The Employment Effect of Post-Industrialization : Evidence from OECD Countries

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1. Introduction

Recently a "jobless economy" or a "jobless recovery" has been observed in many industrialized countries (Cowen, 2011; Rifkin, 1995). Even during the recent economic recovery after the financial crisis in 2007–2008, many countries are still suffering from high unemployment rates and stagnating employment rates (OECD, 2013). According to a report released by the ILO, OECD, and the World Bank (2014), there is a large and persistent shortfall in the number of the jobs being created in G20 countries. Also, OECD (2013) reported that the unemployment rate remained high, and more than 48 million persons were unemployed across OECD countries in 2013.

Many factors are reported as influencing the employment and unemployment rate across different countries and time periods. Previous studies have shown that the labor market institutions and policies of the welfare state are determinants of labor market outcomes across different countries (Blau & Kahn, 2002; Bassanini & Duval, 2006; OECD, 2012). For example, high and long-lasting unemployment benefits, and high tax wedges were found to reduce the employment rate and increase the unemployment rate (Bassanini & Duval, 2006; Esping-Andersen & Regini, eds., 2000; OECD, 2012).

However, compared to these determinants, the impact of post-industrialization on labor market outcomes has not been sufficiently examined. Many countries have experienced post-industrialization and the consequent expansion of service sectors in recent years. This has had an effect on the employment and unemployment rate. According to Freeman and Schettkat (2005), the market-driven United States has created more employment than Europe through the exceptional marketization of household activity. Freeman (2007) claimed that in this regard marketization is the more important factor in the increase of the employment rate than the collective bargaining system, employment protection legislation, or many other labor market institutions.

In this study, we examine to what extent post-industrialization is related to labor market outcomes of different industrialized countries. This topic was focused on in a seminal book by Esping-Andersen (Esping-Andersen ed., 1993). Esping-Andersen and his coauthors investigated the changing class structures in six post-industrial countries. They indicated that the post-industrial future would face a trade-off between a large service proletariat and a large outsider population.[1] This means that the expansion

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1) In their book, the population of outsiders was estimated through the employment rate (as compared to Sweden, the highest), the percentage of long-term unemployed, and the percentage of involuntary part-time workers (Esping-Andersen ed., 1993).

of service sectors would create more jobs, most of which are low-skilled and low-wage. Consequently this would lead to high employment rates and low unemployment rates in those societies with larger service industries in the economy.

Since Esping-Andersen's book was published, more and more countries have undergone post-industrialization. Furthermore, different kinds of service sectors have expanded in each country. As Esping-Andernsen (1993) argued, the employment structure could differ across countries where different kinds of service sectors dominate the economy. In this paper, we examine the extent to which the composition of service sectors across countries has had an effect on employment rates, unemployment rates and labor force participation rates, even after controlling for the labor market institutions or welfare state policies.

This paper is organized as follows. First, we discuss different trajectories towards a post-industrial society, and describe possible scenarios for the employment structure in a post-industrial society. Next, we hypothesize the effect of the composition of service sectors on labor market outcomes. After we explain our analytical model, we present the results. Finally, we discuss the implications these results could have for the employment structure of a post-industrial society.

2. Different Trajectories towards a Post-Industrial Society

Previous studies have discussed a post-industrial society from different perspectives. Bell's pioneering book conceived of the post-industrial society as a society characterized by service dominance and rising professional-technical classes whose privileged social position is determined by their control of scientific knowledge and information (Bell, 1976). He also forecast that a knowledge-based shift from industry to service would bring about an overall skill up-grading in the occupational structure. However, Bell's analyses suffered from a lack of attention to the diversity of service industries in post-industrial societies. He ignored the growth of employment in service sectors such as hospitality and health care (Esping-Andersen ed., 1993; Bernardi & Garrido, 2008; Myles & Turegun, 1994).

Although many countries have undergone post-industrialization, each country has taken a different trajectory towards a post-industrial society. There are two differentiating aspects to the way countries undergo post-industrialization. First, the speed of service sector growth varies across countries. For example, the manufacturing sector still accounts for a relatively large proportion of the economy in Germany or Japan. These countries will grow more slowly into post-industrial societies. Second, different service sectors dominate the economy in each country. For example, there are large consumer service sectors in the North America. On the other hand, Nordic countries have large social service sectors such as health and education. The expansion of each type of service sector has a different impact on labor market outcomes.

In considering the variation of service sectors, Esping-Andersen (1993) postulated three potential outcomes for the employment structure in post-industrial economies. The first possibility is a rise in unemployment and declining labor force participation. This is because fewer and fewer workers are needed in manufacturing sectors and, on the other hand, the service sector's capacity to generate new jobs is limited due to low productivity growth.[2)] Investments in plant and machinery in manufacturing

2) According to Baumol's (1967) model of unbalanced growth, economic activities can be divided into technologically progressive industries (that include manufacturing and agriculture) and non-progressive ones (that include services). The former industries can achieve a constant increase in labor productivity, whereas in the latter industries, labor productivity ↗

sectors have increased labor productivity, and the high degree of productivity has reduced the required labor force. It has resulted in shrinking employment in manufacturing sectors. These factors could in the long term result in mass unemployment in a post-industrial society.

The second possibility for the employment structure in post-industrial societies is that service jobs can be promoted by government-subsidies, primarily in the form of welfare state jobs in health, education, and social services. Governments could subsidize an increase in these jobs to meet increasing demands for these services. Because those who need these services are not necessarily wealthy, and they cannot always afford to pay for it, government-subsidies are necessary for these sectors to expand.

The third possibility is that service employment will expand in the private sector because of low wages that correspond to low labor productivity in these sectors. In post-industrial societies, many kinds of goods and services are sold on the market. For example, people often eat out rather than cooking by themselves, and carry the washing to the laundry rather than doing that by themselves. Consumer service sectors could create many entry level and low-wage jobs which are easily taken by even low-skilled people (Esping-Andersen ed., 1993).

According to these arguments, we anticipate that there are different possible scenarios for the employment structure in post-industrial societies. Esping-Andersen and his coauthors examined the changing class structures in post-industrial societies (Esping-Andersen ed., 1993). They classified industries into the following sectors: the traditional sector and the three service sectors, which are business, social and consumer service sectors.[3)] They then examined the trend in sectoral distribution of employment in each of the following countries: Germany, the United Kingdom, the United States, Canada, Norway, and Sweden. They also investigated the distribution of occupational skills and wages, as well as the employment rates and unemployment rates in these countries.

Comparing these six countries, they found that there were three different trajectories being taken towards a post-industrial society. The first is the Nordic welfare state-led social service economy, and the second is the German slow-growth model. Finally, the North American trajectory was shown to have more evenly distributed growth based on a very large consumer services industry. They also found that, in countries that belonged to the first and third groups, there was a relatively small population of the unemployed, and a large population of low-skilled and low-wage workers. On the other hand, in Germany that was the only country in the second group, the opposite trend was found.

Thus they concluded that the post-industrial future would face a trade-off between a large service proletariat and a large outsider population. That is to say, the different trends towards a post-industrial society could be associated with the different employment structure in each country. According to the above argument, we hypothesize that the employment rate is higher and the unemployment rate is lower in countries where service sectors are dominant in the economy.

Esping-Andersen and his coauthors described the possible variations in post-industrial societies. However, their analyses suffered from several limitations. First, their analyses were descriptive. They only compared the employment and unemployment rates in six countries which had different compositions of service sectors; they did not try to show the employment effect of post-industrialization after controlling for other possible determinants, especially institutions and policies. Institutions and policies

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↘ can be assumed to be almost constant over time.

3) Esping-Andersen (1993) defined the traditional sector as the sector including the traditional activities associated with the fordist system of standardized mass production and mass consumption.

are also key determinants of labor market ouctomes. According to Myles and Turegun (1994), welfare policies and labor unions play key roles in deciding which of the three structural trajectories is likely to occur.

The second limitation is that their analyses ended in the 1980s. Few studies have examined the employment effect of post-industrialization after the work of Esping-Andersen. Since the 1980s, many countries have experienced changes in the structure of the economic sectors. For example, many industrialized countries have experienced de-industrialization, and the relocation of factories to developing countries.

Finally, they focused on only six countries, so they could not distinguish country-specific factors from the general phenomenon of post-industrialization. We need to measure the effect of post-industrialization using variables related to service sectors rather than to countries per se.

In considering these discussions, we have the following research question. While focusing on different kinds of service sectors, and using more recent data of many countries which have faced post-industrialization, we ask whether the composition of the service sectors is related to the employment rate, the unemployment rate, and the labor participation rate in each country. In addition, we anticipate that the employment effects of post-industrialization could be different between males and females. This is because the kind of required labor force could be different depending on each sector. For example, more women tend to work in the social service sector in areas such as health and elderly care in many countries. Therefore, we analyze the data separately for males and females.

3. Hypothesis

Based on the above argument, we construct the following hypotheses: the larger the proportion of the service sector in the economy is, then the higher the employment rate, the lower the unemployment rate, and the higher the labor force participation rate are in each country. We also hypothesize that, among the three different service sectors, the social and consumer service sectors rather than the business service sector are related to a higher employment rate, lower unemployment, and a higher labor force participation rate. This is because the social and consumer service sectors are able to create more low-wage and entry level jobs which are easily taken by even low-skilled people.

Also, we examine the effects of the composition of the service sectors while considering other institutions and policies. Based on previous studies, we consider the collective bargaining structure,[4] the strictness of employment protection,[5] and the generosity of unemployment benefits[6] as important factors that could have effects on labor market outcomes.

4）According to Kahn (2000), unions have had a strong effect in lowering the relative employment probabilities for less-skilled men. Some studies have indicated that trade union bargaining power, when measured by high union density, has increased unemployment rates (Checchi & Garcia-Penalosa, 2010). Also, other related studies have shown that co-ordinated collective bargaining arrangements is an important factor in achieving low structural unemployment rates (OECD, 2012).

5）Esping-Andersen and Regini (2000) showed that strict employment protection increased the unemployment rate, especially among unskilled workers.

6）Some previous studies have shown that high and long-lasting unemployment benefits were found to reduce the employment rate and increase the unemployment rate (Bassanini & Duval, 2006; Esping-Andersen & Regini, eds., 2000; OECD, 2012).

4. Analytical Model

To confirm the employment effect of post-industrialization on labor market outcomes, we perform linear regression analyses using cross-country/time-series data for the years 1990–2011. The following model is estimated for a sample of 23 countries[7)]

$$EM_{it} = \sum_j \beta_j X_{it}^j + \chi G_{it} + \alpha_i + \lambda_t + \varepsilon_{it},$$

where i and t are country and year suffices, α_i and λ_t are country and year fixed effects.

The dependent variable EM_{it} is the employment rate of population aged 25 to 54 in country i and year t. We also use the unemployment rate (UEM_{it}) and the labor force participation rate (LFP_{it}) for the dependent variables. We calculate these rates separately for males and females. G_{it} is the output gap, which we include to control for the effects of aggregate demand fluctuations over the business cycle on the three dependent variables of labor force statistics. Finally, X_{it}^j is the set of the independent variables comprised of sectoral compositions (the composition of economic sectors), policies, and institutions.[8)] Standard errors are clustered at the country level, and missing observations are obtained by linear interpolation when possible.

The employment, unemployment, and the labor force participation rates are taken from the OECD Labour Force Statistics database. As the variables of sectoral compositions, we take employment in the following sectors as a ratio of total employment: the traditional, consumer service, business service, and social service sectors. We divide total employment into the traditional sector, the three service sectors, and the public sector. However, we do not use the information of the public sector.[9)] The public sector makes up a small proportion of the economy, and the proportion has not changed substantially since the 1990s in each country.

To compose the variables of the sectoral compositions, we use the information labeled "employment by activities and status" in each country and each year as set out in the OECD Employment and Labour Market Statistics database. In this database, economic activities are classified based on the International Standard Industrial Classification of All Economic Activities (ISIC) version 3 or version 4. We correlate these two different versions using the correspondence tables offered by the United Nation Statistics Division, and categorize each economic activity into each sector as shown in Table 1.

As the variables of institutions and policies, we consider the collective bargaining structure (union density and coordination of wage-setting), strictness of employment protection (protection of permanent workers against individual and collective dismissals, and regulation on temporary forms of employment), and generosity of unemployment benefits (unemployment benefits replacement rate). The variables of union density and coordination of wage-setting are taken from Visser's database (2013),

7) The available data come from Australia (1990–2011), Austria (1998–2011), Belgium (1993–2011), Canada (1990–2011), Czech (2000–2009), Denmark (1992–2010), Finland (1990–2011), France (1990–2006), Germany (1991–2011), Hungary (2000–2009), Italy (1993–2011), Japan (2003–2011), Korea (2000–2010), Netherlands (1992–2011), New Zealand (1992–2011), Norway (1996–2011), Poland (2000–2010), Portugal (1992–2010), Slovak (2000–2011), Spain (1990–2010), Sweden (1998–2011), Switzerland (1992–2010), and the United Kingdom (1992–2011).

8) We do not include education levels or GDP per capita since these may be endogenous with respect to labor supply.

9) The public sector is composed of public administration and defense, compulsory social security, and activities of extraterritorial organizations and bodies.

Table 1　Independent and Dependent Variables

Dependent variables	
Employment rate (EM)	The number of employed people as a percentage of the whole population (aged 25−54), calculated separately for males and females
Unemployment rate (UEM)	The number of unemployed people as a percentage of the labor force population (aged 25−54), calculated separately for males and females
Labor force participation rate (LFP)	The size of the labor force as a percentage of the whole population (aged 25−54), calculated separately for males and females
Independent variables	
Traditional sector (TRAD)	Employment in traditional industries (agriculture, hunting, forestry, fishing, mining and quarrying, manufacturing, electricity, gas, water, construction, whole and retail trade, transport, storage and communication, information) as a percentage of total employment
Consumer service sector (CONS)	Employment in consumer service industries (accommodation and food service activities, arts, entertainment and recreation, activities of households as employers, other service activities) as a percentage of total employment
Business service sector (BUSI)	Employment in business service industries (financial and insurance activities, real estate activities, professional, scientific and technical activities, administrative and support service activities) as a percentage of total employment
Social service sector (SOC)	Employment in social service industries (education, human health and social work activities) as a percentage of total employment
Union density (UD)	Net union membership as a percentage of wage and salary earners in employment
Coordination of wage-setting (COORD)	The degree of coordination based on a set of expectations about which institutional features of wage setting arrangements are likely to generate more or less coordination (1- the least cordinated to 5- the most cordinated)
Employment protection of permanent workers (EPRC)	Protection of permanent workers against individual and collective dismissals
Employment protection of temporary workers (EPT)	Regulation on temporary forms of employment
Unemployment benefit replacement rate (UBR)	Gross unemployment benefit levels as a percentage of previous gross earnings
Output gap (OUT)	Deviations of actual GDP from potential GDP as a percentage of potential GDP

and the variables of employment protection are taken from the OECD Indicators of Employment Protection database. The unemployment benefit replacement rate comes from the Tax and Benefit Systems: OECD Indicators database.

In the next section, we analyze the data to confirm the effects of sectoral compositions on labor force statistics while controlling for institution and policy variables.

5. Result

5−1. Trends in Labor Force Statistics and Sectoral Compositions

Before estimating the linear regression, we confirm the trends in labor force statistics and the sectoral composition in each country from the 1990s to the 2000s. They are shown in Table 2 and Table 3.[10)]

10) We lack the data from the early 1990s for some countries (the Czech Republic, Hungary, Japan, Korea, Poland, and the Slovak Republic). However, this does not impact our main results. We estimate the linear regression excluding these six countries, but we obtain the similar results with Table 4.

Table 2 Labor Force Statistics in 23 Countries

	Employment rate				Unemployment rate				Labor force participation rate			
	Male		Female		Male		Female		Male		Female	
	1990s	2000s	1990s	2000s	1990s	2000s	1990s	2000s	1990s	2000s	1990s	2000s
Australia	85.4	86.7	63.8	70.2	7.1	4.1	6.6	4.5	91.8	90.4	68.3	73.5
Austria	90.8	90.2	72.1	77.1	3.4	3.5	4.0	4.0	94.0	93.3	75.1	80.3
Belgium	86.3	86.1	61.9	70.5	6.2	6.1	10.5	7.4	92.0	91.7	69.1	76.2
Canada	83.5	85.4	69.9	76.4	8.7	6.3	8.3	5.8	91.4	91.1	76.2	81.1
Czech	89.3	90.3	73.7	74.2	6.0	4.8	9.9	8.3	94.9	94.8	81.8	81.0
Denmark	87.4	88.4	77.3	81.0	5.6	3.9	7.6	4.6	92.6	92.0	83.6	84.9
Finland	81.3	84.6	76.8	79.3	10.4	6.5	9.3	6.8	90.8	90.6	84.6	85.1
France	87.3	87.7	67.0	72.5	8.2	6.7	12.1	9.3	95.1	94.0	76.2	80.0
Germany	87.3	85.8	67.1	73.4	6.5	8.0	9.0	7.9	93.4	93.3	73.7	79.7
Hungary	79.2	80.1	66.9	67.2	6.2	6.3	5.0	6.3	84.4	85.6	70.5	71.8
Italy	84.7	85.7	47.5	57.0	6.4	5.5	12.5	9.2	90.5	90.7	54.3	62.7
Japan	92.0	92.0	64.4	66.8	4.6	4.3	4.9	4.4	96.4	96.2	67.7	69.8
Korea	88.0	87.7	56.0	58.7	4.5	3.8	3.0	2.6	92.2	91.2	57.8	60.3
Netherlands	89.1	90.6	62.3	75.0	3.9	2.9	6.5	3.6	92.7	93.3	66.6	77.8
New Zealand	85.6	88.4	67.0	72.9	6.9	3.5	6.3	4.0	92.0	91.6	71.4	75.9
Norway	89.4	87.8	80.4	81.5	2.9	3.2	2.9	2.7	92.1	90.6	82.7	83.7
Poland	77.6	78.1	64.3	66.0	12.1	11.7	16.0	13.8	88.3	88.4	76.5	76.5
Portugal	89.2	87.4	69.4	74.7	4.2	5.5	5.9	7.8	93.0	92.6	73.7	81.2
Slovak	79.6	82.0	69.8	70.6	15.2	12.4	15.8	14.1	93.9	93.6	82.9	82.3
Spain	81.4	84.5	41.1	59.7	12.7	8.6	24.6	14.1	93.2	92.4	54.6	69.6
Sweden	83.9	86.9	79.8	81.9	7.2	5.3	6.6	5.1	90.4	91.8	85.5	86.3
Switzerland	95.4	93.3	72.8	78.1	2.5	2.7	3.9	4.0	97.8	95.9	75.7	81.3
UK	85.3	87.1	70.1	74.3	8.0	4.7	5.7	4.1	92.7	91.4	74.3	77.5

Note: When the data from the 1990s is not available, the earliest data from each country is substituted for it. The data from 2010 and 2011 are included in calculating the average data of the 2000s.

Table 2 shows the average rates of the three labor force statistics in the 1990s and the 2000s in each country. From the table, we see that the labor force statistics for females changed substantially between the 1990s and the 2000s. Although the employment and labor force participation rates stayed constant for males, the corresponding rates for females increased during this time period. Among our target countries, the Netherlands and Spain experienced larger increases. In the Netherlands, the female employment rate increased from 62.3% to 75.0%, and the female labor force participation rate increased from 66.6% to 77.8%. In terms of the unemployment rate, many countries experienced a slight decrease between the 1990s and the 2000s.

Next, Table 3 shows the changes in sectoral compositions between the 1990s and the 2000s. According to this table, all countries experienced a decrease in the traditional sector as proportion of total employment. Germany, the Netherlands, and Spain experienced a relatively large decrease in the traditional sector between the 1990s and the 2000s. While the ratio of the traditional sector was falling, many countries experienced increases in the business service and social service sectors relative to total employment. As a result, in the 2000s, service sectors made up a substantial part of total employment in some countries such as Sweden and the Netherlands. The Netherlands and Germany experienced a roughly 3% increase in the business and social service sectors between the 1990s and 2000s. Compared to the business and social service sectors, many countries did not experience a substantial increase in the proportion of the consumer service sector.

Table 3　Sectoral Compositions in 23 Countries

	Traditional		Consumer		Business		Social	
	1990s	2000s	1990s	2000s	1990s	2000s	1990s	2000s
Australia	53.6	48.8	10.7	11.5	13.7	15.9	16.2	17.8
Austria	59.4	56.2	10.4	10.5	10.2	12.2	14.0	14.8
Belgium	52.1	48.0	9.8	7.6	11.6	12.8	19.1	21.3
Canada	51.1	48.4	11.3	11.8	14.4	16.7	17.1	17.8
Czech	66.8	65.6	6.8	7.2	7.9	8.4	12.5	12.7
Denmark	52.4	49.0	8.1	7.4	10.1	12.2	23.1	25.6
Finland	55.5	52.6	8.1	8.6	11.2	12.3	20.2	21.8
France	50.4	46.1	8.6	10.3	13.8	16.1	18.6	18.0
Germany	59.9	53.1	7.8	9.4	10.1	13.3	14.2	17.0
Hungary	63.4	61.4	7.8	8.2	7.6	8.8	14.9	15.0
Italy	61.8	56.7	8.6	10.9	8.6	12.6	13.2	13.8
Japan	61.3	58.9	10.7	10.6	11.9	12.9	12.4	13.9
Korea	62.8	58.5	15.9	16.2	10.0	11.7	7.7	9.9
Netherlands	51.3	45.1	8.2	8.7	12.7	15.7	19.9	23.3
New Zealand	57.5	53.0	11.4	9.8	11.5	14.0	13.8	17.4
Norway	50.8	46.4	7.4	7.1	10.6	12.4	25.5	28.3
Poland	69.8	67.5	5.2	5.1	6.3	7.8	13.4	13.5
Portugal	64.5	62.8	11.2	11.5	6.8	7.5	11.3	12.2
Slovak	64.2	63.1	7.4	7.7	6.1	7.7	14.7	14.0
Spain	63.3	57.2	12.3	14.0	8.2	11.1	10.4	11.8
Sweden	47.4	43.9	7.9	8.1	12.8	15.4	26.8	26.8
Swizrland	55.3	51.2	11.6	10.7	14.2	16.6	15.2	17.6
UK	52.2	46.8	10.1	10.1	13.7	15.3	18.0	21.4

Note: When the data from the 1990s is not available, the earliest data from each country is substituted for it. The data from 2010 and 2011 are included in calculating the average data of the 2000s.

5–2. Linear Regression Analysis

In this section, we estimate the linear regression of the employment rate, unemployment rate, and the labor force participation rate. The results are shown in Table 4. We use two models, estimating them separately for males and females. For the variables of the sectoral composition, only the traditional sector is included in Model 1, and the three service sectors are included in Model 2.[11] Based on the direction of the coefficients, the size of the effects, and the statistical significance, we summarize the results of the sectoral composition in Table 5.

According to the results shown in Tables 4 and 5, the size of each sector in the economy impacts the labor force statistics for males and females. Specifically, we obtain the following four findings. First, according to Model 1 of Table 4, larger traditional sector as a proportion of total employment is associated with higher male employment and lower female employment. Although the coefficients are not statistically significant, the traditional sector has a positive effect on the employment rate and a negative effect on the unemployment rate for males. It also has negative effects on female employment and labor force participation rates.

Next, in terms of the three service sectors, Model 2 of Table 4 shows that the three service sectors tend to have diverse effects on the labor force statistics for both genders. However, compared to the other two service sectors, the business service sector has similar effects on the employment and

11) The variables of the traditional sector and each service sector are highly correlated. Especially, the traditional sector is correlated with the business and social service sectors. This means that both a decrease in the traditional sector and an increase in the two service sectors have occurred simultaneously.

Table 4 Regression Results for Labor Force Statistics

	Employment rate				Unemployement rate				Labor force participation rate			
	Male		Female		Male		Female		Male		Female	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
TRAD	0.226 (0.156)		−0.386 (0.233)		−0.192 (0.142)		0.057 (0.090)		0.055 (0.071)		−0.415 (0.246)	
CONS		−0.311 (0.222)		0.616 (0.485)		0.353 (0.228)		−0.011 (0.199)		0.015 (0.088)		0.778 (0.492)
BUSI		0.191 (0.097)†		0.563 (0.287)†		−0.202 (0.119)		−0.498 (0.153)**		0.003 (0.072)		0.261 (0.264)
SOC		−0.513 (0.210)*		−0.067 (0.411)		0.427 (0.212)†		0.490 (0.217)*		−0.128 (0.118)		0.300 (0.372)
UD	−0.127 (0.054)*	−0.120 (0.053)*	0.049 (0.110)	0.062 (0.106)	0.132 (0.044)**	0.127 (0.041)**	0.044 (0.062)	0.030 (0.057)	−0.005 (0.040)	−0.002 (0.040)	0.100 (0.100)	0.106 (0.098)
COORD(1) (ref.)	–	–	–	–	–	–	–	–	–	–	–	–
COORD(2)	−1.040 (0.658)	−1.337 (0.717)†	−1.817 (1.076)	−2.155 (1.226)†	0.507 (0.645)	0.744 (0.728)	0.006 (0.788)	0.477 (0.912)	−0.672 (0.284)*	−0.754 (0.326)*	−2.524 (0.901)*	−2.565 (1.007)*
COORD(3)	1.070 (0.606)†	0.635 (0.608)	0.707 (1.121)	0.639 (1.148)	−1.351 (0.621)*	−0.969 (0.590)	−2.778 (0.761)**	−2.403 (0.709)**	−0.245 (0.232)	−0.334 (0.251)	−1.307 (1.003)	−1.090 (1.026)
COORD(4)	1.263 (0.965)	0.988 (0.891)	1.635 (2.498)	1.550 (2.370)	−1.862 (0.998)†	−1.629 (0.940)†	−3.971 (1.768)*	−3.709 (1.610)*	−0.556 (0.246)*	−0.622 (0.254)*	−0.926 (1.827)	−0.824 (1.797)
COORD(5)	1.463 (0.683)*	0.819 (0.588)	2.568 (1.443)†	3.368 (1.716)†	−1.878 (0.691)*	−1.247 (0.620)†	−3.790 (0.790)**	−3.663 (0.884)**	−0.322 (0.218)	−0.393 (0.208)†	−0.100 (1.339)	1.001 (1.631)
UBR	−0.017 (0.029)	−0.040 (0.024)	−0.122 (0.059)†	−0.114 (0.063)†	0.018 (0.032)	0.040 (0.028)	0.045 (0.038)	0.061 (0.030)†	0.001 (0.022)	−0.002 (0.021)	−0.097 (0.063)	−0.074 (0.065)
EPRC	−0.346 (0.702)	−0.215 (0.780)	−2.591 (1.796)	−1.912 (1.869)	0.334 (0.617)	0.320 (0.656)	0.580 (0.762)	0.120 (0.696)	−0.008 (0.333)	0.118 (0.375)	−3.276 (1.806)†	−2.773 (1.906)
EPT	0.417 (0.438)	0.461 (0.406)	−0.732 (0.664)	−0.503 (0.608)	−0.609 (0.445)	−0.635 (0.410)	0.256 (0.488)	0.114 (0.399)	−0.131 (0.154)	−0.110 (0.146)	−0.767 (0.672)	−0.598 (0.699)
OUT	0.530 (0.076)**	0.507 (0.076)**	0.240 (0.138)†	0.200 (0.137)	−0.551 (0.084)**	−0.527 (0.072)**	−0.527 (0.105)**	−0.473 (0.098)**	0.019 (0.039)	0.019 (0.037)	−0.160 (0.150)	−0.161 (0.131)
R-squared	0.904	0.908	0.949	0.951	0.857	0.862	0.888	0.900	0.932	0.934	0.951	0.951

Note: Coefficients and robust standard errors in parentheses. Models include year and country dummies, N = 390, **p < .01, *p < .05, †p < .10.

Table 5 Summarized Results of Linear Regression Analysis

	Employment rate		Unemployment rate		Labor force participation rate	
	Male	Female	Male	Female	Male	Female
Traditional	UP	DOWN	DOWN	−	−	DOWN
Consumer service	DOWN	UP	UP	−	−	UP
Business service	UP†	UP†	DOWN	DOWN**	−	UP
Social service	DOWN*	−	UP†	UP*	−	UP

Note: The detailed results are shown in Table 4, **p < .01, *p < .05, †p < .10.

unemployment rates for both males and females. The second finding is that a larger business service sector as a proportion of total employment is associated with a higher employment rate and a lower unemployment rate for both genders.

In contrast to the business sector, the consumer and social service sectors have different effects on labor force statistics for males and females. The third finding is that for males, the existence of larger consumer and social service sectors is related to a lower employment and a higher unemploy-

ment rate. In addition, the effects of the social service sector on male employment and unemployment rates are greater than the effects of the consumer service sector.

The last finding is that larger service sectors as a proportion of total employment are related to a higher female labor force participation rate. The coefficients of the three service sectors have positive effects on the female labor force participation rate, whereas the coefficient of the traditional sector has a negative effect. This means that countries with larger service sectors have a smaller non-labor force female population. However, although all of the three service sectors have positive effects on the female labor force participation rate, they have different effects on the female employment and unemployment rates: the consumer and business service sectors have positive effects on the female employment rate. On the other hand, the social service sector has a positive effect on the female unemployment rate.

Finally, in terms of institutions and policies, we find that some variables have significant effects on the labor force statistics. Higher union density is associated with a lower employment and a higher unemployment rate for males. Conversely, we find that a coordinated wage-setting system is related to higher employment and lower unemployment rates for both genders. In addition, strict employment protection of permanent workers is associated with lower employment and higher unemployment rates for females. A higher replacement rate of unemployment benefits is found to be related to a lower employment and a higher unemployment rate for females.

These results showing the effects of various institutions and policies are basically consistent with the results shown by previous studies. The important thing here is that the sectoral composition is associated with the labor market outcomes after controlling for these institutions and policies. In the next section, we discuss the results, and present the implications our results could have for the employment structure of a post-industrial society.

6. Discussion

In this paper, we examined to what extent post-industrialization impacted on labor market outcomes such as the employment rate in each country. Recently, many countries have undergone post-industrialization, and the main engine of employment growth has been the expansion of service sectors. Esping-Andersen and his coauthors declared that the post-industrial future would face a trade-off between a large service proletariat and a large outsider population (Esping-Andersen ed. 1993). This means that if service sectors have not expanded considerably in developed countries, the possibility of employment growth is limited, and these countries might suffer from mass unemployment. Esping-Andersen (1993) showed that there were three different trajectories being taken towards a post-industrial society using the data of six countries. However their analyses were descriptive and focused on only a few countries.

We examined the extent to which sectoral composition has had an effect on employment rates, unemployment rates and labor force participation rates in 23 OECD countries during the years 1990–2011. We conducted the regression analyses using cross-country/time-series data from these countries, and showed that the traditional sector and the three service sectors as a proportion of total employment were related to labor market outcomes in different ways. Also, we found that these results did not necessarily correspond to the facts that Esping-Andersen presented. In this regard, we discuss the following two findings.

First, our results showed that a larger traditional sector was related to higher male employment and lower female employment. Because of a decrease in the required labor force due to improving labor productivity and the relocation of factories abroad, many developed countries have faced a diminishing traditional sector including manufacturing industries. Under these conditions of decline, some countries with a relatively larger traditional sector have not expanded their service sectors as other countries have. Although Esping-Andersen forecast that there would be a large outsider population in these countries, our results showed that a relatively larger traditional sector was related to higher male employment. Additionally, we could not find any evidence of mass unemployment in these countries. Conversely, our results suggest that industries in the traditional sector such as manufacturing and construction have provided many job opportunities for males.

Second, we found that many countries experienced an increase in the service sectors during the past decade, and the expansion of the service sectors increased male and female employment in different ways. Our results suggest that the employment structure in post-industrial countries is complex, because the size of each service sector was diversely associated with labor market outcomes for males and females. In particular, we found a larger business service sector was associated with a higher employment rate and a lower unemployment rate for both genders. This result suggests that industries in the business service sector such as finance and business activities could create jobs for both males and females. On the other hand, the social and consumer service sectors had different effects on labor market outcomes for males and females: in countries where the social and consumer service sectors had expanded, male employment rates were lower, and female labor force participation rates were higher.

Why did the existence of larger social and consumer service sectors have such employment effects? we present the following two explanations. First, females tend to be hired for jobs in consumer and social service sectors more than males. Also, many jobs in these sectors are low-wage, so males tend to be reluctant to take these jobs. The tendency of male underrepresentation is greater in the social service sector than in the consumer service sector as our results suggested. In countries experiencing a decrease in the traditional sector, men tend to lose their jobs, and these men might have difficulties in being retrained and finding new jobs in these service sectors. Another related finding is that a larger social service sector was associated with a higher unemployment rate for females. We interpret this result as follows: as noted above, males tend to suffer from unemployment in countries where the social service sector makes up a higher proportion of the economy. This might be a motive for married women to become job-seekers, which could lead to a higher female unemployment rate.

Second, we found that a larger consumer service sector was related to higher employment and labor force participation rates for females. We believe that these higher rates have been generated by the marketization of household activity. The existence of a large consumer service sector suggests that many household activities are marketized in these economies. The marketization of household activity makes it easier for married women to work outside the home. In this regard, we suggest that women in countries with a larger consumer service sector could have opportunities to work outside the home.

7. Conclusion

In this paper, we showed that labor market outcomes differed across countries with different sectoral compositions. Our results underline that the employment effect of post-industrialization is different for males and females. We also suggested that trajectories in becoming a post-industrial society bi-

ased towards the consumer and social service sectors might lead to higher unemployment for males but not for females. We need a theory of the employment structure in post-industrial societies which incorporates gender differences.

Additionally, although Esping-Andersen did not focus on the expansion of the business service sector, we found that this sector made up a substantial proportion of the economy in many countries, and it was important for the employment of both males and females. Because of expanding capital markets and increasing financialization, finance and related industries have become more important in many economies. Future research should focus on the employment effect of the business service sector.

Although our study casts new light on the employment structure in post-industrial societies, it has several limitations. First, there are values missing from the data, and these may be significant. Because some countries lack detailed information on their economic activities, we lacked data from the early 1990s for some countries. Also, we did not have any data from the United States. We need to collect more comprehensive data to study the employment structures of post-industrialized societies.

The second limitation is that our analyses did not show the precise causal effects of sectoral composition on labor market outcomes. Instead, we should interpret the results as showing an association between these variables. In fact, male and female employment behaviors could possibly have had an effect on which sector developed in each country. To understand the mechanism that generates the relationships between sectoral composition and labor market outcomes, we need to construct a theory that shows how different countries are expanding their service sectors. In this regard, we need to consider the relationship between the expansion of service sectors and government policies such as subsidies and market regulations. Also, there might be other important institutions and policies such as tax-wedges which have an effect on labor market outcomes.[12)]

Lastly, there are other aspects of the employment structure in post-industrial societies which require further study. Economic inequality and the distribution of skills would be two such examples. For instance, although the expansion of service sectors might create more jobs for males and females, there might be greater economic inequality in a service dominant economy. Also, the distribution of occupational skills might differ across countries with different sectoral compositions. In the future, we plan to examine the employment effects of post-industrialization using more comprehensive data, and develop a theory to explain how each country experiences a different trajectory in becoming a post-industrial society.

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The Employment Effect of Post-Industrialization:
Evidence from OECD Countries

ABSTRACT

Recently, many countries have undergone post-industrialization, and the main engine of employment growth has been the expansion of service sectors. In this paper, we examined to what extent post-industrialization impacted labor market outcomes in each country. While focusing on different kinds of service sectors, namely, the business, consumer, and social service sectors, and using annual data of 23 OECD countries during the years 1990–2011, we performed linear regression analyses to examine whether sectoral composition was related to the employment rate, the unemployment rate, and the labor participation rate in each country. Our results showed the following two findings. First, the existence of a larger traditional sector was related to higher male employment and lower female employment. Second, the size of each service sector had diverse effects on labor market outcomes for males and females: a larger business service sector was associated with higher employment for both genders. On the other hand, in countries where the social and consumer service sectors have expanded, male employment rates were lower, and female labor force participation rates were higher. Our results suggested that trajectories in becoming a post-industrial society biased towards the consumer and social service sectors might lead to higher unemployment for males but not for females.

Key Words: post-industrial society, sectoral composition, cross-country/time-series data