Manufacturing	55,123.9	33,150.5	46,586.4	134,860.7	308,161.2
6	Power	8,872.4	0.0	31.0	8,903.4	27,004.4
7	Construction	0.0	68,331.3	0.0	68,331.3	77,310.5
8	Transportation	14,009.5	770.8	4,260.8	19,041.1	47,906.9
9	Communication	8,006.9	0.0	52.2	8,059.1	22,139.5
10	Financial	10,346.0	0.0	395.5	10,741.6	38,149.5
11	Social & Administrative Services	106,577.0	0.0	57.0	106,634.0	120,758.1
12	Rental & Other Services	116,909.0	10,307.0	1,529.1	128,745.0	204,760.4
13	Trade	47,786.9	10,777.6	4,491.7	63,056.3	96,947.6
14	Total Purchase	371,257.4	124,286.5	57,486.7	553,030.6	958,886.5
15	Imports	14,610.2	6,002.3	0.0	20,612.5	54,161.2

*(yen represent the currency of Japan)