

# De-industrialization in Japan and international production linkages in East Asia

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## ABSTRACT.

This paper analyzes the long-term transformations of growth regime and the process of de-industrialization in Japan, considering domestic institutional changes and international economic relations with the East Asian economies. In particular, influenced by structural changes in the manufacturing industry and the service industry as well as the long-lasting recession, de-industrialization has accelerated since the 1990s. In this analysis, we attempt to extend the theoretical framework of the growth regime in the *régulation* theory to understand de-industrialization in Japan, taking account of industrial structural changes and international economic relations, on the basis of our international collaborative researches (Boyer, Uemura and Isogai (eds.) 2012). The macroeconomic analysis of the growth regime and the input-output analysis of industrial changes in the international framework are conducted on the basis of the institutional analysis of the Japanese economy. This study also considers the future prospect of the Japanese growth regime in the context of the rapidly developing international division of labor in Asian economic integration, especially from the viewpoint of the *régulation* theory.

**Keywords:** de-industrialization, the Japanese economy, international production linkages, Asian economic integration, the *régulation* theory

## A. INTRODUCTION

In all the advanced economies, de-industrialization has occurred since the 1970s. De-industrialization is usually defined as the relative decline in output and employment in the manufacturing industry, which is observed universally in all the advanced economies (See de-industrialization in advanced countries in Annex). In particular, in the Japanese case, de-industrialization has accelerated very rapidly, faced with institutional changes in the domestic economy and changes in the international economic relations with the East Asian economies since the 1990s (Uemura and Tahara 2014). Furthermore, the international division of labor has also developed continuously in the East Asian region, where the traditional “flying geese” pattern of economic development has been modified drastically due to the increasing interdependence of international production networks and intermediate goods trade in the context of the diversity and transformations of Asian capitalisms (Boyer, Uemura and Isogai (eds.) 2012; Uemura, Uni, Isogai and Yamada (eds.) 2014, Uemura 2014).

This paper analyzes the long-term transformations of growth regime and the process of de-industrialization in the Japanese economy, taking account of domestic institutional changes in the financial system and wage labor nexus as well as international economic relations with the East Asia economies. In this study, structural linkages between the export-goods manufacturing industry and the business-related service industry with changing wage-labor nexus are analyzed to understand the structural characteristics of de-industrialization in the Japanese economy. Furthermore, we attempt to extend the theoretical framework of the growth regime in the *régulation* theory to investigate long-term industrial structural changes in both manufacturing and service industries in the Japanese economy as well as rapidly growing international production linkages with the East Asian economies.

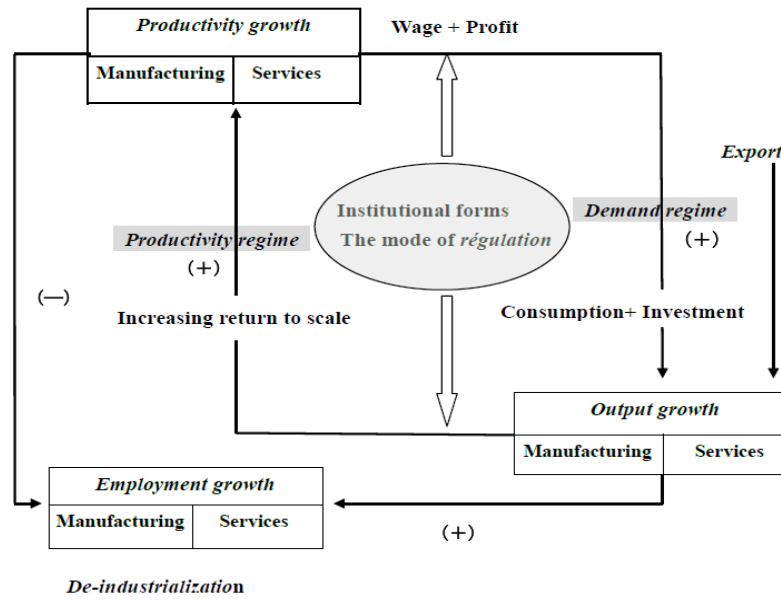
In this paper, firstly, we present the theory of de-industrialization in the multi-sectoral framework from the viewpoint of the growth regime in the *régulation* theory, and show the different types of de-industrialization. Secondly, in the empirical analysis, the macroeconomic analysis of growth regime as well as the input-output analysis of industrial structural changes and international production linkages are conducted systematically to analysis the characteristics of de-industrialization in Japan on the basis of the analysis of institutional arrangements in the Japanese and the transformation of international production linkages and intermediate goods trade in East Asia. Finally, this study also considers the future prospect of the Japanese growth regime, faced with economic interdependence among the East Asian economies in the economic integration from the perspective of *régulation* theory (Uemura, Uni, Isogai and Yamada 2014 ).

## B. THEORETICAL FRAMEWORK OF DE-INDUSTRIALIZATION

### B.1. DYNAMICS OF THE GROWTH REGIME AND DE-INDUSTRIALIZATION

De-industrialization is analyzed in the framework of economic growth and industrial structural change. In the process of economic growth, the dynamics of demand factors and supply factors plays an key role, and the interaction of real and financial factors influences the dynamics of the economy. Furthermore, the industrial structural change should be integrated in the analysis of economic growth, especially when we consider the process of de-industrialization. In this regard, the industrial structural change is formalized effectively by the input-output analysis. Base on this theoretical framework, we explain the dynamics of the growth regime and de-industrialization from the perspective of the *régulation* theory (Petit 1986, Boyer 1988, Petit 1988]. First of all, the cumulative effect of productivity growth and output growth determines the dynamism of a growth regime. Especially, this effect operates more strongly in the manufacturing industry (Kaldor 1978, Petit 1986, Boyer 1988). The framework of cumulative growth and de-industrialization is depicted in Figure 1.

**Figure 1. The Growth Regime and De-industrialization**



The main logic of demand formation is as follows. Productivity gains are distributed into wages and profits, and an increase in profits has a positive effect on the expected profit rate and investment. Then, an increase in investment realizes more profits. Therefore, there is a cumulative casualty between the profit rate and the accumulation rate. Furthermore, investment leads to an increase in intermediate inputs from the other manufacturing and service sectors in the domestic economy as well as the foreign economy. At the same time, an increase in wages reads to more consumption demand (Rowthorn 1982, Taylor 1991). The markets of consumer durable goods and consumer services expand accordingly.

Next, there is a linkage from the consumption to investment. This consists of both short-period and long-period effects. As for the short-period effect, changes in demand influence investment through the adjustment of capacity utilization in the manufacturing industry. As for the long-period effect, a continuous expansion of consumption influences the expected return of investment, leading to an increase in investment. In the actual process of investment decision, these effects are integrated. The accumulation rates are not uniform across the industries as there exist profitability differentials. In this context, there exist two patterns of demand formation, depending on the patterns of coordination in the financial system and wage-labor nexus. If investment is highly sensitive to profits, the casual chain called “profit-led growth”: profits-investment-economic growth is realized. On the contrary, if investment is very sensitive to demand expansion, the casual chain called “wage-led growth”: wage-consumption-investment-economic growth is realized. Furthermore, the causal chain: productivity-unit labor costs-export also plays a crucial role in the growth of the export goods manufacturing industry, which is a basic logic of “export-led growth”.<sup>1</sup>

In short, all of these linkages from productivity gain to demand formation are called “the demand regime” in the *régulation* theory (Boyer 1988). “The demand regime” can be expressed in the following way.

$$\Delta y = f(\Delta \lambda) \quad (1)$$

where  $y$  : final demand vector and  $\lambda$  : labor productivity vector. There are the chain reactions of intermediate demand which is induced by final demand. Therefore, demand vector  $y$

<sup>1</sup> The growth pattern is different from country to country, depending on the specific institutional arrangements. In the Japanese case, “profit-led growth” played a leading role in the high economic growth in the 1960s, and “export-led growth” become dominant after the 1980s (Uemura 2000; 2012, Nishi 2011).

is divided into three components: domestic final demand vector  $y^{dfd}$ , export vector  $y^{ex}$ , import vector  $y^{im}$ ,

$$\Delta y = \Delta y^{dfd} + \Delta y^{ex} - \Delta y^{im} \quad (2)$$

Each of the components can be regarded as the function of productivity growth. Furthermore, the final demand induces intermediate demand, which can be studied the input-output analysis. In our framework of input-output analysis, input coefficient matrix  $A$  is divided into the matrix of domestic input ratios  $H$  and technology coefficient matrix  $A^*$  by following the framework by Franke and Kalmbach (2005), as follows.

$$A = H \circ A^* \quad (3)$$

In other words, the input coefficient matrix is the Hadamard product of the matrix of the domestic shares of intermediate inputs and the matrix of technological coefficients

$$a_{ij} = h_{ij} \cdot a_{ij}^* \quad i, j = 1, 2, \dots, n \quad (4)$$

This can distinguish domestic intermediate inputs and foreign intermediate inputs into the production process. By using the Leontief inverse matrix,  $B = (I - A)^{-1}$ , and equation (1), the increase in output vector can be calculated from final demand vector, technological coefficients matrix, and domestic intermediate inputs, as follows.

$$\begin{aligned} \Delta x &= B_0 \Delta y + (B_1 - B_0) \Delta y \\ &+ B_0 (H_0 \circ \Delta A^*) x_0 + [B_1 (H_1 \circ \Delta A^*) - B_0 (H_0 \circ \Delta A^*)] x_0 \\ &+ B_0 (\Delta H \circ A_0^*) x_0 + (B_1 - B_0) (\Delta H \circ A_0^*) x_0 \end{aligned} \quad (5)$$

where  $x$  is output vector and  $\Delta x$  shows the increase in output from the period 0 to the period 1, and the suffixes are the period 0 and the period 1. The first item shows the output change caused by final demand change. The third item shows the output changes caused by a change in technological coefficient. The fifth item is the output change caused by a change in domestic intermediate inputs. Furthermore, the items 2, 4, 6 are the output changes caused by “residual”. Therefore, the output can be divided into six factors: domestic final demand, export, import, technological change, domestic intermediate inputs, and residual.

$$\Delta x \doteq B_0 \Delta y^{dfd} + B_0 \Delta y^{ex} - B_0 \Delta y^{im} + B_0 (H_0 \circ \Delta A^*) x_0 + B_0 (\Delta H \circ A_0^*) x_0 + RES \quad (6)$$

where  $RES$  is “residual”. Furthermore, divided by the output at the period 0, we obtain the contribution of each components to the output growth. The advantage of this framework is the fact that this makes us to consider the transformation of growth regime on the basis of changes in these components.

Next, the linkage from demand growth to productivity growth is another major causal chain in the economy. An increase in investment leads to an increase in productivity by replacing capital equipments. This effect is more remarkable in the manufacturing industry with the dynamics of the introduction of new capital equipments and the scrapping of old ones. Furthermore, an increase in demand also leads to productivity growth through increasing return to scale especially in the manufacturing industry. This is often called “Kaldor-Verdoorn Law”. Innovation also contributes to productivity growth depending on the social system of innovation

in each national and regional economy. In short, these linkages from demand growth to productivity growth are called “the productivity regime” (Boyer 1988).

$$\Delta\lambda = f(\Delta x) \quad (7)$$

As for the linkages between the manufacturing industry and the service industry, which are reflected by the input coefficient matrix  $A$ , the following points are important in the study of de-industrialization (Petit 1986). First, cumulative causation between output growth and productivity growth operates strongly in the manufacturing industry. Second, the manufacturing industry has its own “subsystem dynamics” (Landesmann and Scazzieri 1996) and causes changes in the linkage between the manufacturing industry and the business-related service industry with the externalization of business activities, which are reflected by the technology coefficient matrix  $A^*$ . The spillover effect of intermediate demand between the manufacturing industry and the service industry contribute to output growth and productivity growth in both industries.

The dynamism of output growth and productivity growth determines employment growth, which gives a basic framework of de-industrialization in terms of employment.

$$\hat{N} = \hat{x} - \hat{\lambda} \quad (8)$$

where  $\hat{N}$  : the vector of employment growth rates ( $\hat{N}_{ij} = \Delta N_{ij} / N_j$ ),  $\hat{x}$  : the vector of output growth rates ( $\hat{x}_{ij} = \Delta x_{ij} / x_j$ ), and  $\hat{\lambda}$  : the vector of productivity growth rates ( $\hat{\lambda}_{ij} = \Delta \lambda_{ij} / \lambda_j$ ).

Therefore, in the matured economy in which the percentage of agricultural employment becomes very small, de-industrialization occurs in terms of the relative share of employment when the growth rate of real output minus the growth rate of productivity in the service industry is bigger than that in manufacturing industry. This dynamics was originally formalized by W. Baumol, and was applied to the process of de-industrialization in the Rowthorn’s model (Baumol 1967, Rowthorn and Wells 1987). De-industrialization brings about an increase in service employment with skill bifurcation and segmentation, depending on institutional characteristics in the labor market (Rowthorn and Glyn 1990, Iversen and Cusack 2000, Peng 2013).

Furthermore, international economic relations, especially, trade, foreign direct investment and international production linkages, have following important effects on the de-industrialization process. Trade specialization between manufactured goods and services influences the dynamism of the national economy. For example, the export goods manufacturing industry can be a starting point of “cumulative causation”, producing tradable products with the increasing return to scale. On the contrary, depending so much on the export of natural resources and the import of manufactured goods may exacerbate the long-term economic stagnation. The pattern of trade specialization causes a “virtuous circle” or “vicious circle” with the conflict of interests among industrial sectors. Foreign direct investment and international production linkages may have either positive effect to promote international division of labor and economic growth, or negative effect to accelerate de-industrialization.

## B.2. FOUR TYPES OF DE-INDUSTRIALIZATION

The condition for de-industrialization in terms of employment is usually explained by focusing on the difference between the growth rate of real output and that of labor productivity (Baumol 1967, Rowthorn and Wells 1987) on the basis of Equation (8). In this paper, focusing on interdependent industrial structures between the manufacturing sector and the service sector, we extend the framework to include four types of de-industrialization. The first type is “positive de-industrialization”, in which growth differentials of labor productivity between the manufacturing sector and the service sector bring about the shift of employment from the manufacturing sector to the service sector. The second type is “negative de-industrialization”, which was caused by decreasing demand and stagnant output in the manufacturing sector. These two types were originally formalized by Rowthorn and Wells (1987). Moreover, the third type can

be defined as “de-industrialization through manufacturing-service linkages”, which is brought about by an increase in intermediate inputs from the business-related service industry to the manufacturing industry, inducing an increase in employment in the service sector. This is often accompanied by the externalization of service activities from the manufacturing sector. The fourth type is “de-industrialization by the shift of final demand to the service sector”, which includes the long-term changes in final demand structures. The four types of de-industrialization are summarized in terms of output, labor, productivity and employment in Table 1.

**Table 1. Four Types of De-industrialization**

	Output		Labor Productivity		Employment	
	Manufacturing	Service	Manufacturing	Service	Manufacturing	Service
Positive de-industrialization	increase or constant	—	considerably increase	—	constant or decrease	increase
Negative de-industrialization	decrease	—	—	—	decrease	increase
de-industrialization through manufacturing-service linkages	increase	increase	—	—	—	increase
de-industrialization by the shift of final demand to the service sector	—	increase	—	—	decrease	increase

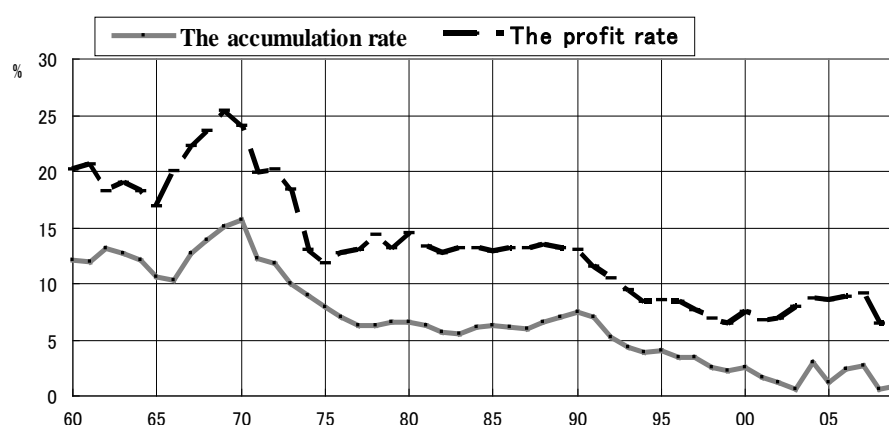
Note: (—) shows that the direction cannot be determined.

## C. TRANSFORMATION OF GROWTH REGIME AND DE-INDUSTRIALIZATION IN JAPAN

### C.1. PATTERNS OF LONG-TERM GROWTH IN THE JAPANESE ECONOMY

The patterns of long-term growth in the Japanese economy are seen in the interaction between the rate of capital accumulation and the rate of profit (Figure 2).

**Figure2. The Accumulation Rate and the Profit Rate**



Source: Cabinet Office, Annual Report on National Account and Gross Capital Stock of Private Enterprises.

In the Japanese economy in the 1960s, the accumulation rate and the profit rate had a strong mutual enhancing effect, producing the profit-investment growth in the period of high economic growth. The high growth ended with the saturation of the domestic demand of consumer durable goods and rising wages in 1970. Then, the Japanese economy was hit by the oil price shock in 1973, and experienced the structural recession during the 1970s. The Japanese economy started to recover from the recession very early and showed the export-led growth in

the late 1970s. The accumulation rate and the profit rate were relatively stable with export to US and Asia. However, the accumulation rate continuously rose though the profit rate started to fall in the bubble boom in the late 1980s. Therefore, the Japanese fell into the structural crisis due to the “over-accumulation” and the collapse of bubble in the 1991 (Uemura 2000). The accumulation rate and the profit rate decreased sharply. The Japanese economy started to recover from the recession in 2002. In the process, the profit rate recovered, but the accumulation rate did not at the aggregate level. This process was promoted by export to Asian countries. Then, the profit rate fell sharply when the Japanese economy was hit by the Subprime crisis in 2008.

**Figure3. GDP Growth Rate and Wage Share**



Source: Cabinet Office, Annual Report on National Account.

The fluctuation of the profit rate is determined by wage share and the output-capital ratio.<sup>2</sup> The relationship between the real GDP growth rate and the wage share is depicted in Figure 3. In the Japanese economy, wage share fluctuates counter-cyclically due to “labor hoarding” in large firms in the manufacturing industry, and this supports consumption demand in a recession.<sup>3</sup> However, in the recovery process after 2002, the fall in wage share was extremely sharp because wages were depressed and many workers were fired with institutional changes in the employment system. When the Japanese economy was hit by the Subprime crisis in 2008, wage share started to rise again, and this caused a strong pressure to reduce employment.

## C.2. INDUSTRIAL STRUCTURAL CHANGES AND THE TRANSFORMATIONS OF THE GROWTH REGIME IN JAPAN: AN INPUT-OUTPUT ANALYSIS OF DE-INDUSTRIALIZATION

In order to understand the long-term dynamics of the Japanese economy, we should take into account industrial structural changes. In particular, the export goods manufacturing industry plays a central role in economic growth, and structural changes in the manufacturing industry and the inter-linkages between the manufacturing industry and the service industry strongly influences the growth pattern of the Japanese economy. Therefore, we should have a proper classification of industry to analyze the economic structures. We modify the industry classification used by R. Frank and P. Kalmbach to analyze de-industrialization in Germany (Franke and Kalmbach 2003; 2005), and apply our framework to the Japanese economy in Table 2 (Uemura and Tahara 2014).

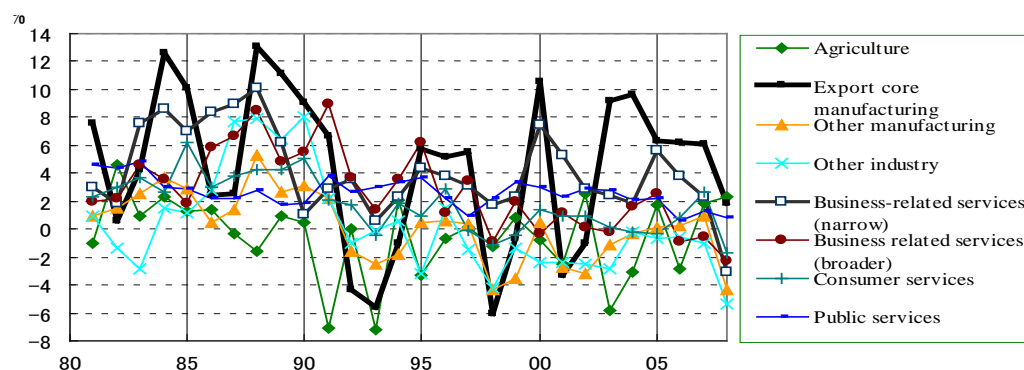
<sup>2</sup> As for the analysis of the potential output-capital ratio and capacity utilization, see Uemura (2000, 2012). There has been a decreasing trend of output-capital ratio in the Japanese economy.

<sup>3</sup> H. Uemura analyzed the “counter-cyclical” movement of wage share, taking account of institutional arrangements in the “wage-labor nexus” in the Japanese economy (Uemura, 2000).

**Table2. Industrial Classification for the Analysis of De-industrialization**

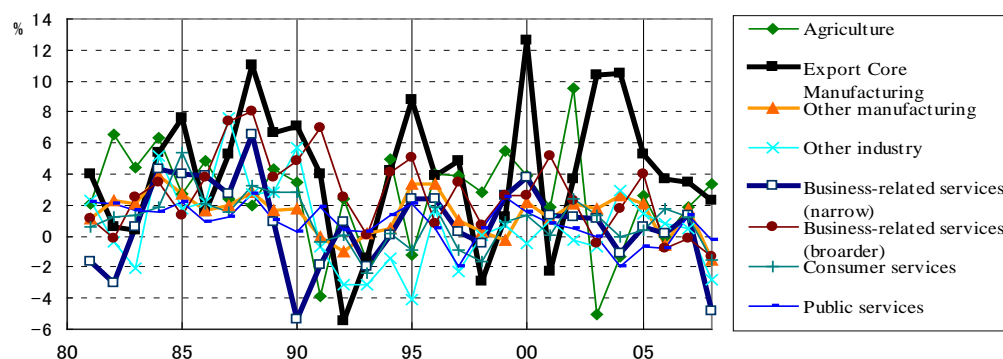
1	Agriculture	Agriculture, Forestry, Fisheries, Livestock and sericulture farming
2	Export core manufacturing	Transportation equipment, General machinery, Electronic and electrical equipment, Precision machinery and equipment
3	Other manufacturing	Textile, Office and service industry machines
4	Other industries	Construction, Electricity and Gas, Water supply, Mining
5	Business-related services in a narrow sense	Finance, Rental of office equipments and goods, Advertisement, Information services and internet-based services
6	Business-related services in a broad sense	Wholesale, Research, Telegraph and telephone, Mail, Transportation
7	Consumer services	Retail, Insurance, Real estate, Transportation, Broadcasting, Entertainment, Eating and drinking places, Accommodation
8	Public services	Education, Medical, Hygiene
9	Unclassified	Unclassified

**Figure 4. GDP Growth Rates in the Different Industries**



Source: RIETI, JIP Database.

**Figure 5. Labor Productivity Growth Rates in the Different Industries**



Source: RIETI, JIP Database.



Figure 4 and Figure 5 show the uneven growth rates of real output and labor productivity in different industries, using JIP Database.<sup>4</sup> Furthermore, according to Equation (6) in Section 2 which is based on the input-output analysis of industrial structural change, we can formalize our framework of input-output analysis as follow.

$$\text{(the growth rate of real output)} = \text{(the contribution of final demand)} + \text{(the contribution of export)} - \text{(the contribution of import)} + \text{(the contribution of technological coefficient)} + \text{(the contribution of domestic input)} + \text{(residual)}$$

The results of this analysis are summarized for different time periods in Table 3: stable growth in the 1980s (1980-85, 1985-90), long-term recession in the 1990s (1990-95, 1995-2000), recovery in the first half of the 2000s (2000-05), and recession with the financial crisis of the late 2000s (2005-09). The mechanism of de-industrialization in terms of real output changed during the period with the transformations of the growth regime.

In the period of 1980-85, export, mainly to US, contributed to economic growth significantly. However, with decelerating exports caused by the appreciation of yen following the Plaza Accord, domestic demand eventually emerged as a major contributor of growth in the bubble boom period of 1985-90. Sufficient export and domestic demand had a countervailing effect on the de-industrialization process. Although there were fears relating to the hollowing-out of industry with the de-localization of productive activities in Japan in the late 1980s, the absolute level of manufacturing employment was sustained with a slightly decreased relative share due to an increase in service employment. In this period, the character of de-industrialization in terms of employment was not influenced so much by a shift of employment from the manufacturing to the service industry, but by an increase in output of the service industry due to the expansion of domestic demand. This corresponds to “*de-industrialization by long-term shifts in demand from the manufacturing to the services*”.

At the beginning of the 1990s, the Japanese economy experienced a deep recession due to over accumulation and the collapse of the bubble boom, resulting in a sharp decrease in domestic demand. In this situation, “the export core manufacturing” industry led economic growth and had contributed to the increase in total output. In the 1990-95 and 1995-2000 period, de-industrialization mechanism reflected a different character than before. In “the export core manufacturing” industry, both output and labor productivity increased, and as a result, the “*positive de-industrialization*” mechanism operated in this particular industry. On the contrary, in “the other manufacturing” industry, a decrease in output coexisted with an increase in labor productivity, resulting in the operation of a “*negative de-industrialization*” mechanism. At the same time, as examined in the previous section, the manufacturing-service linkages strengthened with an increase in output of “the business-related services” industry, resulting in the operation of “*de-industrialization by manufacturing-service linkages*” mechanism.

In 2002, following the so-called “Lost Decade,” the Japanese economy started recovering (Uemura 2012). Our analysis for 2000-05 shows that exports exclusively led the growth of “the export core manufacturing” industry. Domestic demand decreased with stagnant consumption, brought about by falling wage share. In this situation, the growth gap between “the export core manufacturing” industry and “the other manufacturing” industry widened with the further expansion of “business-related services” in the form of “*de-industrialization by manufacturing-service linkages*,” while “personal services” remained stagnant. The results for 2005-09 reflect effects of the subprime crisis of 2008. “The export core manufacturing” industry, which previously led economic growth, experienced a decrease in output as a result of sharp fall in exports to the US and Asia. This further led to a corresponding decrease in output in “the business-related services” industry. In all of these processes, the domestic share of intermediate inputs decreased continuously in the manufacturing industry, which reflected increasing intermediate goods import from Asian countries.

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<sup>4</sup> Japan Industry Productivity Database (JIP Database) is provided by Reserch Institute of Economy, Trade and Industry (RIETI), the Japanese government.

In short, a stable export-led growth regime, supported by export as well as domestic demand, existed in the 1980s. In the long-lasting recession, following the collapse of the bubble boom in 1990, the growth regime transformed with gradual institutional changes such as financial liberalization and the transformation of the employment system, and the pattern of de-industrialization in Japan also changed. In this situation, “the export core manufacturing” industry and “the business-related services” industry supported economic growth, while “the other manufacturing” industry with decreasing shares of domestic inputs negatively contributed to economic growth, showing stronger inter-industry disparity and accelerating de-industrialization.

**Table 3. Decomposition of Output Growth (Annual rates))**

1980–1985		Output Growth	Contribution					
			Domestic final demand	Export	Import	Technological Coefficient	Domestic share of intermediate inputs	Residual
1	Agriculture	0.04%	0.05%	0.01%	-0.01%	-0.04%	0.04%	-0.01%
2	Export core manufacturing	0.74%	0.38%	0.36%	-0.01%	0.01%	0.01%	0.00%
3	Other manufacturing	0.62%	0.69%	0.18%	-0.09%	-0.10%	0.04%	-0.11%
4	Other industry	-0.02%	0.00%	0.02%	0.05%	0.01%	0.05%	-0.14%
5	Business-related services in a narrow sense	0.43%	0.28%	0.05%	-0.01%	0.12%	0.00%	-0.01%
6	Business-related services in a broad sense	0.30%	0.22%	0.10%	-0.01%	-0.02%	0.03%	-0.03%
7	Consumer services	0.72%	0.59%	0.03%	0.00%	0.06%	0.03%	0.02%
8	Public services	0.46%	0.46%	0.01%	0.00%	-0.01%	0.00%	-0.01%
The economy as a whole		3.29%	2.67%	0.77%	-0.09%	0.04%	0.20%	-0.29%

1985–1990		Output Growth	Contribution					
			Domestic final demand	Export	Import	Technological Coefficient	Domestic share of intermediate inputs	Residual
1	Agriculture	0.00%	0.08%	0.01%	-0.04%	-0.06%	0.03%	-0.02%
2	Export core manufacturing	0.98%	0.72%	0.21%	-0.12%	0.12%	0.01%	0.04%
3	Other manufacturing	0.67%	1.13%	0.11%	-0.37%	-0.16%	0.09%	-0.15%
4	Other industry	0.90%	1.00%	0.02%	-0.08%	-0.21%	0.36%	-0.19%
5	Business-related services in a narrow sense	0.61%	0.48%	0.05%	-0.09%	0.14%	0.04%	0.00%
6	Business-related services in a broad sense	0.69%	0.63%	0.03%	-0.08%	0.06%	0.05%	0.00%
7	Consumer services	0.84%	1.01%	0.03%	-0.09%	-0.10%	0.03%	-0.04%
8	Public services	0.25%	0.33%	0.01%	-0.01%	-0.05%	0.00%	-0.02%
The economy as a whole		4.94%	5.39%	0.45%	-0.88%	-0.26%	0.60%	-0.38%

1990–1995		Output Growth	Contribution					
			Domestic final demand	Export	Import	Technological Coefficient	Domestic share of intermediate inputs	Residual
1	Agriculture	-0.06%	0.00%	0.01%	0.00%	-0.07%	0.01%	0.00%
2	Export core manufacturing	0.02%	-0.07%	0.15%	-0.08%	0.06%	-0.04%	-0.01%
3	Other manufacturing	-0.15%	-0.02%	0.10%	-0.14%	-0.13%	0.05%	-0.01%
4	Other industry	-0.04%	-0.10%	0.01%	-0.04%	-0.04%	0.13%	-0.01%
5	Business-related services in a narrow sense	0.25%	0.13%	0.03%	-0.01%	0.08%	0.01%	0.01%
6	Business-related services in a broad sense	0.55%	0.25%	0.02%	-0.01%	0.26%	0.03%	0.01%
7	Consumer services	0.24%	0.26%	0.01%	0.00%	-0.04%	0.01%	-0.01%
8	Public services	0.35%	0.36%	0.00%	0.00%	-0.01%	0.00%	0.00%
The economy as a whole		1.16%	0.80%	0.33%	-0.29%	0.13%	0.21%	-0.02%

1995–2000		Output Growth	Contribution					
			Domestic final demand	Export	Import	Technological Coefficient	Domestic share of intermediate inputs	Residual
1	Agriculture	-0.01%	0.00%	0.01%	0.00%	0.00%	-0.01%	0.00%
2	Export core manufacturing	0.36%	0.19%	0.28%	-0.18%	0.14%	-0.07%	0.00%
3	Other manufacturing	-0.27%	-0.04%	0.13%	-0.08%	-0.12%	-0.13%	-0.02%
4	Other industry	-0.19%	-0.22%	0.02%	0.00%	0.13%	-0.10%	-0.02%
5	Business-related services in a narrow sense	0.37%	0.14%	0.05%	-0.04%	0.23%	-0.02%	0.00%
6	Business-related services in a broad sense	0.14%	0.08%	0.13%	-0.06%	0.03%	-0.04%	-0.01%
7	Consumer services	0.10%	0.15%	0.03%	-0.02%	-0.04%	-0.01%	-0.01%
8	Public services	0.27%	0.26%	0.00%	0.00%	0.02%	0.00%	0.00%
The economy as a whole		0.76%	0.57%	0.64%	-0.38%	0.39%	-0.39%	-0.06%

2000–2005	Output Growth	Contribution					
		Domestic final demand	Export	Import	Technological Coefficient	Domestic share of intermediate inputs	Residual
1 Agriculture	–0.02%	0.00%	0.01%	–0.01%	–0.01%	–0.02%	0.00%
2 Export core manufacturing	0.59%	0.42%	0.45%	–0.30%	0.12%	–0.08%	–0.02%
3 Other manufacturing	–0.26%	0.10%	0.23%	–0.17%	–0.15%	–0.22%	–0.05%
4 Other industry	–0.19%	–0.13%	0.03%	–0.03%	0.21%	–0.16%	–0.10%
5 Business-related services in a narrow sense	0.42%	0.20%	0.08%	–0.04%	0.25%	–0.05%	–0.02%
6 Business-related services in a broader sense	0.14%	0.24%	0.12%	–0.05%	–0.05%	–0.09%	–0.04%
7 Consumer services	0.06%	0.17%	0.04%	–0.03%	–0.09%	–0.02%	–0.02%
8 Public services	0.31%	0.31%	0.00%	0.00%	0.01%	–0.01%	0.00%
The economy as a whole	1.04%	1.32%	0.95%	–0.63%	0.29%	–0.64%	–0.25%

2005–2009	Output Growth	Contribution					
		Domestic final demand	Export	Import	Technological Coefficient	Domestic share of intermediate inputs	Residual
1 Agriculture	–0.01%	–0.03%	0.00%	0.01%	0.00%	0.00%	0.00%
2 Export core manufacturing	–0.53%	–0.28%	–0.51%	0.29%	0.01%	–0.04%	0.00%
3 Other manufacturing	–0.58%	–0.31%	0.00%	0.12%	–0.43%	0.00%	0.04%
4 Other industry	–0.32%	–0.31%	–0.01%	–0.06%	0.08%	0.00%	–0.02%
5 Business-related services in a narrow sense	–0.12%	–0.16%	–0.02%	0.03%	0.03%	0.01%	–0.01%
6 Business-related services in a broad sense	–0.54%	–0.32%	0.01%	0.02%	–0.29%	0.03%	0.02%
7 Consumer services	0.06%	0.06%	–0.02%	0.04%	–0.03%	0.00%	0.00%
8 Public services	0.16%	0.14%	0.00%	0.00%	0.02%	0.00%	0.00%
The economy as a whole	–1.87%	–1.22%	–0.55%	0.46%	–0.60%	–0.01%	0.04%

*Note: Outputs are measured at 1995 constant prices*

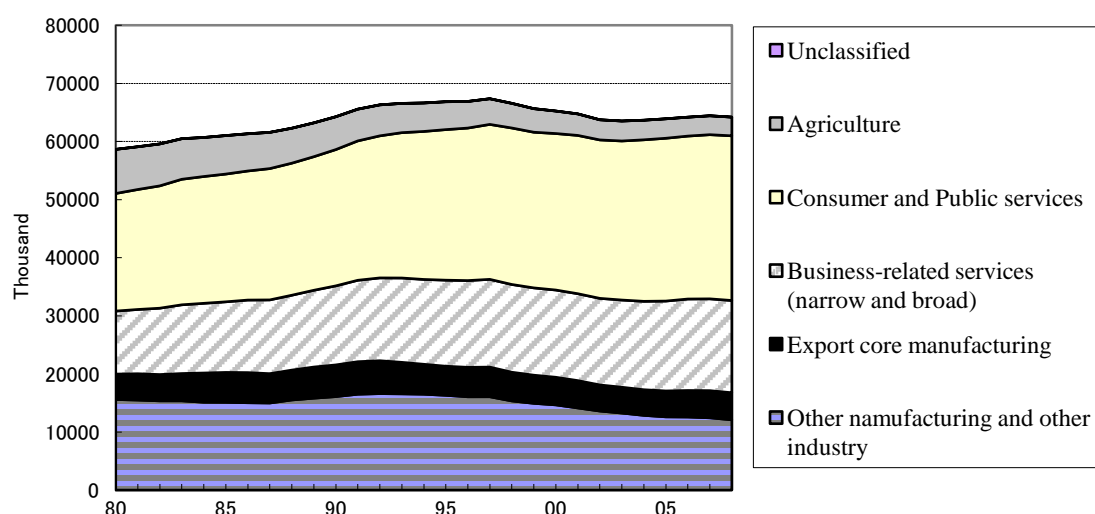
### C.3. DE-INDUSTRIALIZATION AND SHIFTS IN EMPLOYMENT STRUCTURES

The transformation of growth regime and the changing mechanism of de-industrialization influence employment structures in different ways in different periods. As explained in Equation (8) in Section 2, we can formalize shifts in employment structures with the following relation in term of employment, real output and labor productivity.

$$(\text{the growth rate of employment}) = (\text{the growth rate of real output}) - (\text{the growth rate of labor productivity})$$

When the growth rate of output exceeds the growth rate of labor productivity, employment increases in that particular sector. On the contrary, when the growth rate of output is less than the growth rate of labor productivity, employment decreases in that particular sector. Therefore, we can investigate shifts in employment in a sector by examining the growth rates of output and labor productivity. Moreover, as we have seen in Section 2, these growth rates are not independent and are rather brought about by the process of “cumulative causation” between output growth and productivity growth in the economy as a whole. Figure 6 depicts long-term structural changes in employment, and shows that manufacturing employment started to fall even at its absolute level in the early 1990s. Following the above equation, Table 4 shows the annual growth rates of output, labor productivity, and employment in each industry in the Japanese economy.

**Figure 6 Structural Changes in Employment**



Source: RIETI, JIP Database

**Table 4. Output Growth, Productivity Growth and Employment Growth (Annual rates)**

		1980–1985	1985–1990	1990–1995	1995–2000	2000–2005	2005–2009
<b>Export core manufacturing</b>	Output	11.74%	7.06%	-1.11%	0.15%	0.01%	-6.23%
	Labor Productivity	8.23%	5.85%	0.54%	1.18%	1.26%	-5.25%
	Employment	3.52%	1.21%	-1.64%	-1.02%	-1.25%	-0.98%
<b>Other manufacturing</b>	Output	5.25%	4.99%	-0.13%	-1.24%	-0.99%	-4.70%
	Labor Productivity	5.34%	4.39%	1.06%	1.24%	2.11%	-2.81%
	Employment	-0.09%	0.60%	-1.19%	-2.48%	-3.10%	-1.90%
<b>Business-related services in a narrow sense</b>	Output	8.17%	10.74%	3.94%	3.36%	1.48%	-1.46%
	Labor Productivity	2.94%	5.05%	0.94%	1.35%	-1.65%	-4.18%
	Employment	5.23%	5.69%	3.00%	2.01%	3.13%	2.72%
<b>Business-related services in a broad sense</b>	Output	4.25%	9.18%	5.71%	-0.30%	0.42%	-4.30%
	Labor Productivity	3.05%	8.48%	4.71%	0.64%	1.83%	-3.33%
	Employment	1.20%	0.70%	1.00%	-0.94%	-1.41%	-0.97%
<b>Consumer services</b>	Output	7.84%	7.30%	3.21%	0.62%	-0.24%	0.53%
	Labor Productivity	6.30%	5.73%	1.18%	0.41%	0.27%	0.45%
	Employment	1.53%	1.57%	2.04%	0.20%	-0.51%	0.08%
<b>Public services</b>	Output	7.31%	4.23%	5.28%	2.56%	1.68%	1.11%
	Labor Productivity	5.25%	3.29%	3.09%	0.78%	-1.21%	0.81%
	Employment	2.06%	0.94%	2.19%	1.79%	2.89%	0.30%
<b>The economy as a whole</b>	Output	6.52%	7.20%	2.31%	0.41%	-0.06%	-1.88%
	Labor Productivity	5.71%	6.13%	1.51%	0.89%	0.35%	-1.63%
	Employment	0.81%	1.06%	0.80%	-0.48%	-0.41%	-0.25%

Sources: RIETI, JIP Database

Note: Outputs are measured at 1995 constant prices.

In the 1980s, although there was a growth differential between “the export core manufacturing” industry and “the other manufacturing” industry in the Japanese economy, it witnessed expanding domestic demand with positive growth rates in both industries in the export-led growth regime. Therefore, de-industrialization did not occur explicitly in terms of the level of employment during the period.

In the long-lasting recession of the 1990s, however, the differential between “the export core manufacturing” industry and “the other manufacturing” industry was maintained at lower growth rates. Subsequently, employment decreased as a result of the mechanism of “*positive de-industrialization*” operational in “the export core manufacturing” industry. Employment registered a more remarkable decrease as a result of the mechanism of “*negative de-industrialization*” operational in “the other manufacturing” industry. On the contrary, employment increased in “the business-related service in a narrow sense” as a result of the mechanism of “*de-industrialization by manufacturing-service linkages*.” Business-process outsourcing accelerated,

producing more service employment during this period. Therefore, even in the 2005-09 period including the global financial crisis, “business-related service in a narrow sense” recorded a growth rate as high as 2.72% and demonstrated a strong relationship with “the export core manufacturing” industry.

Employees released by the manufacturing industry are absorbed by the service industry. Since the 1990s, employment has continuously increased in the service industry with a decrease in labor productivity in services. In other words, all the service industries except “business-related service in a broad sense” acted as an “employment sponge” and absorbed discharged employees, and showed positive growth rates of employment even during the 2005-09 period which included the world financial crisis. This structural shift in Japan corresponds to what is called “the strategy of saving industry” in the political science literature (Palier and Thelen 2014, Peng 2014).

The absorption of employment by the service industry is preferable, as it contributes to the retention of employment in the whole economy. However, this caused two serious problems in the Japanese case. From the institutional point of view, workers laid off by manufacturing firms were often re-employed as non-regular workers by smaller firms in “the business-related services” industry. This process was further promoted by the externalization of service activities from manufacturing firms. This process of absorption of employment in the service industry and the increasing number of non-regular workers brought about more inequality in Japanese society.

From the structural point of view, releasing workers from the manufacturing industry and re-employing them in the service industry had a productivity-enhancing effect on the manufacturing industry and a productivity-suppressing effect on the service industry (Uemura and Tahara 2014). Under these conditions, polarization occurred between the high-productivity manufacturing industry and the low-productivity consumer services industry, weakening the coordinating mechanisms of wages and employment (Lechevalier 2011; 2012, Isogai 2012). This was a phenomenon specific to economic growth induced by “the export core manufacturing” industry in the 2000s. After the subprime crisis in 2008 and the earthquake in 2011, “the export core manufacturing” industry was damaged to such an extent that it exacerbated the polarization of the Japanese economy and society.

## **D. INTERNATIONAL PRODUCTION LINKAGES IN EAST ASIA AND THEIR EFFECT ON THE JAPANESE MANUFACTURING INDUSTRY**

### **D.1. INCREASING INTERMEDIATE GOODS TRADE IN EAST ASIA**

Asian capitalisms have been forming a very large economic zone, showing their diversity and interdependence in these twenty years. (Boyer, Uemura and Isogai (eds.) 2012, Harada and Tohyama 2012). In particular, intermediate goods trade and international production linkages have developed very rapidly, promoted by the activities of multinational firms, in East Asia since the 1990s, and the Japanese economy has been involved into the Asian-wide international production linkages. We can see the growing interdependence in the trade matrix of Asian countries for 2000 and 2011 in Table 5, which is calculated on the basis of RIETI-Trade Industry Database (RIETI-TD).<sup>5</sup> We can investigate changes in trade pattern among the Asian economies in the 2000s.

According to the trade matrix, intermediate goods trade has developed much more within the East Asian region than with North America and EU, and this means that tighter international production linkages and regional value chains have been developed by the activities of multinational firms in the East Asian region. Under these conditions, the international division of labor has developed among Asian capitalisms which have different

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<sup>5</sup> RIETI-Trade Industry Database (RIETI-TD) is provided by Research Institute of Economy, Trade and Industry (RIETI), the Japanese government.

domestic institutions, showing different patterns of macroeconomic dynamics (Nishi, Isogai and Uemura 2014, Uemura, Uni, Isogai and Yamada (eds.) 2014).

**Table 5. Trade Structures in East Asia**

2000 ( Million Dollar)								
Expot	Import	China	Japan	Korea	Taiwan	AEAN	North America/E U/ ROW	The World as a Whole
China	Intermediate goods trade (A)		13946	6433	3791	9942	84342	118453
	Total Trade (B)		54657	12799	6202	18019	302857	394534
	A/B (%)		25.5	50.3	61.1	55.2	27.8	30.0
Japan	Intermediate goods trade (A)	30170		22290	21263	49331	145258	268312
	Total Trade (B)	41501		31824	38436	69365	322207	503333
	A/B (%)	72.7		70.0	55.3	71.1	45.1	53.3
Korea	Intermediate goods trade (A)	20255	12214		5649	12940	50830	101889
	Total Trade (B)	23199	20132		8967	16950	102512	171761
	A/B (%)	87.3	60.7		63.0	76.3	49.6	59.3
Taiwan	Intermediate goods trade (A)	3921	9348	3242		15744	69484	101739
	Total Trade (B)	4634	18168	4287		19962	115421	162471
	A/B (%)	84.6	51.5	75.6		78.9	60.2	62.6
ASEAN	Intermediate goods trade (A)	15553	30755	12149	13910		158885	231252
	Total Trade (B)	21983	57985	18149	20109		305146	423372
	A/B (%)	70.7	53.0	66.9	69.2		52.1	54.6
North America/EU/ ROW	Intermediate goods trade (A)	51243	83412	43023	30393	153016		361086
	Total Trade (B)	103896	223957	92990	64723	242680		728246
	A/B (%)	49.3	37.2	46.3	47.0	63.1		49.6
The World as a Whole	Intermediate goods trade (A)	121143	149675	87136	75006	240973	508799	
	Total Trade (B)	195212	374899	160050	138437	366977	1148142	
	A/B (%)	62.1	39.9	54.4	54.2	65.7	44.3	
2011 ( Million Dollar)								
Expot	Import	China	Japan	Korea	Taiwan	AEAN	North America/E U/ ROW	The World as a Whole
China	Intermediate goods trade (A)		60241	50023	27111	70740	523819	731934
	Total Trade (B)		172497	82636	43149	121189	1448826	1868298
	A/B (%)		34.9	60.5	62.8	58.4	36.2	39.2
Japan	Intermediate goods trade (A)	121511		49215	37719	81560	195803	485809
	Total Trade (B)	188932		67484	51995	110884	405076	824370
	A/B (%)	64.3		72.9	72.5	73.6	48.3	58.9
Korea	Intermediate goods trade (A)	116652	28661		15898	46058	132842	340111
	Total Trade (B)	155655	37808		17785	55287	236223	502759
	A/B (%)	74.9	75.8		89.4	83.3	56.2	67.6
Taiwan	Intermediate goods trade (A)	66699	13318	11028		45898	97521	234464
	Total Trade (B)	85901	18451	13117		53204	148955	319628
	A/B (%)	77.6	72.2	84.1		86.3	65.5	73.4
ASEAN	Intermediate goods trade (A)	112714	64882	29179	23180		398077	628033
	Total Trade (B)	184065	117634	51527	32522		720749	1106498
	A/B (%)	61.2	55.2	56.6	71.3		55.2	56.8
North America/EU/ ROW	Intermediate goods trade (A)	280077	159530	110576	60243	388191		998616
	Total Trade (B)	892673	478037	299923	132708	654079		2457420
	A/B (%)	31.4	33.4	36.9	45.4	59.3		40.6
The World as a Whole	Intermediate goods trade (A)	697653	326633	250022	164151	632446	1348062	
	Total Trade (B)	1507225	824428	514688	278159	994644	2959829	
	A/B (%)	46.3	39.6	48.6	59.0	63.6	45.5	

As for the trade relations between Japan and China, we can see a specific production and trade pattern that Japanese multinational firms export intermediate goods from Japan to China and assemble them into final goods in their factories in China which are exported to North America and EU. This process played a role as the main channel through which the Subprime crisis was transmitted to the Japanese economy, leading its sharp fall in 2008. In these ten years, however, we have also seen a considerable increase in China's export of intermediate goods to Japan and other Asian countries, and the asymmetry between Japan and China has been moderated rapidly.

As for trade relations between Japan and Korea, Korea depended on intermediate goods import from Japan in 2000, but Korea has rapidly increased its intermediate goods export to Japan recently. Furthermore, Korean has trade surplus with China, but trade relations are relatively symmetric in terms of intermediate goods trade. Taiwan has the high ratio of intermediate good trade, especially with Korea and ASEAN.

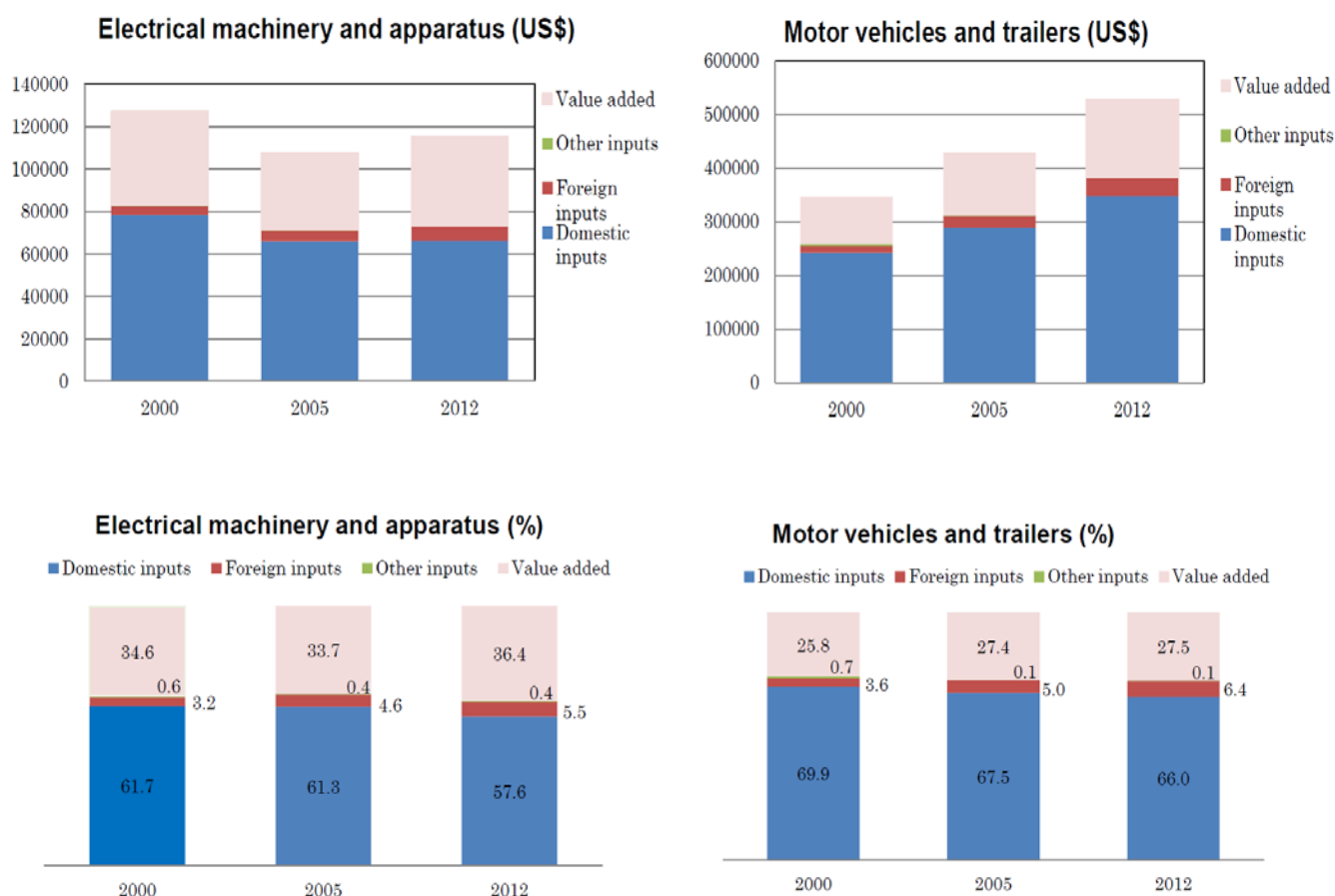
Furthermore, it should be pointed out that China has increased its weight in the East Asian region and has become the center of international division of labor in recent years, but at the same time, more than half of exported goods are produced by foreign multinational firms,

especially Japanese ones. Therefore, there are two factors which modify the original “flying-geese” pattern (Akamatsu 1962, Boyer, Uemura and Isogai (eds.) 2012, Uemura 2014). First, China has developed rapidly to become the second largest economic power in the world economy, and Japan has become just one of the leading countries in the international division of labor in East Asia. Second, China’s industrial development patterns shows “leapfrogging” caused by the development of international production linkages which is driven by multinational firms. In this situation, more than half of the trade has become intermediate goods trade in the East Asian region.<sup>6</sup> The off-shoring in the global value chains shows very complex pattern of structural dynamics, depending on not only international wage differentials as a basis of “flying-geese pattern”, but also the scale of markets, industrial infrastructures and social capitals.

## D.2. CHANGING COST AND VALUE-ADDED STRUCTURES IN THE JAPANESE MANUFACTURING INDUSTRY

The rapid increase in intermediate goods trade in the East Asian region influences the cost and value-added structures of Japanese manufacturing industry. Especially, the inputs of intermediate goods from foreign countries, mainly other Asian ones, have increased rapidly in recent years. We will focus on two typical manufacturing industries: “Electrical machinery and apparatus” and “Motor vehicle and trailers”. Figure 7 shows changes in cost and value-added structures in these industries from 2000 to 2012.

**Figure 7. Outputs and Cost Structures in the Japanese manufacturing industries**



Source: YNU-GIO<sup>7</sup>

<sup>6</sup> The increase in intermediate goods trade requires the reconsideration of trade theories, and this is bringing about the rejuvenation of the Classical trade theory (see Shiozawa 2007). Furthermore, the development of international production linkages makes the Leontief-type quantity adjustment more important in the world economy (see Uemura 2014).

<sup>7</sup> YNU-GIO (Yokohama National University- Global Input-Output ) Table is provided by Center for Economic and Social Studies in Asia (CESSA), Yokohama National University. As for detailed information about the data, see Sato and Shrestha [2014].



In the “electrical machinery and apparatus” industry, output has decreased (in the dollar term), and the domestic input of intermediate goods and services has decreased very rapidly. This causes a decrease in intermediate demand for its own and the other industries in Japan with its weakening domestic backward linkages and accelerating de-industrialization. In fact, the electrical machinery and apparatus” industry has fired many workers to increase its labor productivity and to keep its international competitiveness in the 2000s. In the “motor vehicle and trailers” industry, output is growing (in the dollar term) and the domestic input of goods and services is still maintained with its employment inducing effect. Therefore, it should be noted that even within the export core manufacturing industry, the “electrical machinery and apparatus” industry and the “motor vehicle and trailers” industry show different patterns in the induced effect of output and employment in the domestic economy, faced with increasing production linkages and intermediate goods trade in East Asia. In this context, the thorough analysis of the interaction between structural changes in international linkages in East Asian and the changing pattern of de-industrialization in Japan must be an important topic for our further research.

## E. CONCLUSIONS

We analyzed the transformation of growth regime and de-industrialization in Japan and international production linkages in East Asia in a framework that integrates the growth regime of the *régulation* theory and the input-output analysis of industrial structural change and de-industrialization. The results of our analysis can be summarized as follows.

First, the Japanese economy experienced a transformation of growth regime with financial liberalization and institutional changes in wage-labor nexus during the long-lasting recession of the 1990s. During the post-2002 recovery process, although the profit rate recovered with a sharp decline in wage share caused by depressing wages and firing workers, a new growth regime with a full-fledged *régulation* mode was not established (Yamada and Hirano 2012). The Japanese economy maintained its export-led nature, but the core mechanisms to promote productivity growth and coordinating mechanisms were severely weakened by gradual institutional changes owing to financial liberalization and neo-liberalist labor policies (Lechevalier 2011). Furthermore, faced with fierce international competition in East Asia, heavy reliance on exports rendered the Japanese economy stagnant and the accumulation rate remained at very low levels.

Second, significant differentials in output and productivity growth rates exist between “the export core manufacturing” industry and “the other manufacturing” industry. Furthermore, structural linkages of the “business-related services” industry are much stronger with “the export core manufacturing” industry than the “consumer services” industry. In the 1990s, “the export core manufacturing” industry supported economic growth under the condition of stagnant domestic demand, and this induced the growth of “the business-related services” industry through intermediate demand from “the export core manufacturing” industry. The delocalization of productive activities became very active in “the export core manufacturing” industry, but Japanese firms in this industry did not significantly scale down their output until the mid-2000s. However, when the Japanese economy was hit by the subprime crisis in 2008, both export and industrial output fell sharply, causing severe unemployment problems.

Third, the process of de-industrialization has demonstrated several characteristics in Japan. In the 1980s, de-industrialization was mitigated by an expansion in export and domestic demand, and only “de-industrialization by long-term shifts in demand from manufacturing to the services” was observed during the bubble boom in the late 1980s. During the long-lasting recession after the collapse of the bubble in 1990, “positive de-industrialization” was operational in “the export core manufacturing” industry in tandem with higher productivity growth, and “negative de-industrialization” occurred in tandem with stagnant demand in “the other manufacturing” industry. Therefore, polarization was exacerbated in terms of output and employment in the Japanese economy. Furthermore, the mechanism of “de-industrialization by manufacturing-



service linkages” continued to strengthen after the late 1980s, becoming remarkable in the 1990s. As a result, de-industrialization in terms of employment has accelerated since the 1990s.

Fourth, with regard to structural changes within the manufacturing industry, intra-manufacturing linkages have become stronger since the 1990s, especially in “the export core manufacturing” industry. Furthermore, output of “the business-related services” industry increased with the technical coefficient effect and domestic demand effect, and output of “the consumer service industry” also increased with the expansion of final domestic demand. In this situation, workers released by “the export core manufacturing” industry and “the other manufacturing” industry were mostly absorbed by the service industry as non-regular workers. After the 2008 subprime crisis, however, output of “the export core manufacturing” industry decreased, and consequently “the business-related services” industry lost its employment-absorbing capacity, causing severe employment problems.

Fifth, in an international context, international production linkages and intermediate goods trade have developed rapidly in East Asia, and the Chinese economy has grown continuously, accepting foreign multinational firms and showing a “leapfrogging” pattern in its industrial development. This new reality requires a modification of the traditional “flying-geese pattern” of economic development in East Asia (Uemura 2014). Faced with these intentional structural changes, the electrical machinery industry and the motor vehicle industry have shown different patterns in output and intermediate inputs in the Japanese economy since the early 2000s. In the electrical machinery industry, output has not grown, and the domestic input of intermediate goods and services has decreased rapidly. This causes a decrease in intermediate demand for its own and the other industries with its weakening domestic backward linkages and accelerating de-industrialization. In this situation, the electrical machinery industry has fired many workers to increase its labor productivity. In the motor vehicle industry with high international competitiveness, output is growing and the domestic input of goods and services is still maintained with its employment inducing effect in the economy.

Taking account of all of these results of our analysis, we can consider the future prospect of the Japanese growth regime from the viewpoint of the *régulation* theory. Under the conditions mentioned above, it is necessary to construct stronger domestic backward linkages of “the export core manufacturing” industry with proper institutional coordinating mechanisms in the domestic economy. In this regards, the following policies are imperative in order to establish a stable growth regime.

First, we should establish an appropriate mode of *régulation* to create dynamic industries which can lead the international division of labor in the East Asian region. Faced with rapid economic growth of China and other Asian countries, the Japanese economy is set to inevitably witness a relative decline in manufacturing employment in the process of de-industrialization. In this situation, it is very important to invest continuously in the creation of new innovative industries with highly competitive edge.

Second, with regard to the service industry, there should be a focus on promoting active innovation not only in business-related services, but also in personal services such as medical care, elderly care, and higher education. In these promising areas, it is important to create an integrated innovation system comprising both manufacturing and service components which would be supported by a continuous increase in domestic demand and incomes.

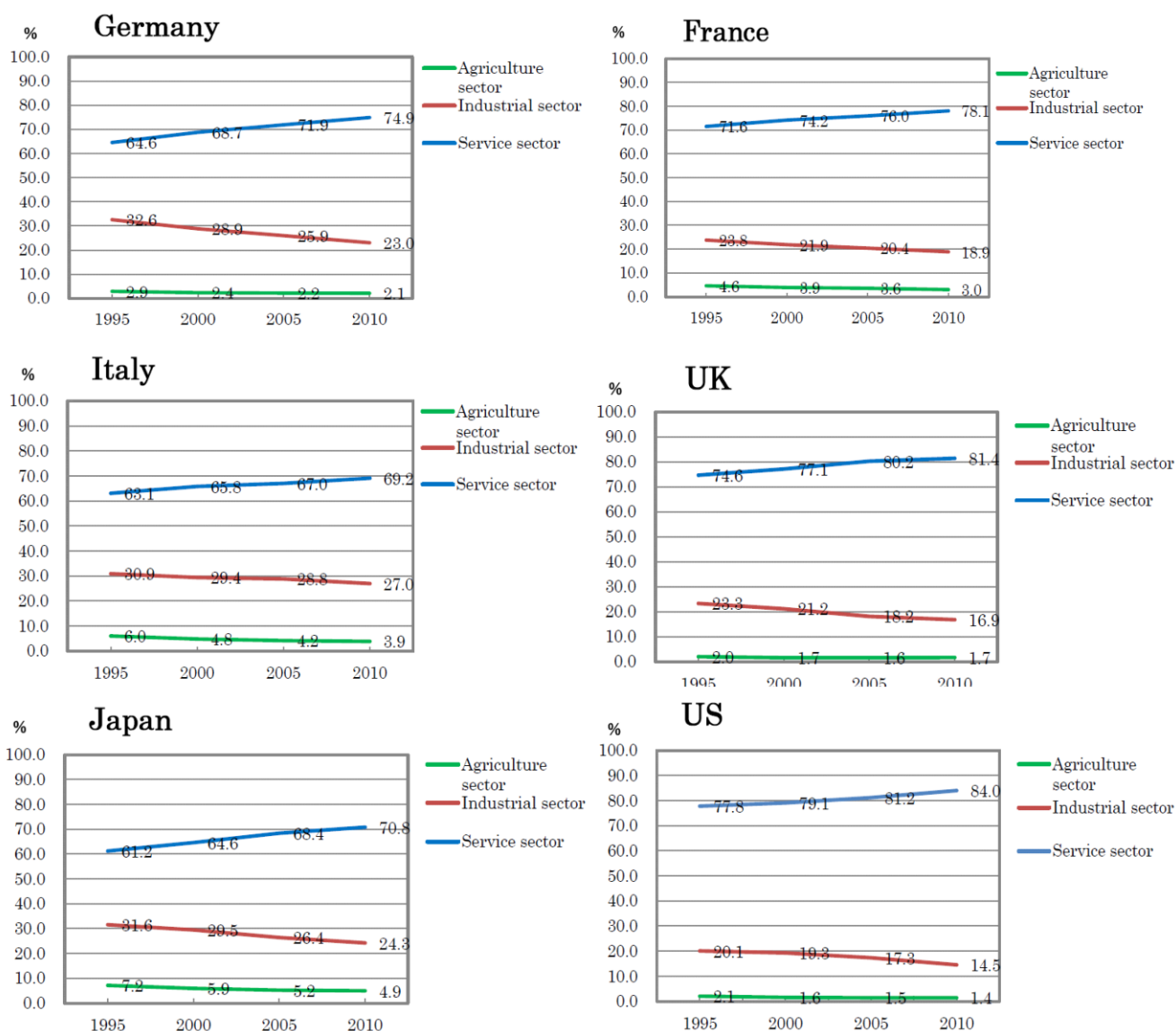
Third, in order to promote innovation in these areas, the establishment of appropriate institutions and a *régulation* mode is also indispensable. In the Japanese economy, large export-goods manufacturing firms have trade surplus, weakening their linkages compatible with other industries, and small and medium-sized firms. Moreover, the Japanese mode of *régulation* has demonstrated dysfunction (Yamada and Hirano 2012). Therefore, in order to realize a new stable growth regime, it is necessary to establish a new form of institutional and structural compatibility among the financial system, wage-labor nexus, and the system of public finance, to enable a new development of medical care, social welfare services, and higher education with sufficient employment growth. In this regard, social compromise encompassing both regular and non-

regular workers should be established to introduce effective programs for skill formation, employment security, wage determination, and social welfare.

## F. ANNEX : DE-INDUSTRIALIZATION IN ADVANCED COUNTRIES

De-industrialization has occurred in all the advanced countries: Germany, France, Italy, UK, US and Japan, and these countries show different patterns of de-industrialization which reflect the diversity of advanced capitalisms (Amable 2001).

### Employment Structures and De-industrialization in the Advanced Economies



Source: World Input-Output Database (WIOD).<sup>8</sup>

<sup>8</sup> World Input-Output Database (WIOD) is provided by the WIOD Project which is funded by the European Commission. As for detailed information about the database, please see Timmer, Dietzenbacher, Stehrer, and de Vries [2015].

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