

# Dynamics of the U. S. Industrial Structure after Lehman Brothers' Bankruptcy: Innovation, Globalization, the Social Division of Labor, and Income Polarization<sup>1)</sup>

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## 1. Viewpoints to Analyzing U. S. Industrial Structure

### (1) Previous Studies in the Field of Industrial Structure Before Lehman Brothers' Bankruptcy

Many studies on U.S. industrial structure dynamics have focused on the growth of service sectors (Asaba [1996], Hirano [2005], Yamagata [2012])<sup>2)</sup>. Some studies analyzed the reorganization process of the U.S. manufacturing industry and the change in industrial structure after the 1980s, the 1 revival of industrial competitiveness in the 1990s, and the increasing economic instability after the 2000s (Nakamoto [2003], [2004], [2013]).

Nakamoto [2004] and Tamura [2005], [2007] have focused on the growth of business services after the 1990s. They asserted that it was appropriate to interpret this growth as a result of increased manufacturing industry productivity. They pointed out that this phenomenon consisted of the trend of manufacturing industry servicing, rapid growth of the business sector because of cost reduction, and outsourcing of the manufacturing industry, wage decline, non unionization, and the offshoring problem. These studies explain the situation of the 1990s accurately.

However, according to estimations based on BEA I O tables, the ripple effect of the manufacturing industry on the business sector (the production added employment inducement effect) is falling to the third position after Lehman Brothers' bankruptcy

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1) This paper is a revised version of an independent JIEA of October 30, 2016.

2) The definition of the service sector in this paper is subject to Clark [1940]. Previous studies also use a similar definition.

(BEA [1999], [2014]). This data suggests that many industries other than the manufacturing industry purchase business services to progress innovation and reduce costs. First, it is important to examine the industrial structure dynamic after Lehman Brothers' bankruptcy, based on the recognition of such difference.

Second, it is necessary to examine whether the expansion of the service sector, such as social services (healthcare, education, etc.) and distribution services (retail and wholesale trade), is progressing (Castells [1999], [2009]). Castells interpreted the growth of the service sector as a development of the social division of labor and highly developed industrial society, driven by innovation (productivity improvement and the rise and progress of information technology). Among advanced nations, the U.S. has been at the forefront of development of social and distribution services. Therefore, this is an important objective of this study in analyzing the dynamics of these industries after Lehman Brothers' bankruptcy.

Spence and Hlatshwayo [2011] (report of the research project of the Council on Foreign Relations) studied the change of the added values and employment of each industry from 1980 to 2008. According to this study, the added value increased in almost all industries, but the major portion of employment increase concentrates in the service sector (such as social services and distribution services), whose jobs are difficult to spill overseas (non tradable). The "tradable", sectors such as the manufacturing and information technology industries, either reduced or did not add many jobs, and employment has increased in emerging countries instead of in the U.S. Moreover, low value added activities were quickly outsourced from the U.S. among the tradable industries and activities, and these processes may reach high value added activities.

Brynjolfsson and McAfee [2011], [2014], and Frey and Osborne [2013] asserted that the progress of digital technology lost part of professional or high value activities and jobs. Verification of these views is also an important research objective.

**(2) Factors Affecting Industrial Structure Dynamics : Development of Productivity (Technical Evolution), Globalization, and Social Division of Labor**

**(a) Viewpoints**

The starting point of the argument on advanced industrial structure is Petty and Clark's empirical rules, which pointed out that capital, labor force, and income moved in the order of primary, secondary industry, and tertiary industry in terms of productivity, specifically focusing on labor force movements (Petty [1690], Clark [1940]). The logic of this rule starts from generating a social surplus, and the next

step is releasing the labor force from production activities and the expansion of mental activities and leisure. The most powerful driving force in advance industrial structure is the increase of productivity in the primary and secondary industries. Although Petty and Clark set a basic argument for this field, but the following unsolved problems remain: a more detailed analysis of manufacturing industry dynamics, such as the trend toward high value added activities and labor force reorganization as a result of globalization, is not fully performed. After Lehman Brothers' bankruptcy, it is necessary to consider the "reshoring" of the manufacturing industry to the U.S. (Kinoshita [2011]), in addition to the growth, specialization, and evolution of the service sector and each service industry.

**(b) Contributions and Limit of Economics, Sociology and Geography**

I first consider economic arguments. Although economic literature does not directly study advanced industrial structure but rather income inequality, we can identify the factors that advance industrial structure indirectly. The latest research on expanding income inequality pointed out that the impact of technological progress is the greatest and the impact of globalization follows. The influence of globalization consists of the influence of trade and direct investment, where direct investment had more influence (Jaumotte, Lall, and Papageorgiou [2013]). The Stolper Samuelson theorem pointed out that unskilled labor forces' wages fell by trade and also the gap between productivity and the wages of exporters and non exporters, as its gap consequently expanded in advanced nations (Stolper and Samuelson [1941]). Although the Stolper Samuelson theorem includes errors, studies that developed this theorem insisted on expanding demand for advanced human resources in advanced countries (home country of the foreign direct investment) and wage inequality between high skilled human resources and unskilled labor (Goldberg and Pavcnik [2007], and Harrison, McLaren, and McMillan [2011]). The studies that focused on the technological influence on labor force pointed out that technologies (especially IT) replaced and lost moderate skill and wage labor forces (Abel and Deitz [2012] and Bureau of the Census [2012]). To fully study the advancement of industrial structure requires consideration of these factors.

Next, I review sociological and geographical studies. Castells [1999], [2009] and Sassen [1991], [2008] presented base viewpoints to interpreting service sector growth. According to their theories, the service sector consists of "producer service," "personal service," "social service," and "distribution service." These services are born independently

or differentiated from existing industry structure because of the purchase of existing industries, innovation, the progress of IT technology, and productivity improvement.

Producer services provide services mainly to establishments or companies that produce goods and services, and personal services mainly meet personal consumption. Social services, such as education and healthcare and social assistance, contribute to the reproduction and development of the entire society, and the distribution service plays an important role in the sales and purchases of goods and services that other industries produce. This classification and conceptualization is based on the viewpoint of production and distribution of values in the society.

Castells and Sassen interpreted that the growth of these service industries is a result of developments in innovation, globalization, and social division of labor. They emphasized the importance of producer service and pointed out that income polarization occurred within the generation of various service industries. Although they clarify the factors, process of the service sector growth, and its merits and demerits, their studies are insufficient from the viewpoint of this study on the following points.

First, “finance and insurance” contain producer services. Considering their position within industry structure, finance and business services should be distinguished. This industry provides currency, credit, and other financial derivatives recently, and the business service introduces services to establishments or companies. Therefore, this study uses business service instead of the producer service concept<sup>3)</sup>.

Second, it is necessary to distinguish and analyze the three types of business services separately to discuss the income polarization problem after 2008. The business service also includes three types of services: knowledge intensive business services (KIBS)<sup>4)</sup>, management of companies (holding company and business management services), and routine type business services (back office, waste management, etc.).

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3) The definition of business service in this paper is the service that mainly provides services to establishments or companies, excluding financial service. In the North American standard industrial classification (NASIC), this corresponds to professional and business service. Although professional services, such as law, accounting, engineering, R&D, management consulting, supply services to individuals, the main customers are establishments and companies (refer to Yamagata [2012]).

4) Major studies have pointed out that KIBS contain part of R&D services, management consulting, engineering service, IT services, advertisement, design, management consulting, law service, accounting, etc. These can be categorized into three types: research and technical, creative, qualification and specialized (Miles [2012]).

The KIBS and management of companies are associated with high wages, while routine type business services with lower wages.

Third, the growth of social services and distribution service are an outcome of a social division of labor development. Although Castells and Sassen interpreted these processes as the emergence of a highly developed industrial society, it is also necessary to interpret the consequences of excessive consumption (Nakamoto [2013]), and large increase of health care costs and their national burden (Hasegawa [2012]).

Fourth, in addition to these viewpoints, the increase of low wage industries and occupational employment is investigated in this study.

### **(c) Analysis Issues Post Lehman Brothers' Bankruptcy**

The following points around the structural changes after Lehman Brothers' bankruptcy should be examined. First, it should be considered whether the industrial structure advancement continued or reversed. President Obama and the Democratic Party tried to strengthen the U.S.' domestic economy and revitalize industries, especially manufacturing, environment and energy, to overcome the Great Recession. Central policy targets were to "reshore" and strengthen the manufacturing industry and revitalize the middle class. However, it can be interpreted to reverse advanced industrial structure by new non service industry development and reshore manufacturing (Sakurai [2014], Kubo [2010], Sunada [2009], Government Institutes [2009]).

Second, the impact of the Green New Deal and the Shale Revolution should be analyzed. President Obama promoted the Green New Deal during his first term to survey whether the environment and energy industry developed or not. Although the Shale Revolution progressed irrespective of the Obama administration's policies, the impact this has had on the U.S. economy should also be examined.

Third, it is necessary to analyze U.S. industry structure dynamics, considering the increasing the importance of innovation. The following issues will be discussed: whether business services, especially KIBS, which provide both knowledge and services to establishments and companies, developed; and whether art activity, which is thought to be one of the supporting factors of innovation, expanded.

Fourth, examining the relation between advanced industrial structure and income polarization is required. Only the trend of each industry's and occupation's wage (labor income) as the base of the income polarization problem can be inquired in this study. The question is whether the level of technology, knowledge, skill, and tradability have influenced the polarization to high wage industries and occupations and low

wage industries and occupations (Reich [1991], Moretti [2012], Murray [2012], BOC [2012]). Conversely, we also need to establish whether a new trend that leads to middle class revival was created and whether the correlative low wage industry, which mainly depends on personal consumption, has expanded. The influence of the wealthy class in personal consumption after Lehman Brothers' bankruptcy increase also needs to be taken into consideration.

Finally, the dynamics of the manufacturing industry after Lehman Brothers' bankruptcy, the so called "reshoring," should be analyzed, considering whether manufacturing plants returned to the U.S. and whether the number of manufacturing jobs and wages increased. The issues related to manufacturing are analyzed in Section 3.

## 2. Industrial Structure Dynamics after Lehman Brothers' Bankruptcy

### (1) Industrial Structure Dynamics in Added Value, Corporate Profits, and International Data

#### (a) Change in Added Value per Industry

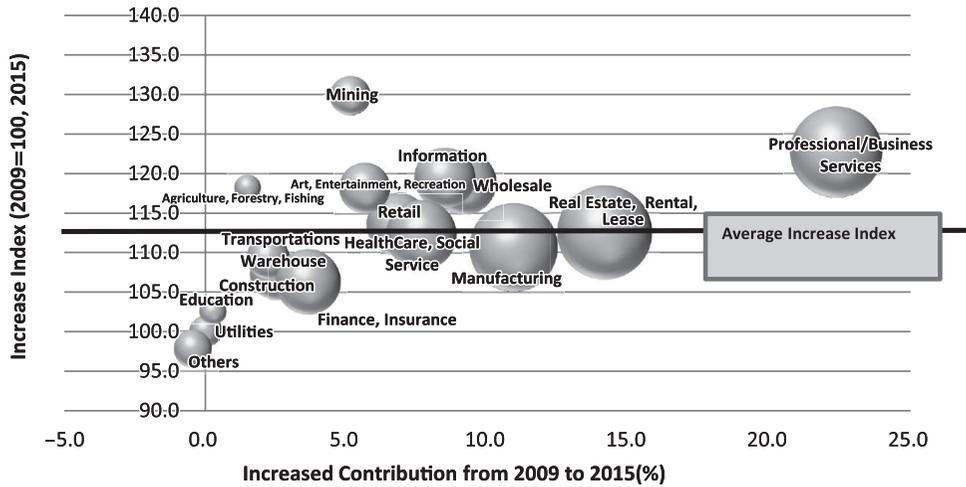
The change of added value for each industry from 2009 to 2015 is analyzed<sup>5)</sup>. Fig. 1 shows each industry's added value dynamics, where each bubble size indicates the amount of added value to each industry in 2015. The X axis indicates the increased contribution (2009 to 2015) of each industry to all industrial added value increases, and the Y axis the growth ratio of the added value in each industry in 2015 (2009 = 100).

Fig. 1 confirms the followings. First, the biggest added value industry is the business service (professional and business service). The second biggest are real estate, and manufacturing, healthcare and social services, wholesale, retail, finance and insurance, information, and art, amusement, and recreation follow.

Second, the industry in which added value grew most during this period is mining (129.8), followed by professional and business services (122.7); information (119.5); wholesale (118.8); art, entertainment, and recreation (118.2); agriculture, forestry and fishing (118.3); retail (113.7); real estate (112.5); healthcare and social (112.3); and manufacturing (110.7). The utilities sector (electricity, gas, and water

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5) In this paper, the specialized and business services are treated as business services because their purchase ratio from establishments or companies is above two thirds (BEA [1999], [2014]).



Source) Created based upon data from U.S. Dept. of Commerce, BEA, [annually f], *Gross Domestic Product by Industry Data* ([http://www.bea.gov/industry/gdpbyind\\_data.htm](http://www.bea.gov/industry/gdpbyind_data.htm), as of July 11, 2016).

Figure 1 Added Value of Each Industry (Amount, Percentage Contribution to Increase, Increase Index from 2009 2015 (2009 dollars))

services) (100.1) hardly grew from 2009 to 2015<sup>6)</sup>. Although it increased 10 points from 2009 to 2012 because of the environment and energy policy of the Obama administration (Green New Deal), the growth of this industry slowed after that.

Third, the increased contributions on the X axis show the following. It is the professional and business services (22.3 points) that have the largest contribution, followed by real estate (14.2), manufacturing (10.9), wholesale (9.2), information (8.5), healthcare (7.7), retail (6.8), and art, entertainment, and recreation (5.6).

If sizes, degrees of growth, and increased contributions of added value are considered synthetically, industrial added values not only recovered and increased, but also registered following structural changes. 1) The business service that provides services mainly to companies and establishments took the leading position in the growth of industrial structure, and became a more important industry. 2) However, some different industries are contained inside business services, as mentioned in

6) Although the added value is hardly growing, the electrical generation capacity, and production of renewable energy in the U.S. grew steadily after 2008 (The Council of Economic Advisers [2014]). Probably, the energy and electric power price decline have influenced it. Although the growth of the industry as seen by public utilities' data ended with the short term boom, it is needed to be cautious of the "Green New Deal" not having necessarily died completely.

Section 1. In the business service, the routine type business services (back office and waste management; corresponding to the outsourcing of low value added activities) lead the increase of added value (45%), and KIBS (35%) and corporate management (20%) follow (BEA [annually f]).

Regarding job dynamics, the difference in the three types of industries becomes important. Routine type business services have grown mostly upward and occupied approximately half of the increase in the added value of the business sector. This means U.S. companies' advanced reorganization, rationalization, and outsourcing aim at cost reduction. Corporate management services and KIBS follow. This phenomenon reflects increased activities of the holding companies and management services according to the rationalization and pursuit of efficiency of business organizations and the growing importance of innovation and professional knowledge production in the U.S. industrial structure.

Real estate holds the second position regarding the size and increased contribution to added value. This shows revival and activity on the housing market, and the latest real estate prices and the numerical added values recovery are steady. Although it is suggested that the influence of the monetary policy of the Federal Reserve is strong and its sustainability questionable, the importance of this industry cannot be confirmed in the below mentioned employment and occupations analysis. Since it is not deeply related to the subject of this study, detailed analysis of the real estate industry is not carried out.

The size of the added value in the manufacturing industry holds the third position, and its contribution increased by approximately 10 points. It is necessary to consider the meaning of added value increase in this industry. Although the manufacturing industry's presence is still large in respect to the added value, employment seldom recovered or increased. It is suggested that the manufacturing industry advanced its high added value. Therefore, it is necessary to analyze the profits and wages of the manufacturing industry carefully in the following section.

The increase of the information industry's added value reflects mainly the growth of software publishing and IT services in the information industry (BEA [annually f]). Distribution services (wholesale and retail trade) also grew steadily. This service is primarily based on personal consumption. Therefore, this suggests the continuing recovery and expansion of personal consumption after Lehman Brothers' bankruptcy. The steady growth of healthcare and social services holds the sixth

position. Although we can confirm that growth of the healthcare and social service industry continued from added value data, this phenomenon is an outcome of the large amount of medical expense burden for U.S. residents (Hasegawa [2012])<sup>7)</sup>.

In addition, it is necessary to focus on the high degree of growth in mining. Data confirms that shale gas and oil in the U.S. have developed rapidly after Lehman Brothers' bankruptcy, and especially profits and wages in this industry have increased. However, since crude oil prices fell in 2014 and 2015, overestimation of the effect of the Shale Revolution on the U.S. industrial structure is to be avoided. Although the growth of the arts, entertainment, and recreation industries fundamentally shows that personal consumption and services continued to grow, the degree of growth in the arts is the highest in this category. As mentioned later, this may suggest a rise in the importance of innovation in the U.S. industrial structure. Although the environmental energy industry presented rapid growth temporarily in 2009 and 2010 (utilities: electricity, gas, and water services), the boom ended and its growth is not seen in Fig. 1 as of 2015.

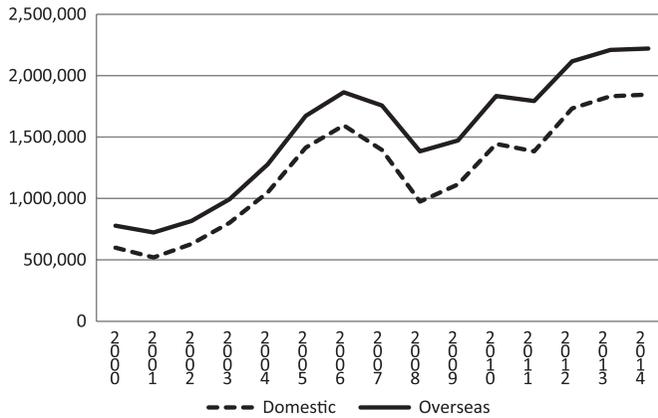
Overall, until 2015, in which reliable data was analyzed, the composition ratio of the service sector, especially the business service, in the industrial structure expanded.

#### **(b) Recovery of Corporate Profits**

The trends of corporate profits of the U.S. industries are analyzed based on Figs. 2 and 3. These data have added only the profit of industrialized organizations, not having necessarily included all establishments. U.S. multinational companies may have also added limited overseas profits because of their tax avoidance behavior. Despite data limitations, a certain tendency can be revealed by these data. Fig. 2 shows that corporate profit gradually recovered from 2009 and the maximum amount exceeds the 2006 level, which was the highest point before Lehman Brothers' bankruptcy. Fig. 2 also indicates the tendency of overseas earnings ratio increasing as compare to before 2008. This is because U.S. companies built organizations that compensate for the profit depression in the U.S. through the overseas earnings expan-

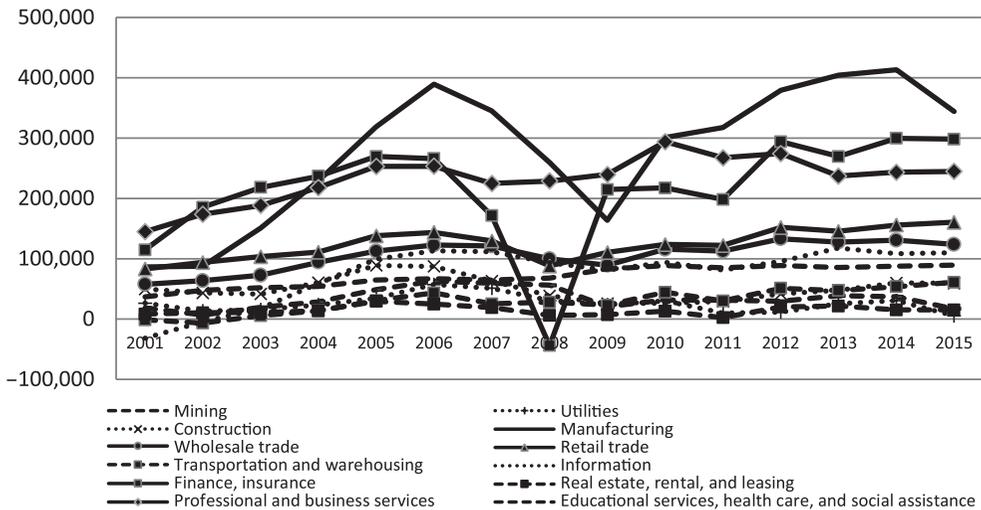
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7) The medical expense burden of U.S. residents is very heavy; the number of non insured amounted to 49 million in 2009. The GDP ratio of medical expenses is approximately 17%, twice the average of advanced nations'. The U.S. developed a highly advanced healthcare system and division of labor, so the wealthy can receive better healthcare and hospitable nursing (Hasegawa [2012], Department of Health and Human Services listening comprehension (September 11, 2014)). Moreover, the healthcare and social assistance industries have produced a large numbers of jobs.



Source) Created based upon data from BEA [annually a], *National Data interactive table, Table 6.17D. Corporate Profits Before Tax by Industry (A)* ([http://www.bea.gov/iTable/iTable.cfm? ReqID=9&step=1#reqid=9&step=1&isuri=1](http://www.bea.gov/iTable/iTable.cfm?ReqID=9&step=1#reqid=9&step=1&isuri=1), as of June 09, 2016).

Figure 2 Domestic and Overseas Corporate Profit before Tax (2009 million dollars)



Source) Created based upon data from BEA [annually a], *National Data interactive table, Table 6.17D. Corporate Profits Before Tax by Industry (A)* ([http://www.bea.gov/iTable/iTable.cfm? ReqID=9&step=1#reqid=9&step=1&isuri=1](http://www.bea.gov/iTable/iTable.cfm?ReqID=9&step=1#reqid=9&step=1&isuri=1), as of June 09, 2016).

Figure 3 Corporate Profit before Tax in Each Industry (2009 million dollars)

sions, such as in emerging countries, and earn profits globally<sup>8)</sup>.

Fig. 3 shows the transition of corporate profits of the top 10 industries. These

8) In addition, Lehman Brothers' bankruptcy is the event that has strengthened the global businesses of not only the manufacturing industry, or finance and the insurance business, but also personal service industry companies (e. g., Starbucks).

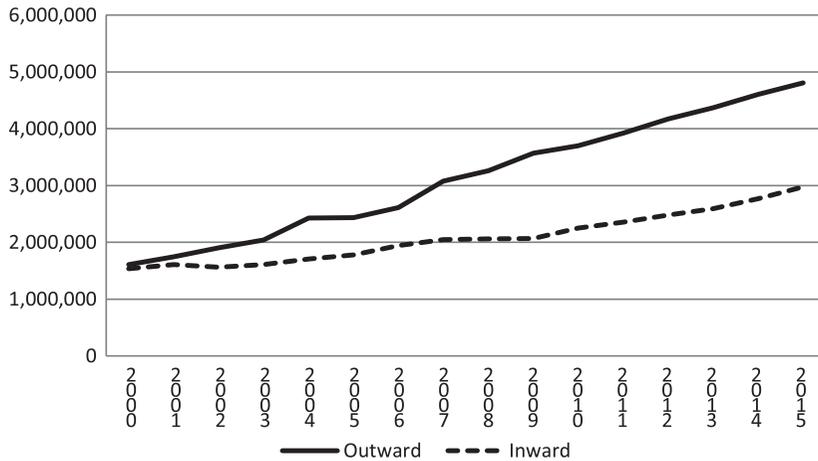
are classified into main industries, although some companies are performing business in various industries. For example, many companies entered the finance business in the 1980s, and the manufacturing industry largely shifted its business to service activities in the 1990s. This figure shows a certain trend.

First, the manufacturing industry remains the first position, except in 2009. This industry was increasing added value, while the amount of profits is the first among all industries. We can confirm a tendency to increase added value and profit after 2008 (Lipscomb [2011]). Second, although the finance and insurance industry fell into a deficit in 2008, it has recovered and maintains second position. Although it is not high ranking by added value, this industry is high level in terms of amount of profits. This suggests that the large amount of profit in this industry has revitalized. Third, the business services earn a significant profit and occupy the third position. This industry is stable in respect to profits and was in the top temporarily in 2009 after Lehman Brothers' bankruptcy. As previously mentioned, the business sector includes KIBS, corporate management, and routine type business services. When their internal composition is investigated, the profits of KIBS and corporate management are large (BEA [annually a]). Since the holding company is classified, corporate management has added up very large profits. Since the KIBS supply knowledge and technical services required for innovation activities for companies and establishments, the amount of profits may be large and increasing quickly. This phenomenon means that the importance of business services has increasing after 2008. Fourth, distribution services (retail and wholesale trade) are also increasing their profits. These data confirm the revival of distribution services accompanying personal consumption recovery after Lehman Brothers' bankruptcy. Fifth, the information industry and education, healthcare and social services are maintaining almost the same ranking as before 2008. The information industry contains many high profit companies, especially in IT services. Education, healthcare and social services contain many non profit establishments, are labor intensive, and have generous scope for employment. Therefore, this industry is inferior to the manufacturing and finance and insurance industries in the amount of profits. However, since the industrial scale is large, this industry is the seventh.

### (c) Trend of Direct Investment and Exports and Imports

#### (c 1 Direct Investment)

The progress and influence of globalization in the U.S. industrial structure are analyzed. Fig. 4 shows the trend of foreign and inward direct investment from 2009 to



Source) Created based upon data from BEA [annually i], *Balance of Payments and Direct Investment Position Data* (<http://www.bea.gov/international/dilusdbal.htm>, as of August 7, 2016).

Figure 4 Foreign Direct Investment (Inward, Outward, 2009 million dollars)

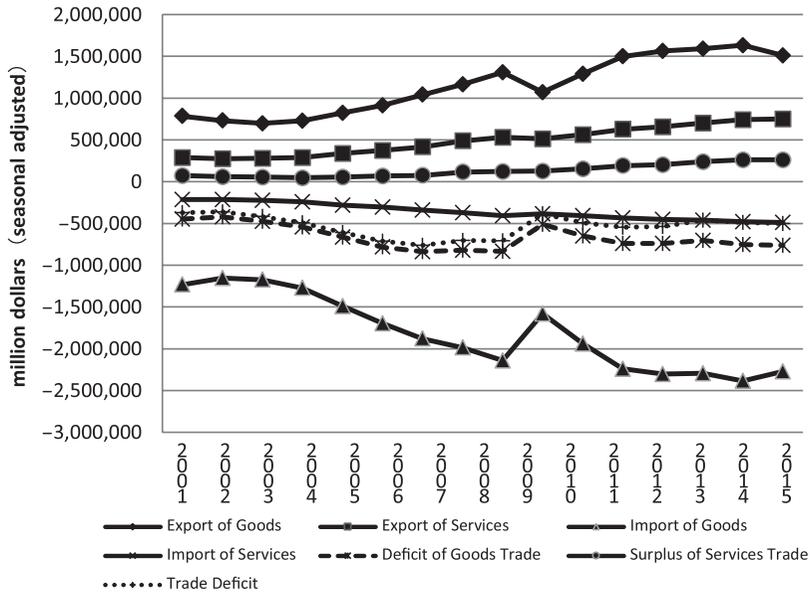
2015. The figure indicates foreign direct investment increased at almost the same pace or quicker as before Lehman Brothers' bankruptcy period, and these data suggest that U.S. companies advanced their overseas expansion steadily. The percentage the manufacturing industry occupies is approximately 8%, and the finance and the insurance are almost equal. Since the weight of holding companies is very large, business services prevail. However, the details cannot be revealed per BEA data (BEA [annually j]).

Although the amount of direct inward investment is less than the amount of foreign direct investment, the increase sped up after Lehman Brothers' bankruptcy, with approximately between 20% and 40% being represented by the manufacturing industry (BEA [annually j]). Since the direct inward investment of the manufacturing industry increased after 2008, as examined in Section 3, this trend increased direct inward investment.

These data suggest that the trend with which the U.S. industry strengthens global investment has not changed, and that the "reshoring" of the manufacturing industry sped up the inward direct investment pace. The detailed process and meaning of "reshoring" will be surveyed in Section 3.

### (c 2) Exports and Imports

Fig. 5 shows the U.S. export and import trends of goods and services after 2000. The conventional structure before 2008 is an excess of imported goods, excess of



Source) Created based upon data from BEA, [annually h], *Trade in Goods and Services* (<http://www.bea.gov/international>, as of June 13, 2016).

Figure 5 Import and Export of Goods and Services (2009 million dollars)

export services, and massive total trade deficit<sup>9)</sup>. This trend has not changed. Although imported goods fell in 2009 temporarily because of Lehman Brothers' bankruptcy, they started increasing and exceeded the 2008 level after 2010<sup>10)</sup>. The fact that "reshoring of the manufacturing industry" has reduced imports cannot be confirmed. Service trade surpluses are increasing steadily, without falling. The service trade surplus consists of patent licensing fees, financial account balances, travel balances, transport service surpluses, etc. This also includes the surpluses of the business service trade (approximately 20%), much of which is KIBS. However, KIBS features both exports and imports, and we are not necessarily dealing with a situation with only export surpluses. Imports from overseas and offshoring have also occurred<sup>11)</sup>. It is thus

9) As compared to before 2008, the ratio for GOD of the current balance deficit reduced, below 4%. The sustainability of the current account deficit has improved (Kawasaki and Sugawara [2016]).

10) Since the 2015 data are preliminary figures, there is a possibility for revision.

11) According to the empirical study of Norman and Zaidi [2011], it is complicated to determine whether employment increases or decreases in the U.S. IT and business services in connection with offshoring activities. In short, high value added activities have increased and low value added activities have decreased.

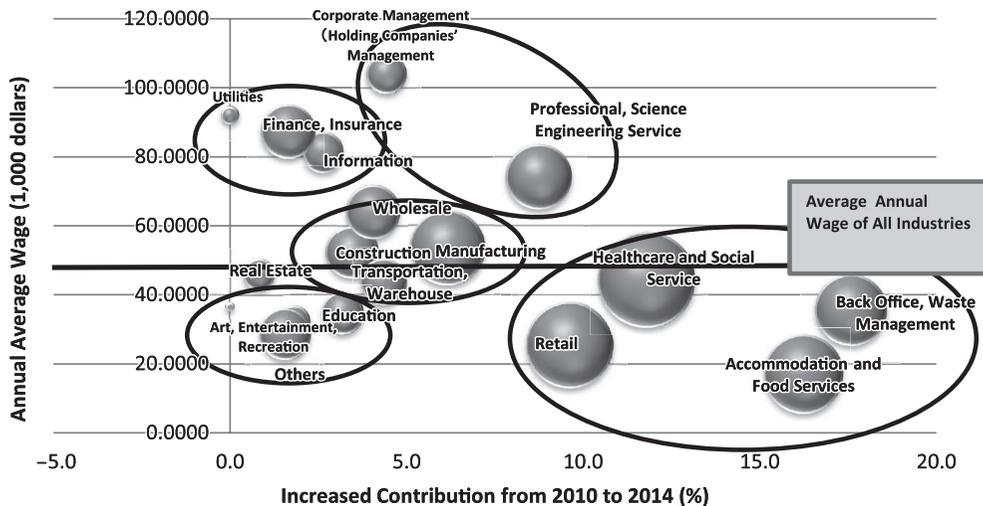
appropriate to understand that KIBS have earned trade surpluses since their present development in advanced nations and have reached global competitiveness (Ferreira, Raposo, Fernandes [2016]).

In addition, the Shale Revolution effects, such as decreased crude oil imports and natural gas exports have not contributed to the decrease in imports, and exports clearly increased in 2013 and afterwards. The Shale Revolution effects depend on crude oil price changes; therefore, we should carefully confirm Shale Revolution effects.

## (2) Change of Employment Structure

### (a) Meaning of Employment Recovery and Increase after 2010: Job Polarization to High Wage Industries Jobs" and Low Wage Industries Jobs"

I examine the influence of advanced industrial structure on the employment structure based on Fig. 6. This figure shows the increase in percentage contribution from 2010 to 2014 (X axis) of each industry, the average annual payroll (Y axis) of each industry, and the total number of jobs per each industry in 2014 (size of bubbles)<sup>12)</sup>. The starting point was set to 2010 because that year registered the lowest



Note) Including Self Employment.

Source) Created based upon data from U.S. Dept. of Commerce, Bureau of the Census [annually], *County Business Patterns* (<http://www.census.gov/programs-surveys/cbp/data/tables.html>, as of June 08, 2016).

Figure 6 Number of Jobs in Each Industry of 2014, Percentage Contribution to Increase from 2010 to 2014, Annual Average Wage

12) The concepts of job and employment differ in whether managers and self employed workers are counted or not, and a gap may rise. Since the County Business Patterns used in Fig. 6 and the Occupational Employment Statistics used in Fig. 7 mostly include self employ-

point for number of jobs after Lehman Brothers' bankruptcy.

**Fig. 6** shows the following. First, the middle wage industries (manufacturing, wholesale, construction and transportation industries) near the average wage do not increase much. The increased contribution of the manufacturing industry, which holds the maximum scale in this category is approximately five points, and accounts for only a part of the increases from 2010 to 2014. Detailed reasons why manufacturing jobs seldom increased are explained in Section 3.

Second, high wage industries include professional, science and engineering services, (corporate management and professional, science and engineering service are parts of the business sector and have high wage levels), finance and insurance, information (increased parts are mainly software publishing and IT services), and utilities services. These industries, except for utilities, have increased employments. Professional, science and engineering services, and corporate management services, which are parts of the business sector, are especially important as job creators and contributed to approximately 15% of the increased contribution.

Third, low wage industries include administrative and waste management (routine type business services, a part of the business sector), retail trade, healthcare and social services, and accommodation and food services, which have wages below average. These services employ enormous amounts of workers and their increased contributions are large. Since the healthcare and social services industry comprises high wage occupations, such as doctors and medical technicians, as well as low wage occupations, such as medical support and care jobs, its average wage is a little lower than the average of all industries. This difference will be distinguished and analyzed by the occupational statistics in **(b)**. The large number of healthcare and social service jobs and the industry's increased contribution is clear because of the aging U.S. society. The U.S. healthcare and social services industry has grown based on the sacrifice of a large amount of medical expenses burdens and has produced many related occupations such as doctors, medical technicians and care jobs<sup>13)</sup>.

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ment, using them can analyze the employment structure almost correctly. However, these statistics do not cover 2015 or 2016 data. Although the Current Employment Statistics used in Table 1 does not capture self employed workers fully, this data can still analyze the latest employment dynamics.

13) Although systematic research on the U.S. healthcare and social service industry is scarce, Mizuho Bank Industrial Research Group [2014], Hayakawa [2011], my interviews at the Department of Health and Human Services (HHS) (September 11, 2014), and a nursing

Fourth, the art, entertainment, and recreation industry is a low wage industry, and its increased contribution is not large. Entertainment and recreation are based on personal consumption and pay low wages. The wage level in the arts industry is a little lower than industrial averages (BOC [annually]). This data shows that we cannot expect the art industry to generate high quality jobs excessively. In addition, the art industry is concentrated in urban areas, where innovation is active. The point of this argument will be discussed in (3).

Fifth, we can confirm the following changes. Mining holds a special position. Although the finance and insurance bubble are hiding the mining bubble, the annual payroll is USD 84,242.9, as the industry employs over 750,000 workers and has increased approximately 30% after 2008. Since the number of jobs is small, the increased contribution is only two points. The Shale Revolution contributed very little in respect to the number of jobs. Fig. 6 also shows that the increased contribution of utilities is almost zero. Utilities (electricity, gas, water supply, etc.) increased by approximately 10% until 2010 due to the Green New Deal (environmental and energy policy) of the Obama administration, and decreased after 2011 because the Green New Deal could not be implemented except for the American Recovery and Reinvestment Act in 2009. This industry also did not have significant contributions in terms of the number of jobs, except for short term impacts. In addition, the education and real estate industries are mostly stagnate. Although the contribution of the added value of real estate is increasing to some extent, there is almost no contribution in respect to an increase in the number of jobs. This may be because real estate businesses' added value and profit swelled during the recovery of real estate prices and did not substantially expand.

The above analysis can be summarized as follows. Job polarization has progressed in a form that jobs in both relative high wage (37.8%) and low wage industries (62.2%) increased. The core of high wage jobs that increased after Lehman Brothers' bankruptcy was in the business sector (corporate management and the specialty, science, and engineering services). However, jobs have been increasing mostly in relative low wage industries. This process hardly shows a sign of "revival of the middle class."

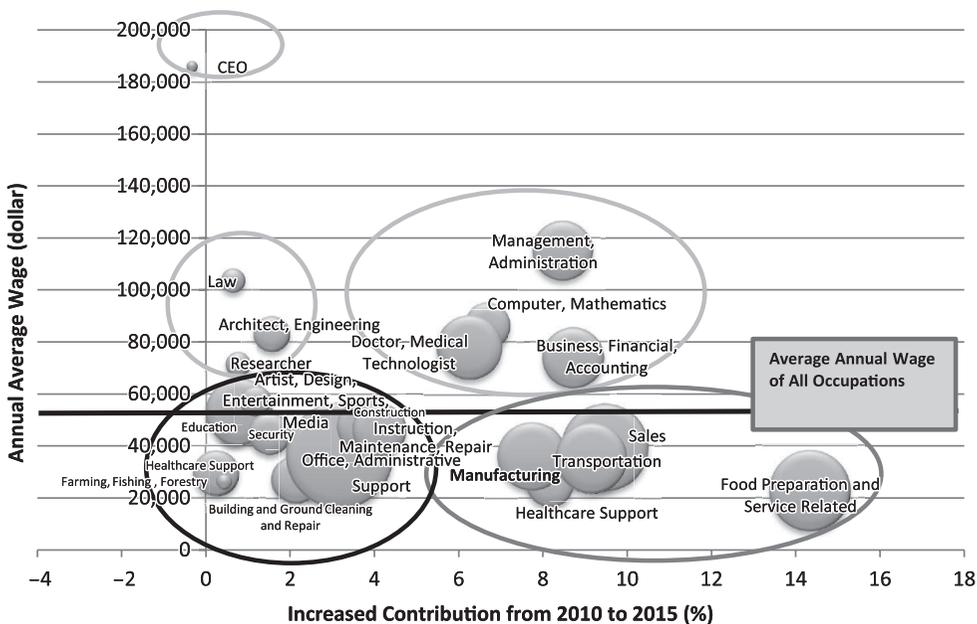
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home in Seattle (September 12, 2011) show that the division of labor has progressed significantly and employed many diversified occupations from high wage doctors to low wage various assistants in hospitals and care agencies.

(b) Analysis of Occupation Structure after 2010: Polarization to High Wage and Low Wage Occupations

Each industry contains various occupations such as CEOs, managers, research and development, clericals, sales, and production. U.S. occupations are classified and fragmented strictly, and wages and employee benefit programs differ greatly by occupation. Therefore, it is necessary to analyze the employment structure dynamics according to occupation statistics.

Fig. 7 shows the existence of five categories. The first category is CEOs, whose wage levels are high and decreased a little. The second category contains stagnant occupations, such as administrative support (clerical), which are shown close to the vertex. These are not increasing substantially. The third category contains professional occupations, including law, architecture and engineering, and research, which have high wages but little increase in contribution. The fourth category contains management, business, accounting and finance, computer and mathematics, and doctors and medical technician occupations. The increased in the contribution of these occupations



Note) Including Self Employment.

Source) Created based upon data from U.S. Dept. of Labor, Bureau of Labor Statistics [annually a], *Occupational Employment Statistics* (<http://www.bls.gov/oes/>, as of June 11, 2016).

Figure 7 Number of Jobs in Each Occupation, Percentage Contribution to Increase from 2010 to 2015, Annual Average Wage

is comparatively large and wages also are comparatively high. The fifth category contains production, transportation, sales, caretaking (caretaking occupations except doctors and medical technicians), and food preparations and services related to below the third category. These occupations' wages are lower than average and contributions increases are large.

Fig. 7 shows that the polarization of jobs after Lehman Brothers' bankruptcy means that relative low wage occupations comprise the majority (70.1%) of job growth. Food preparation and service related jobs, in particular, have the lowest wage levels and the largest increases in contribution. This industry depends mainly on personal consumption, and these occupations are low skilled with intense movement. Caretaking is a low wage occupation within healthcare and social services, and its increase in contribution is larger than that of doctors and medical technicians. Although clerical, installer, and repair jobs are large in numbers, these have not increased for the most part because sufficient jobs could not be generated after Lehman Brothers' bankruptcy.

Fig. 7 also shows that "high wage and increasing" occupations, which have above average wages and increases, are management positions; doctors and medical technicians; computer and mathematics (mostly in IT Services) jobs; and business; accounting and finance jobs. These are the leading occupations that offer high wages and increasing contributions in advancing industrial structures, but they are relative minorities. Production and transport occupations have increased to some extent. The Obama administration expected these occupations to be middle class jobs (The Council of Economic Advisers [2015]). The occupational dynamics shows that the revival of the middle class may be difficult in the short term.

### (c) Employment Dynamics after 2014

I examine the latest employment dynamics according to the latest reliable industry data at the time of writing this paper. Since Table 1 is based on the Department of Labor's employment statistics, this table cannot be compared directly with Figs. 6 and 7<sup>14)</sup>. However, we can examine the newest employment dynamics.

Table 1 shows that the number of private sector jobs increased by 5,329,000, amounting to 121,797,000. This exceeded the number in August 2007, the highest level before Lehman Brothers' bankruptcy. After 2008, the number of jobs increased to its

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14) The data in figures 6 and 7 contain self employment. However, Table 1 data do not.

Table 1 Employment by Industry from April 2014 to April 2016 (Non Agricultural Sectors)

Unit : 1,000 persons, %

Industry	2014/4	2016/4	Number of changes from 2014/4 to 2016/4	Percentage of increased contribution	Percentage of each industry in all sectors (2016/4)
<b>Mining</b>	<b>885.0</b>	<b>706.0</b>	<b>- 179.0</b>	<b>- 3.4</b>	<b>0.6</b>
<b>Construction</b>	<b>6,103.0</b>	<b>6,659.0</b>	<b>556.0</b>	<b>10.4</b>	<b>5.5</b>
<b>Manufacturing</b>	<b>12,139.0</b>	<b>12,298.0</b>	<b>159.0</b>	<b>3.0</b>	<b>10.1</b>
Wholesale trade	5,803.2	5,925.7	122.5	2.3	4.9
<b>Retail trade</b>	<b>15,301.0</b>	<b>15,919.5</b>	<b>618.5</b>	<b>11.6</b>	<b>13.1</b>
Transportation and warehousing	4,598.9	4,885.9	287.0	5.4	4.0
Utilities	550.2	564.4	14.2	0.3	0.5
Information	2,723.0	2,782.0	59.0	1.1	2.3
Finance and insurance	5,905.4	6,133.0	227.6	4.3	5.0
Real estate and rental and leasing	2,036.4	2,117.4	81.0	1.5	1.7
<b>Professional, scientific, and technical services</b>	<b>8,280.4</b>	<b>8,840.8</b>	<b>560.4</b>	<b>10.5</b>	<b>7.3</b>
Management of companies and enterprises	2,167.6	2,263.6	96.0	1.8	1.9
<b>Administrative and support and waste management and remediation services</b>	<b>8,493.9</b>	<b>8,997.6</b>	<b>503.7</b>	<b>9.5</b>	<b>7.4</b>
Educational services	3,405.9	3,527.4	121.5	2.3	2.9
<b>Health care and social assistance</b>	<b>17,906.4</b>	<b>19,046.6</b>	<b>1,140.2</b>	<b>21.4</b>	<b>15.6</b>
Arts, entertainment, and recreation	2,090.8	2,229.4	138.6	2.6	1.8
<b>Accommodation and food services</b>	<b>12,514.2</b>	<b>13,216.4</b>	<b>702.2</b>	<b>13.2</b>	<b>10.9</b>
Other services (except public administration)	5,614.0	5,684.0	70.0	1.3	4.7
<b>Total for all sectors (except public administration)</b>	<b>116,468.0</b>	<b>121,797.0</b>	<b>5,329.0</b>	<b>100.0</b>	<b>100.0</b>

Notes 1) Seasonally Adjusted Independently. See [http://www.bls.gov/web/emp/sit/cestn.htm#SA\\_ind](http://www.bls.gov/web/emp/sit/cestn.htm#SA_ind) for details.

Notes 2) Includes motor vehicles, motor vehicle bodies and trailers, and motor vehicle parts.

Notes 3) Excludes nonofficial commissioned real estate sales agents.

Notes 4) Includes ambulatory health care services, hospitals, and nursing and residential care facilities.

Notes 5) Includes rural mail carriers.

Source) Created based upon data from BLS [monthly], *Current Employment Statistics* (<http://www.bls.gov/web/emp/sit/cesebl1.htm>, as of September 06 2016).

highest level in U. S. history.

Healthcare and social services (21.4%), accommodation and food services (13.2%), retail trade (11.8%), professional, science and engineering services (10.5%), and construction (10.4%) occupied the higher rank of increased contributions in employment for the last two years. Although the manufacturing industry has recovered its number of jobs since its lowest point in 2010, the increased contribution of the manufacturing industry (3.0%) is slight. Job creation by the manufacturing industry, which the Obama administration considered, remained at approximately 410,000 in its second term (January 2013–January 2017). The Obama administration pledged to add one million manufacturing jobs in its second term. However, the job creation from 2010 in this industry was approximately 800,000, and therefore, the Obama administration was not able to honor its pledge when it was counted even from the lowest number after Lehman Brothers' bankruptcy. The reason the increase in manufacturing jobs was restricted is analyzed in Section 3. Moreover, **Table 1** shows that the increased contributions of the information, finance and insurance industries are small. Although these industries have had large added value and corporate profit increases, their contribution to the national economy in respect to job creation is significantly smaller than that of the service sector, which includes business services, healthcare and social services, and distribution services. Since face to face contact plays an important role in these services, these industries' job creation cannot flow overseas easily.

Thus, analysis of the latest employment dynamics also shows that the service sector has further increased its ratio in the industrial structure. Business services that offer services to companies or establishments, social services that reflect social maturation such as aging and improvement in living standards, and distribution services, that are affected by personal consumption expansion, have further increased<sup>15)</sup>. The reason these service industries' jobs increase is that they cannot be outsourced overseas easily as jobs in manufacturing and information industries because of their relative need for face to face contacts.

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15) Reich [1991] predicted that intellectual (symbolic analysts), personal service, and routine workers would remain in their home country, while innovations and globalization would continue. It is generally the same analysis as this study, but whether routine workers are stable in the long term is left behind as a point of argument.

### (3) Discussion : Environment and Energy industry, the Shale Revolution, Innovation, and Globalization

Based on the viewpoints presented in Section 1, in (a) (d) I discuss on the results of this section's analysis.

#### (a) Impact of the Shale Revolution and Green New Deal

First, I discuss the impact of the Shale Revolution. **Fig. 1** shows that the added value of mining was increasing rapidly, and **Fig. 6** shows the number of workers was also increasing until 2014. This is because shale oil and gas development and production increased (BOC [1999], [2005], [2009], [2015]). However, it can be estimated that they have a slight influence on total U.S. jobs since mining accounts for only 0.6% of total workers. Additionally, **Table 1** shows that mining jobs are decreasing lately, and thus the industry's contribution is near zero.

Second, I discuss the impact of the Green New Deal of the Obama administration. This study limits the analysis to utilities (electricity, gas, and water services)<sup>16)</sup>, where the added value and number of jobs in this industry increased by approximately 10% from 2009 to 2010. However, the added value and employment decreased afterward and has not increased as of 2015. This ended with a very short boom from 2009 to 2010.

#### (b) Foreign and Inward Direct Investment Exchange (Globalization of Corporate Activity) and Employment

**Fig. 4** shows direct investment data and confirms the progress of foreign and inward direct investment after Lehman Brothers' bankruptcy. This figure shows the overseas and inward investments of the U.S. industry expanding.

I also confirm the influence of direct investments on employment. As such, **Table 2** shows 1) the overseas employment ratio of U.S. firms (the number of overseas jobs in firms headquartered in the U.S./the number of jobs in domestic industries) and 2) the foreign firms' employment ratio in the U.S. industry (the number of jobs with foreign firms'/the number of jobs in domestic industries'). The former was 12.1%, and the latter 5.5% in 2012. The increase in overseas employment ratios

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16) The environmental and energy related industries active after Lehman Brothers' bankruptcy have spread from utilities (power generation and transmission), IT, manufacturing, business services, financial and insurance (Jones [2009]), my interviews at Silicon Valley, Seattle, and Washington, D.C. from 2009 to 2013). This paper limited analysis only to the utilities that have the biggest weight in this category.

Table 2 Trend of Domestic/Overseas Ratio of U. S. Industries and Foreign Companies Employment (2009-2012) Unit: %

industry	overseas employment ratio				foreign companies employment ratio			
	2001	2008	2009	2012	2001	2008	2009	2012
Mining	34.7	58.5	NA	34.5	NA	14.1	NA	17.6
Manufacturing	31.9	41.2	46.6	51.3	15.9	17.5	18.6	20.8
Wholesale trade	13.6	12.9	13.9	15.0	9.6	10.2	9.9	10.0
Information	18.9	14.7	17.8	20.0	8.3	11.0	11.2	NA
Finance and insurance	5.1	4.4	17.1	13.0	5.2	7.5	6.6	7.4
Professional, scientific, and technical services	6.3	8.8	10.7	13.9	2.7	3.3	3.5	3.8
Other industries	3.0	4.5	NA	4.0	NA	3.4	NA	NA
All industries	8.5	9.8	11.4	12.1	5.4	5.2	5.2	5.5

Notes 1) The “overseas employment ratio” means (employment overseas for the U. S. companies / domestic employment of the U. S. companies).

Notes 2) The “foreign companies employment ratio” means (the number of domestic employment of foreign companies / the number of domestic employment of the U. S. industries).

Source) Created based upon data from BOC [annually], *County Business Patterns* (<http://www.census.gov/programs-surveys/cbp.html>, as of 08 August, 2016), BEA [annually d], *Financial and Operating Data, U. S. Direct Investment Abroad, All Nonbank Foreign Affiliates, Employment, By Industry of Affiliate Only* (<http://www.bea.gov/iTable/iTable.cfm?ReqID=2&step=1#reqid=2&step=10&isuri=1&202=3&203=8&204=5&205=1&200=1&201=2&207=39,32&208=52&209=1>, as of 02 Dec 2014).

and foreign firms’ employment ratios advanced yearly. However, there are data that cannot be measured statistically. Since business commissions to overseas firms and offshoring progressed in recent years, there is a possibility that de facto overseas employment of U. S. industries is greater than shown in **Table 2**.

On the other hand, although foreign affiliated firm employment ratio suggests that U. S. firms are the main generators of domestic jobs, foreign affiliated firm ratio was 5.5% in 2012 and it followed a slight increasing trend afterwards. In the case of the manufacturing industry, which globalization is advancing most, the overseas employment ratio was 51.3%, and the foreign affiliated employment ratio 20.8% in 2012. We can confirm that foreign affiliated firms are generators of employment to some extent in the manufacturing industry<sup>17)</sup>.

The above data and analysis show that, in respect to employment, globalization advanced after Lehman Brothers’ bankruptcy. There is a possibility that U. S. companies moved their domestic jobs to overseas more than statistics show, in the form of outsourcing to foreign companies. We need to recognize that continuing global invest-

17) The computer and electronic device industry has largely advanced commission of production to overseas firms. This activity does not appear in statistical data.

ment has affected the U.S. employment structure after 2008.

**(c) Innovation, Employment and Geographical Polarization**

In the 21<sup>st</sup> century, in order to maintain employment and income in the U.S., the importance of innovation activities is increasing (Moretti [2012]). For example, U.S. manufacturing companies have expanded the domestic function and jobs that companies should maintain in connection with innovation activities and management strategies. These are the headquarters, R&D, design, verification and testing, and customer support. Even when the U.S. manufacturing industry advanced overseas production and the outsourcing of producing function to overseas firms, these functions expanded in the U.S. (Yamagata [2012]). Expansion of innovation activities is an important factor for KIBS (OECD [2006], BEA [1999], [2014], Ferreira, Raposo, and Fernandes [2016]) because KIBS supply advanced technologies and knowledge, management, R&D, design, verification services, etc., for companies or establishments. If innovations and globalization continue, it is assumed that the growth of these services will continue.

Activities in the art also have supportive functions to innovation (Florida [2003], [2005], Atkinson and Ezell [2012]). The macro data analysis shows growth of the art in added value to some extent, but almost no growth in employment. However, we can confirm the increase of the art industry employment in metropolitan areas where innovation activities are concentrated, such as San Francisco, Silicon Valley (San Jose), Boston, New York, etc. (Markusen [2010]).

Moretti [2012], Murray [2012], and Yamagata [2016] pointed out the new regional uneven development that reflects the rise of 21<sup>st</sup> century type innovation cities and areas, and ruin of 20th century type manufacturing industry cities and areas<sup>18</sup>). Recently, the extended industry and employment have been concentrated to metropolitan areas where universities and research institutes exist (Arraibas Bell and Gerritse [2015]). For example, GE moved its headquarters and some R&D centers to Boston MSA to access Harvard University. The art activities will further agglomerate in such cities and areas. However, it is necessary to recognize that the wage level in the art industry is not high<sup>19</sup>.

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18) Reich [1991] has already pointed out the advance of innovations and globalization bringing job polarization. Furthermore, economic and geographical polarization have advanced simultaneously in the U.S. (Reich [1991], Murray [2012]).

19) The industrial policy to enhance the art industry is useful because its expansion is based

Although the inauguration of President Trump can be thought of as a counter-attack of the white working class in the Midwest, which declined geographical polarization, the uneven geographical development discussed here will continue in the long term regardless of President Trump's action.

#### (d) Advanced Industrial Structure and Income Inequality

In this final discussion subsection, I argue on the relation between advanced industrial structure and income inequality in recent U.S. history. The growth of the service sector and job polarization brought income inequality (Reich [1991], Murray [2012]). This study shows that the low wage industries and occupations have increased further, especially low wage distribution services, personal services and related occupations. Such employment and occupations depend on personal consumption (Honda [2007]). As such, we should pay attention to the change in personal consumption expansion after Lehman Brothers' bankruptcy as compared with before.

Only the wealthy class increased personal consumption after Lehman Brothers' bankruptcy. According to estimations by Cynamon and Fazzari [2008], [2015a], and [2015b]<sup>20)</sup>, only the top 5% of the income layer increased their personal consumption from 3,200 billion dollars in 2009 to 3,600 billion dollars in 2012. Thus, the top 5% of the income layer represented 33.9% of U.S. personal consumption expenditures as of 2012<sup>21)</sup>. The remaining 95% of the layer did not increase personal consumption. This shows that the personal consumption expansion structure has changed to depend more on the wealthy class. I consider the advanced industrial structure after Lehman Brothers' bankruptcy does not have the effect to increase the middle class, but to advance

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on innovation activities to meet advanced industrial structure. However, we should recognize that the wage level in the art industry is not high.

20) They are the experts of income inequality problems to conduct joint researches with Piketty.

21) Household debt has enabled expansion of personal consumption. Although the largest (in amount of money) mortgage (housing) loan did not recover enough, consumer loans (card loan and car loan) expanded after Lehman Brothers' bankruptcy (Federal Reserve Bank of New York [2016]). The main wealth of the non wealthy class is housing, and the housing price did not recover sufficiently after 2007. The non wealthy class could not replace their houses and borrow or increase mortgage (housing) loan.

Therefore, the non wealthy class except for the top 5% layer cannot increase personal consumption like before Lehman Brothers' bankruptcy. On the other hand, the wealthy class has a large amount of real estate and stocks, and can receive of dividends more than the non wealthy class (Nakamoto [2013]). Moreover, personal consumption of the top layer is further increasing with the asset price rise and corporate profits' recent recovery.

job polarization to low wage jobs and high wage jobs. Additionally, the expansion of low wage industry jobs and occupations depended more on the wealthy class's personal consumption. These processes might suggest that the U.S. is entering a spiral of income inequality expansion.

### 3. Myth and Fact of Manufacturing Industry Reshoring

#### (1) Employment Dynamics of the Manufacturing Industry

I focus on the manufacturing industry dynamics after Lehman Brothers' bankruptcy, especially on the reshoring of manufacturing, because this is one of the most important points of the argument on industry structure dynamics.

**Fig. 3** shows the manufacturing industry increased added value and corporate profits. However, this industry did not increase employment sufficiently. The U.S. manufacturing industry "revived" in added value and corporate profits but not employment in full. **Table 3** shows the change in the number of jobs per type of industry in manufacturing from 2010 to 2016. The increased contribution of the transportation equipment and machinery is large, with plastic and rubber products, food, fabricated metal products, beverage and tobacco products following. A number of seven industries, such as computers and electronic products decreased. Only limited industries have increased the number of jobs, and some industries have decreased it.

After 2008, the Obama administration and many specialists pointed out that the possibility of the manufacturing industry reshoring was increasing (Boston Consulting Group [2011], [2014])<sup>22)</sup>. The question is why could the U.S. manufacturing industry not increase employment sufficiently.

#### (2) Trends of the Foreign and Inward Direct Investment and Manufacturing Industry Establishments and Extensions of Production Facilities

##### (a) Transition of Foreign and Inward Direct Investment in the Manufacturing Industry

Regarding the trend of the foreign and inward direct investment in the U.S. manufacturing industry, **Fig. 8** shows that, before Lehman Brothers' bankruptcy, the amount of foreign direct investment did not increase much, and the amount of inward direct investment continued to exceed foreign investment. Foreign direct investment

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22) According to interviews with the Department of Commerce of the state of Michigan, and with industrial policy makers in the state of Washington, in September 2011 and 2014, discussions that aimed to return production facilities to the U.S. were carried out.

Table 3 Transition of Each Manufacturing Industry's Employment from 2010 to 2016

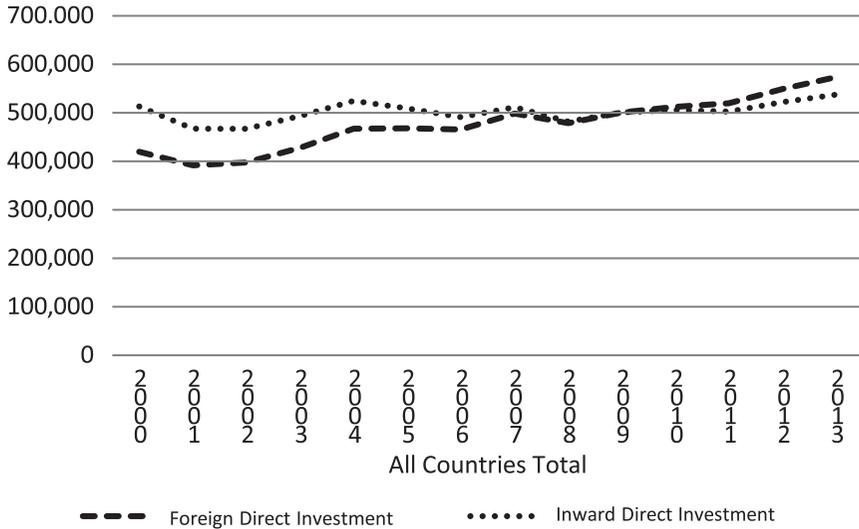
Unit : thousand persons

Business (selected)	2010/1	2016/4	Change from 2010/1 to 2016/4	Index (2010 = 100, 2016)	Percentage contribution to increases or decrease (%)
Food	1,447.9	1,522.0	74.1	105.1	8.8
Beverage and Tobacco Product	165.2	224.4	59.2	135.8	7.1
Textile Mills	120.1	113.7	6.4	94.7	0.8
Textile Product Mills	119.8	117.1	2.7	97.7	0.3
Apparel	160.8	133.8	27.0	83.2	3.2
Leather and Allied Product	120.4	133.5	13.1	110.9	1.6
Wood Product	341.9	382.1	40.2	111.8	4.8
Paper	396.8	371.8	25.0	93.7	3.0
Printing and Related Support Activities	494.9	445.0	49.9	89.9	6.0
Petroleum and Coal Products	113.5	111.9	1.6	98.6	0.2
Chemical	792.5	817.3	24.8	103.1	3.0
Plastics and Rubber Products	615.1	690.3	75.2	112.2	9.0
Nonmetallic Mineral Product	371.6	399.4	27.8	107.5	3.3
Primary Metal	347.3	377.1	29.8	108.6	3.6
Fabricated Metal Product	79.6	1,433.1	1,353.5	1,800.4	161.5
<b>Machinery</b>	<b>974.2</b>	<b>1,087.8</b>	<b>113.6</b>	<b>111.7</b>	<b>13.6</b>
Computer and Electronic Product	1,095.3	1,042.2	53.1	95.2	6.3
<b>Transportation Equipment</b>	<b>1,318.3</b>	<b>1,612.8</b>	<b>294.5</b>	<b>122.3</b>	<b>35.1</b>
Furniture and Related Product	360.3	388.8	28.5	107.9	3.4
Manufacturing (all manufacturing industries including which are not listed in this table)	11,460.0	12,298.0	838.0	107.3	100.0

Note) Seasonally adjusted.

Source) Created based upon data from BLS [monthly], *Current Employment Statistics* (<http://www.bls.gov/web/empsit/ceseeb1a.htm> as of August 20, 2015).

increased at the latest in 2012 and afterwards, its amount of foreign direct investment and pace exceeding the amount of inward direct investment (BEA [annually e]). On the other hand, inward direct investment also increased during the Obama administration. These data suggest that the U. S. succeeded in attracting investment. Therefore, it is better to regard “manufacturing industry reshoring” as a manufacturing



Source) Created based upon data from BEA [annually c], *International Economic Accounts* (<http://www.bea.gov/international/>, as of March 21, 2015).

Figure 8 Trend of Manufacturing Foreign/Inward Direct Investment (2009 dollars, unit : 1 million)

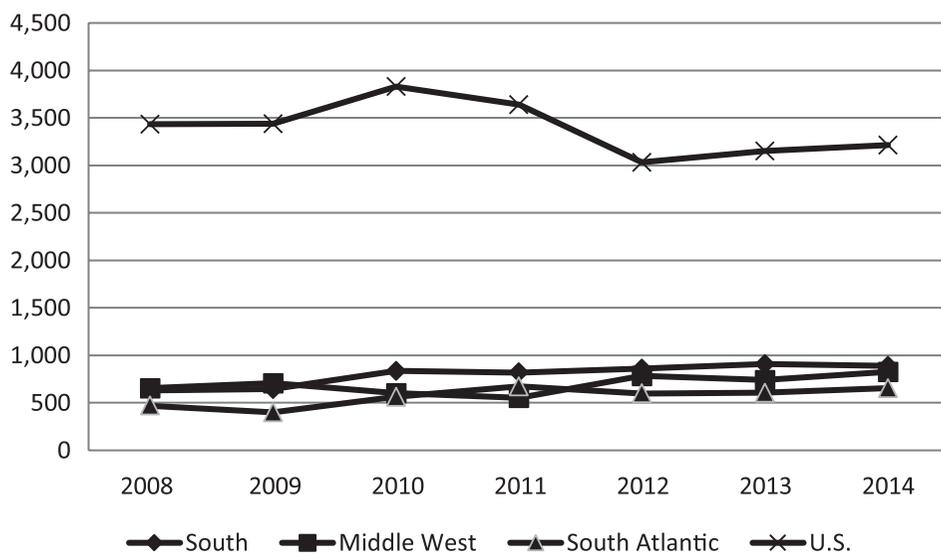
investment increase in the U.S., while the manufacturing industry was strengthening global investments.

**(b) The Trend of the Production Facilities Establishments and its Expansions in the U. S.**

Here, I analyzed establishments and expansion trend of production facilities in the U.S. quantitatively and qualitatively. Although official factory location statistics do not exist in the U.S., we can use private enterprise collected data that can cover the number of establishments and the expansion of production facilities (The Conway Data [quarterly]). However, statistical data by the governments and private companies do not cover both the closing of factories and reductions of production capabilities.

Fig. 9 shows that the number of establishments and extensions of production facilities in the U.S. increased from 3,436 in 2008 to 3,830 in 2010. However, they decreased after 2011 and remain around 3,000. Actually, approximately 3,000 production facilities were established or expanded constantly, and this number only increased marginally and temporarily around 2010. The “manufacturing industry reshoring” was thus a limited and temporary movement.

To explain why and how did the manufacturing industry’s reshoring to the U.S. progress after Lehman Brothers’ bankruptcy, this study utilizes information in U.S. newspapers, trade papers, economic magazines, and the database which an NPO,



Source) Created based upon data from The Conway data [quarterly], *Site Selection*, The Conway data, various issues.

Figure 9 Number of New Establishment and Expansion of Manufacturing Facilities in the U.S. (2009-2014)

Reshoring.com, collected and united the information on the manufacturing industry reshoring. The mission of this Nonprofit Organization is to promote reshoring of the manufacturing industry to the U.S., and the database contains 427 examples of decision to invest by the end of 2015. Table 4 shows typical cases.

The database and Table 4 show that only limited types of industries, such as the transportation equipment (aircraft and automobile), machinery (machine tool, industrial robot, construction machinery, etc.), chemicals, and primary metals were establishing and expanded production facilities.

The reasons for the establishment and expansion of production facilities listed in Table 4 and the database are as follows. First, the production facilities of the transportation equipment were established and expanded because commercial aircraft and automobile markets recovered after the economic turmoil. Second, the machine and the industrial robot factory to supply producer goods for the transportation equipment industry and other manufacturing industries that were expanding the investment in the U.S. were established and expanded in the U.S. Third, the number of construction machinery factories increased, corresponding to the economic recovery and the construction boom. Fourth, the fall of energy, oil and natural gas prices in the U.S. also contributed in this respect. Specifically, the energy price fall in the U.S. provoked

Table 4 Typical Cases of US Manufacturing Facilities Investment Since 2009

Company	Home country	Industry	State	Right to work	The content of investment	Reasons
GE	US	Electricity, Heavy Electricity, etc.	Kentucky	×	Water heaters (home appliances) production from China	Reduction of energy price/Wage reduction/Increase of China's risk
Whirlpool	US	Major appliance	Ohio	×	Washing Machine (from China)	Energy price downfall/Increase of China's risk
Apple	US	IT	California	×	IT Products (PC, Smart phone) production (from China)	Improve production system and supply chain management efficiency and lead-time reduction / Increase of China risk
Exxon Mobil	US	Petroleum	Texas	○	Ethylene plant new establishment	Energy and material price downfall
Dow Chemical	US	Chemical	Texas	○	Ethylene plant expansion	Energy and material price downfall
Nucor	US	Primary metal	Louisiana	○	Steel Work (Gas Power)	Energy price downfall
US Steel	US	Primary metal	Ohio	×	Steel working capacity expansion for shale gas and oil excavation equipment	Energy price downfall/Mining demand expansion
Ford	US	Automobile	Michigan	○	Assembly line expansion for domestic market	Energy price downfall/Foreign exchange risk evasion/Reduction of wage and employee benefit programs/Introduction of right to work by Michigan State
GM	US	Automobile	Ohio	×	Assembly line expansion for domestic market	Energy price downfall/Foreign exchange risk evasion/Reduction of wage and employee benefit programs
Caterpillar	US	Construction machinery	Georgia	○	Production transfer from Canada and Japan	Energy price downfall/Reduction of wage and employee benefit programs
Boeing	US	Aircraft	Washington	×	Product capacity expansion	Tax cut of the state government/Reduction of wage and employee benefit programs/Access to the high skill workforce
Pearless Industries	US	IT/home appliance	Wisconsin	×	Product capacity expansion	Lead-time reduction/Integration of production process/ Introduction of right to work by State government/Reduction of wage
Mitsubishi Chemical / Idemitsu / Mitsui Chemical	Japan	Petroleum and Chemical	Texas / Louisiana	○	Expansion of Petrochemical complex (with Dow Chemical)	Energy and material price downfall
Toyota	Japan	Automobile	Mississippi / Alabama	○	New plant establishment and assembly line expansion for domestic market	Foreign exchange risk and trade conflict evasion/Production in market country
Nissan	Japan	Automobile	Tennessee	○	New plant establishment and assembly line expansion for domestic market (Electric car/Lithium-ion battery)	Foreign exchange risk and trade conflict evasion/Production in market country
Nippon Steel & Sumitomo Metal	Japan	Steel	Alabama	○	Product capacity expansion	Energy price downfall
Shouwa Denko	Japan	Chemical (graphite)	South Carolina	○	Product capacity expansion	Energy price downfall/Increase production of graphite for steel production in the U.S./State tax cut/Wage reduction
Amada	Japan	Industrial Machinery	California	×	Product capacity expansion	Corresponding to machine tool and plant facility demand increase due to new production plant and expansion of production capacity in the U.S.
Vallourec	France	Steel	Texas	○	Seamless pipe plant investment	Energy price downfall/Shale revolution in the U.S. and increased demand for pipeline
Airbus	France	Aircraft	Alabama	○	New plant establishment for the A320 production	Trade conflict evasion/Production in customer country (Airbus' management strategy)
Alstom	France	Heavy electricity	Tennessee	○	New plant establishment (Turbine)	Production in a market country (due to nuclear power plant investment in the U.S.)
VW	Germany	Automobile	Tennessee	○	New plant establishment	Foreign exchange risk evasion/Production in market country
Lenovo	China	IT	North Carolina	○	New establishment of a factory (PC/Tablet/PC/Server)	Energy price downfall/Downfall of wage
Arecolor initial	Nederland/Luxembourg	Steel	Alabama	○	Product capacity expansion	Energy price downfall/Increase in the U.S. domestic demand

Source) Created based upon data from *Interviews with Staffs of each company, Michigan State Talent and Economic Development, National Association of Manufacturers, National Governors Association, Washington State Department of Commerce, U.S. Department of Commerce, Japanese newspapers, the Reshoring.com database, U.S. business magazines and newspapers, and webpages of each company.*

by the Shale Revolution contributed greatly to the establishment and extension of production facilities in the U. S. (Porter, Gee, and Pope [2015])<sup>23)</sup>. It was especially effective in the chemical and primary metal industry that uses energy or oils as materials in large quantities. Fifth, it is important for production to be in the marketed country (exchange risk evasion), since the volatility of the foreign exchange market is large due to global monetary easing in recent years. Finally, there are the cases where cost reductions from wages and welfare programs gave additional incentives. The details of this trend are surveyed in (c).

Although transportation equipment has increased employment considerably, other industries did not increase it by much. This is because the chemistry and primary metal are equipment industries and advance labor saving in new factories and facilities; existing factories hardly play important roles in job generation. Many cases are U. S. companies, but Japanese, German, French, Dutch, and Chinese companies also expanded their businesses to the U. S. The Japanese and German companies have advantages in machine tools and industrial robots, and there are cases of Chinese companies in the IT and household appliance fields. We can confirm several cases which are “reshoring from China” because of the more efficient supply chain management, shorter lead time, and rising wages in China.

### (c) Why Has the Number of Jobs Not Recovered Sufficiently?

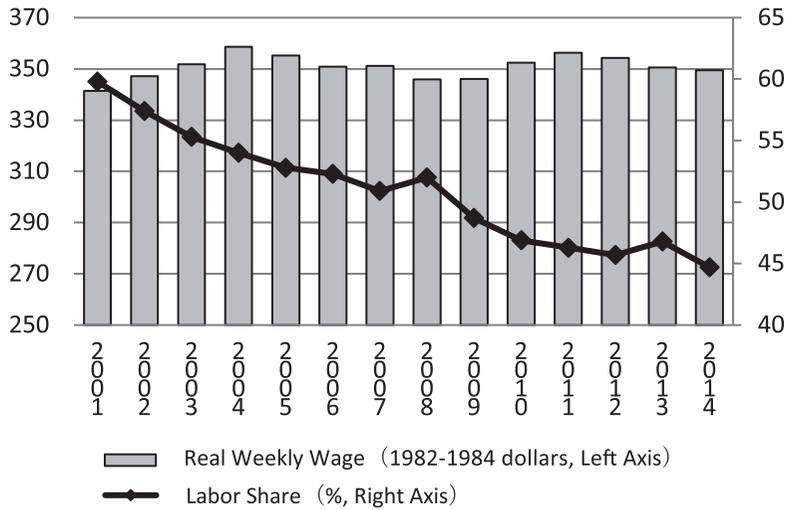
The number of jobs did not recover sufficiently despite the recent manufacturing industry reshoring in the U. S. because the recent establishment and expansion of production facilities in the U. S. made it difficult to increase employment.

The automation of new production lines and labor saving technologies in new factories has advanced such that, according to interviews, there are cases in which industrial robots and introduction of IT technologies in the automobile and machining factories are replacing human labor<sup>24)</sup>. Additionally, the scrapping of old production facilities in the U. S. progressed less than the new establishments and expansions. The closing of factories and reductions of production facilities continued especially in the

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23) Porter, Gee, and Pope [2015] indicated that, if the U. S. production cost was 100, that of the China increased to 95 in 2014, and shrank the difference between the former and the latter recently. They pointed out that this is because the Chinese costs rose and the U. S. energy costs fell.

24) Interview at the Department of Economic Development of Michigan State (September 8, 2014).



Source) Created based upon data from BEA [annually b], *Industry Economic Accounts* (<http://www.bea.gov/industry/index.htm>, as of 04 July, 2015), BLS, *Employment, Hours, Employment Statistics Survey* (<http://data.bls.gov/cgi-bin/dsrv?ce>, and Earnings from the Current as of 04 July, 2015).

Figure 10 Trend of Real Wage and Labor Share of the Manufacturing Industry

Northeast and the Midwest. Overall, scrapping and building of production facilities occurred in the U.S.<sup>25)</sup>

It is suggested that the effort of manufacturing companies to maintain large profits and competitiveness globally by labor saving has produced the phenomenon that “employment does not increase even if production facilities increase.” In addition, it is necessary to note that the following situations are advancing with the establishments of new production and expansion facilities. According to the cases of GE (Kentucky), Caterpillar (Georgia), and Boeing (Washington), listed in my database and **Table 4**, their wages and employee benefit programs were cut as conditions of new location and expansion. **Fig. 10** shows that the fall of the manufacturing industry labor share and control of the real wages continued even after 2009. It is true that such cost reductions contribute to strengthening the cost competitiveness of the manufacturing industry in the U.S. However, these cost reductions are likely to cause a phenomenon similar to what is called the “race to the bottom.”

Finally, I consider whether the policy of the Obama administration contributed to the “manufacturing industry reshoring.” I believe that this has seldom contributed

25) Interview at the National Association of Manufacturers (NAM) Research Institute (September 11, 2014).

to establishments and extensions of production facilities, except for the effect of the “weak dollar” which progressed after Lehman Brothers’ bankruptcy with the quantitative easing policy of FRB. Based on database analysis and **Table 4**, the following factors that the production facilities increased can be identified: 1) external factors: labor cost and country risk increase rise in China; 2) internal factors: energy and material price decline in the U.S. accompanying the Shale Revolution, the cost competitiveness recovery by the wage repressions, economic recovery in the U.S.; 3) companies factors: the improvement of supply chain efficiency, such as shortening of lead time, and avoidance of foreign exchange risk. However, political factors are hardly confirmed. This is because the Obama administration could not implement effective manufacturing industry reshoring promotion policies<sup>26)</sup>.

#### 4 . Conclusions

This study shows that the weight of the service sector in the U.S. has increased and that the business sector has led the growth of the service sector based on the analysis of added value, corporate profits, and employment after Lehman Brothers’ bankruptcy. The business service was the largest in the amount of total increase, contribution, and index of added value. The number of jobs in the business service also increased considerably. Although the added value of the manufacturing industry increased marginally and earned large profits that were the top in each industry, the number employed hardly increased and the “manufacturing industry reshoring” had only a very restrictive effect in respect to employment. Although finance and insurance, information, and real estate and leasing increased added values and profits, they hardly increased the number of those employed. Instead, the distribution and social services increased employments drastically.

The mining industry increased added value sharply because of the Shale Revolution. However, this industry had almost no increased in its contribution to employment. Although the art, recreation, and entertainment sector also increased added value, it did not increase job contribution by much.

Furthermore, the employment and occupational structure were analyzed taking the wage level into consideration. Overall, this analysis shows that job polarization

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26) Refer to Yamagata [2016].

has progressed. Although employment in the various industries and occupations for which wage levels were middle seldom increased, both employment of high wage and low wage industries and occupations increased more. Specifically, low wage industries and occupations increased considerably. By industry, employment in the routine type business services with a low wage level is low increased more, but that of KIBS and corporate management services, which had a higher wage level, did not increase significantly. High wage level industries, such as finance and insurance, and information industries did not increase employment significantly. However, employment in low wage industries, such as distribution and personal services increased largely. By occupation, the wage levels of professional occupations were high because these occupations needed professional licenses or special abilities, and the employment in these occupations increased. Although Brynjolfsson and McAfee [2011], [2014] and Frey and Osborne [2013] insisted that a part of high added value and professional employment would be lost, the analysis of this study shows that such professional employment increased overall. However, the increased contribution of these occupations in total was approximately thirty points, and increased contribution of the low wage level occupations was larger and approximately 70 % of all increases. These results are somewhat close to those of Spence and Hlatshwayo [2011].

This study claims that the reason that the industrial structure and job polarization advanced is the constant innovation (technological progress), globalization, and development of division of labor in the U.S. industry. Such dynamics have acted strongly especially in the United States after the 1970s. The manufacturing, information, and finance and insurance industries, which have high added value and pursue large profits, advanced global investment but hardly increased domestic employment. Only the business service, for which the degree of trade is low and has trade surplus, has increased the added value and employment. However, business services consist of routine business service, KIBS, and corporate management service. Although KIBS grew with the expansion and development of innovation, the routine business services, which are the result of outsourcing and cost reduction of companies, have grown most. Moreover, the increased contribution of the social services, including the healthcare and social industry, for which growth is remarkable in the U.S., distribution service, personal service, and occupations that depend on personal consumption, such as sales, care, and food preparation and services, are significant.

Numerous jobs were created, and the number of jobs after 2015 exceeded the

number before Lehman Brothers' bankruptcy. However, relatively more low wage jobs have been created. Moreover, only the wealthy class has increased personal consumption after 2008. The recent job generation is likely to depend more on the wealthy class than before Lehman Brothers' bankruptcy. The industrial structure in the U.S. has further advanced with the polarization that this study shows.

Lastly, the advanced industrial structure is a long term trend since the 1970s. No matter what President Trump will do, it will not be reversed easily. Although Trump is aiming to revive the white working class, to stimulate the U.S. economy, and reverse the advanced industrial structure, his authoritarian, mercantilist, and too pro business policies ignore democracy and international collaboration, and are unrealistic. These policies might expand income inequality in the U.S, and will confuse the global economy. Now, it is necessary to improve the quality of jobs, strengthen income redistribution, and correct income inequality in the U.S. by effective policies to fix the side effects of globalization rather than "Trump."

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