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Value-added Effect of Labor Productivity in Extending the Mandatory Retirement Age: Evidence from Korea

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In this study we use an inter-industry analysis to evaluate the economic ripple effect of the mandatory retirement age extension system. The data employed herein include the industry input-output table and labor data. The labor productivity table by age and industry was generated using the results of a survey. The survey was conducted among the manufacturing and service sectors. The average wage by industry and age (Ministry of Labor, Monthly Labor Statistics Survey) and the number of wage workers by industry and age (National Statistical Office) were also determined to be used in this study. The principal empirical findings of this work are that the extension of mandatory retirement exerts a value-added effect ranging from a minimum of 1.02 trillion Kwon (about 1 billion US dollars) to a maximum of 3.01 trillion Kwon (about 3 billion US dollars). If the mandatory retirement age is extended from the current 55 to 60, the industries that benefits from the largest value-added effects are the public administration and education service sectors. This means that more workers will continue to work after the age of 55 relative to other industries, or that the wage levels of workers over the age of 55 will be higher, or that the decline in the productivity of these workers will be lower. The economic ripple effect of the extension of mandatory retirement age is estimated to be quite immense. The extension of retirement age should begin in the service sector, in which the loss of productivity is anticipated to be relatively small. This study addresses a variety of policy remedies to soft-land the extended mandatory retirement age, and to enhance its social benefits.

Keywords: *extension of mandatory retirement age, economic ripple effect, age discrimination in employment, life cycle labor productivity function, wage peak system.*

Introduction

The object of this study is the value-added effect of the extension of the mandatory retirement age in Korea. One of the most pressing employment issues associated with the current aging of Korean society is the age-based mandatory retirement system, which has been practiced by the majority of Korean employers for a great many years. The mandatory retirement age in Korea was fixed at the relatively early age of 55. In March 2009, the Korean government legislated the prohibition of age discrimination in personnel management (Age Discrimination in Employment & Aged Employment Promotion Act) in order to expedite the corporate extension of the mandatory retirement age. As a result of this legal change, the mandatory retirement age tends to increase; such an increase in the retirement age limit results in a value-added effect of labor productivity for Korean society.

The goal of this study was to assess the value-added effect of the extension of the mandatory retirement age triggered by the new legislation of the Age Discrimination in Employment & Aged Employment Promotion Act in Korea. In order to achieve this goal, this study involved the following specific tasks:

- Estimate the overall value-added effect of labor productivity in extending the mandatory retirement age.
- Conduct industry comparisons of the value-added effects and identify the industrial priority of extending the mandatory retirement age.
- Suggest a practical policy to create a win-win situation for relevant employers and employees, and thereby to soft-land the extension of the retirement age limit.

Method. The Input-Output Model (IOM) was utilized in this study to measure the associated social costs and benefits as in the previous literatures (Han, 1995; Luis & Wolff, 1996). More specifically, this study is to evaluate the ripple effect of the extension of the mandatory retirement age on the national economy. This method enables us to evaluate the economic outcomes of the extension or abolition of the mandatory retirement system in the countries with aging societies.

Early Retirement in the Aging Society

The aging society and falling fertility rates in Korea have been implicated as the "silent killers" of the Korean economy. Comprising 7.2% of the population in 2000, the proportion of Koreans in the over-65 age group is increasing rapidly, reaching 10.7% in 2010 and an anticipated 15.1% in 2020. However, the proportion of the Korean population in the 20s has declined, from 17.5% in 2000 to 13.9% in 2010 (Korea National Statistics Office, 2001). Additionally, the proportion of Koreans aged 50-64 is also expected to increase, from 13.2% in 2000 to a projected 21.2% in 2015. This phenomenon is attributable, in part, to advances in medical technology and public health, which have substantially increased the average lifetimes of Koreans.

Despite the rapid aging of Korean society, the mandatory retirement age in Korea has generally remained at 55 years of age, which was excessively early in a country undergoing rapid aging. Korea has had a mandatory retirement system since the 1970s. In the 1970s, retiring at the age of 55 was a favorable proposition for workers, since life expectancies were rather short. However, as the Korean life expectancy currently exceeds 80 years, the prospect of such an early retirement can seriously negatively impact the lives of post-retirement Koreans, especially when coupled with the generally undeveloped state of the Korean social safety net (Cho & Kim, 2005; Cho & Keum, 2009).

Comparison of the Korean Retirement System with those of other countries

The Korean mandatory retirement system mandates the termination of an employment contract regardless of the employee's intentions or capabilities to continue his/her work relationship, once the employee reaches a certain age established by virtue of the rules of employment, collective agreements, or labor contracts. According to the Korean Labor Standards Act, companies must establish rules of employment or forge collective agreements. (Korean Labor Institute, 2007).

For a Korean case, many factors contribute to the fixture of the mandatory retirement age at 55. First, the dominant wage scheme in Korea is the Hobong (seniority-based) system, which pays out salaries on the basis of age and continuous years of service; also, owing to the restrictions on worker layoffs in Korea laid out in the Labor Standards Act, the mandatory retirement system is a method of adjusting the aged workforce, or a sort of a quasi-dismissal system. Second, according to the majority of collective agreements in Korea, eligibility for union membership in the majority of Korean trade union contracts is restricted to individuals in their 40s; therefore, unions are generally less likely to work toward benefits for elderly workers, including measures such as the extension of the mandatory retirement age. Finally, by maintaining an age-based mechanical retirement system, the system makes human resources (HR) management quite a bit easier than in wage schemes predicated on performance appraisals. This serves to deter HR managers from making efforts to escape or reform the system. (Cho, 2004; Cho, 2005).

The mandatory retirement system in Korea, which does not take into consideration the capabilities of employees or labor productivity, contrasts sharply with the system in the USA, in which the involuntary retirement of aged workers is restricted severely under the Age Discrimination and Employment Act (ADEA), or the European system, which forbids discrimination against the aged, including mandatory retirement via collective agreements (Cho, 2007). Japan has a mandatory retirement system similar to that of Korea; however, even in Japan, this law forbids the mandatory retirement of those under 65, which differs from Korea in that early retirement is not legally prohibited.

Lithuania has also enjoyed a fairly rapid economic growth, particularly subsequent to the EU accession in 2004. As a result, employers have been faced with several issues: most notably, rapidly-growing wages and critical labor supply shortages (Olaf & Violeta, 2007). Additionally, the steady work resource aging process exerts negative economic effects (Berzinskiene, 2005; Cesyniene, 2005). In an effort to address these challenges, the retirement age in Lithuania has been changed. The retirement age, after which a person can receive old-age pension benefits, was 55 years for women and 60 years for men in Lithuania in 1994. Since 1995, the retirement age has been pushed back four months every year for women and two months every year for men. This pushback was also recently accelerated. In 2003, the retirement age for women was 60 years and for men was 62.5 years. A plan is also currently in place to continue with these retirement age push backs until both women's and men's retirement age is 65 years (Jukka & Valkonen, 2002).

Previous Studies on the Retirement System

Previous studies to assess empirically the outcome of extending retirement age have largely focused on a specific firm or sector. However, there has been no empirical research thus far conducted to assess the effects of an extension of mandatory retirement at the industry or national levels. For example, McNaught and Barth (1992) previously calculated the cost of maintaining employment for older and younger workers using data obtained from the Days Inn Atlanta Call Center; younger workers were found to have higher turnover rates than older workers, which means that the cost of employment for the younger workers was higher, owing to factors such as training costs. A similar study was conducted in the UK at the Institute of Management Studies at the University of Sussex; in that study, the cost of recruiting and training a new hire was set at $2,500 per worker, and it was concluded that the employment stability of older workers might make them more beneficial to companies than younger workers. Michael, Li, Frank, David, and Robert (2000) suggested the following after reviewing survey data of workers aged between 30~49 in Scotland: the senior corporate level should not address labor market issues arising from retirement such as the mandatory retirement system, but the government level should consider the relevant economic and cultural characteristics carefully when making these decisions. Additionally, they argued that the

early retirement of aged workers from the labor market involves elements of national and social waste.

Therefore, when attempting to adjust the retirement period of aged workers, more careful consideration should be afforded to the benefits offered after retirement than has been the case in institutional artifacts such as the mandatory retirement system. Brooke (2003) conducted a study of the labor participation patterns of older workers (above 45) and younger workers (16~44) through data compiled by the Australian Bureau of Statistics. He demonstrated that older workers tended to have 2-4 more years of continuous service than younger workers, and suggested that the net benefit of hiring older workers exceeded the net benefit of hiring younger workers.

Shannon and Grierson (2004) employed data obtained from the Labor Force Survey and Census to evaluate the effects of mandatory retirement on the unemployment rate through the method of differences in difference. According to the study results, the existence or non-existence of the mandatory retirement scheme exerted no significant effects on the employment rates of the aged (ages 65 to 69). In other words, the retirement of aged workers is determined by social trends, and is unrelated to the existence or non-existence of a mandatory retirement scheme. Clark and Ghent (2008) surveyed staff at the University of North Carolina to determine the impacts of the mandatory retirement system on faculty members, via logistics analysis. According to their results, after the abolition of the mandatory retirement system, the retirement ratio of faculty in the age 70-71 bracket was significantly reduced, but no impact was reported for other age brackets.

On the contrary to the previous studies, this paper makes the first attempt to measure the ripple effect of retirement age extension on labor productivity throughout the economic network. This line of research may be helpful for the countries considering the alteration of the mandatory retirement system and needing the background information on the ripple effect of such institutional change.

Extension of the Mandatory Retirement Age and Labor Productivity

The following methodology can be employed to assess the labor productivity of workers working under extended retirement, owing to the age discrimination inherent in the employment system and its consequent increase in value added by labor. The labor productivity of the typical worker changes according to years of service (age). The labor productivity of the typical worker differs according to age, job characteristics, work period, working hours, income, sex, and education level. The labor productivity function of the typical worker can be expressed as follows:

$$I = I(a : T, Y, E \ldots\ldots) \quad (1);$$

This function, *ceteris paribus*, is the life cycle labor productivity function:

$$I = I(a) \quad (2);$$

The life cycle labor productivity function is expressible as is shown in Figure 1. The worker continuing his/her career evidences relatively lower productivity in the early 20s, but as the worker ages, his/her skill increases to its peak, and then gradually declines.

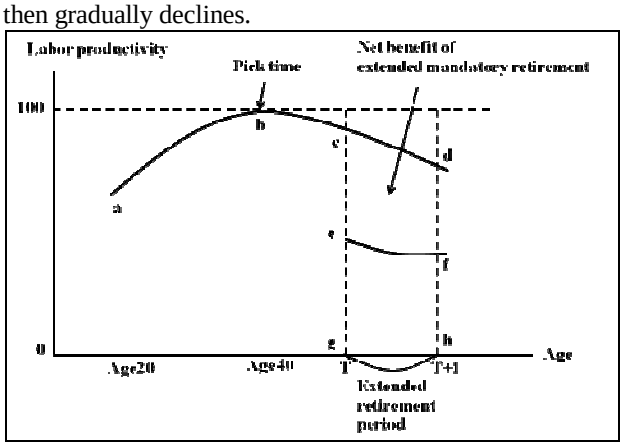

Figure 1. Life Cycle Labor Productivity Curve

The value of additional manpower provided by the worker during his/her extended retirement period becomes the benefit created by the implementation of age discrimination. If age discrimination is absent within an employment system, the time of retirement will be at period T, but if this system is implemented and the mandatory retirement age is extended to T+1, the benefit deriving from the extension of the mandatory retirement age becomes "cdhg". In the case of retiring at period T and finding an alternative career, this person assumes that his/her productivity will decline relative to the case in which the individual continues his/her current career, and thus the worker will wish to maintain his/her productivity via the mandatory retirement age extension. Therefore, we anticipate that the expected labor productivity of an alternative career will be somewhat lower than the labor productivity of the current career. The labor productivity function of an alternative career can be expressed as "cef", and the anticipated labor productivity function of the alternative career is as follows:

$$H = H(a) \quad (3);$$

The difference of the net labor productivity of workers under extended retirement conditions is expressed as "*I*-*H*". "cdef" is the net increase in labor productivity due to the enforcement of the age discrimination policy. The increase in wages is based on the increased productivity owing to the extension of the mandatory retirement age of worker i, in industry j. The M_{ij} can be expressed as the increase in labor productivity from the extension of the mandatory retirement age (I_{ij}) × wage per unit of labor productivity (m_{ij}).

$$M_{ij} = \int_{T}^{T+1} (I_{ij}\ m_{ij}) \quad (4);$$

T is the time of extended retirement age, and T+1 is the time of retirement. According to the same logic, the increase in wages based on the productivity anticipated by workers with extended retirement in their alternative career, R_{ij}, is as follows:

$$R_{ij} = \int_{T}^{T+1} (H_{ij}\ m_{ij}) \quad (5);$$

The wage based on productivity as defined above differs from the actual wage payments made by companies in actuality. If the actual amount of paid wages for 1 period is defined as w_{ij}, the actual increase in wage income during the period of retirement extension, W_{ij}, is expressed as follows:

$$W_{ij} = \int_{T}^{T+1} w_{ij} \quad (6);$$

If the relationship among the paid wage (W_{ij}), wage based on productivity (M_{ij}), and expected wage at an alternative career (R_{ij}) is "W > M > R", then workers will wish to extend their mandatory retirement age. In this case, companies are paying higher wages relative to labor productivity. If companies make a rational decision, the "W = M > R" relationship will be maintained. The net benefit (B) can be calculated by subtracting the increase of expected labor income in an alternative career from the increase in labor income with extended retirement.

$$B = \sum_{i}^{n} \sum_{j}^{k} (M_{ij} - R_{ij}) \quad (7);$$

Table 1

Structure of Input-Output Table

		Intermediate demand			Final demand	Total output
		$j = 1$	$j = 2$	$j = 3$	$Y = y_i$	$X = x_i$
Intermediate Input	$i = 1$	m_{11}	m_{12}	m_{13}	y_1	x_1
	$i = 2$	m21	m22	m23	y2	x2
	$i = 3$	m31	m32	m33	y3	y3
Capital	$V_K = k_j$	k_1	k_2	k_3		
Labor	$V_L = l_j$	l_1	l_2	l_3		
Total output	$X = x_j$	X_1	$X2$	$X3$		

The Ripple Effect of the Extension of Mandatory Retirement Age

Based on the theoretical frame established above, the ripple effect of the extension of the mandatory retirement age on the national economy--in other words, the value added by labor--can be calculated using an input-output model. In the input-output model, the increase in final demand brings about an increase in the production of the national economy, thus resulting in the creation of added value. Here, under the premise that the production of the national economy increases sufficiently to fully absorb workers with extended retirement ages, this study calculated the contribution of workers with extended retirement on the total value added. In the input-output model, the total output equation of the supply side is as follows:

$$X = (I - B^T)^{-1} (V_K + V_L)^T \quad (8);$$

Here, $(I - B^T)^{-1}$ is the production-inversed matrix (not the Leontief-inversed matrix). The factor of matrix B, $b_{ij} = M_{ij} / X_i$, and T refers to the transpose matrix. $(V_K + V_L)$ is the total value added. The value added by labor can be calculated by multiplying the labor productivity for each industry and age group with the unit wage of labor productivity and then by multiplying this by the number of workers by industry and age group.

$$V_L = F_L W_F L \quad (9);$$

F_L is the labor productivity of each industry and age group, W_F is the unit wage of labor productivity for each industry and age group, and L is the number of workers in each industry and age group. In the above equation, if workers retire at a certain age, the contribution of labor productivity to total output by the sum of labor productivity of workers in their current careers and the labor productivity of workers in alternative careers, excluding the sum of the retired workers, is as follows:

$$\Delta X = (I - B^T)^{-1} (V_K + \Delta F_L W_F L) \quad (10);$$

$$\Delta G = k \Delta X \quad (11);$$

Using equations (10) and (11), three scenarios of retirement--at the ages of 50, 55, and 60--were established, and the total value added and the contribution to value added by labor in the case of the extension of mandatory retirement age at each age was calculated.

Table 2

Classification of Industrial Sectors

Sec. No.	Sectors	Sec. No.	Sectors
1	Foods, beverages and Tobacco	14	Electric services, gas and Water supply
2	Fiber, wearing and Leather products	15	Construction
3	wood, Paper products	16	Trade

Sec. No.	Sectors	Sec. No.	Sectors
4	Printing, publishing and Duplication	17	Foods service and Hotel
5	Petroleum and Coal products	18	Transportation and Warehousing
6	Organic basic chemical products	19	Communications and Broadcasting
7	Nonmetallic mineral products	20	Finance and Insurance
8	Primary iron and Steel products	21	Real estate
9	Fabricated metal and General machinery	22	Business services
10	Electronic, Electric equipment	23	Public administration and Education
11	Precision instruments	24	Health and Social service
12	Transportation equipments and Parts	25	Culture, entertainment
13	Furniture and Other manufacturing products	26	Other social services and Non-classifiable activities

Survey and Data

The data employed in this study came from The Input-Output Table (2005) and Employment Table obtained from the Bank of Korea, and the labor productivity table by age and industry was created using the results of a survey. This survey was conducted with the manufacturing and service industries, and excluded the agriculture, fisheries, and mining industries. The average wage by industry and age (Ministry of Labor, Monthly Labor Statistics Survey, 2007) and the number of wage workers by industry and age (National Statistical Office, 2007 Economically Active Population Survey) were determined for this study. The industry classification employed for the survey and inter-industry analysis are provided in Table 2.

Evaluation of Labor Productivity

Herein, we shall evaluate the labor productivity by industry evaluated via surveys. In the surveys, workers and companies (HR manager) were instructed to evaluate the labor productivity by age in the case in which workers continue to work in their current careers versus the labor productivity by age in the case in which the workers retire from their current careers and undertake alternative careers.

Labor productivity after retirement was lower than that prior to retirement. However, some respondents asserted that labor productivity after retirement would be higher than the current labor productivity. In these cases, the respondent tended to overevaluate his/her work ability after retirement, or perceived his/her ability in the current job to be underevaluated. In the analysis, the mean value of labor productivity by industry was determined for the following two cases:

Case 1: The mean value of labor productivity excluding respondents who asserted that their labor productivity after retirement would be higher than their incumbent labor productivity.

Case 2: The overall mean value of labor productivity, regardless of how respondents evaluated their labor productivity after retirement relative to their incumbent labor productivity.

Labor productivity in the current career was at a maximum in the late 30s, and declined as workers moved into their 40s and 50s. The degree of decline was higher in the manufacturing industry than in the service industry. For instance, the labor productivity of the manufacturing industry Case 1, on a scale of 100, was 94.03 for workers in their 30s, 87.04 for workers in their 40s, and after a gradual decline was 49.71 for those over 60. Meanwhile, the labor productivity in the service industry was 94.8 in the 30s, 88.5 in the 40s, and after a gradual decline dropped to 54.8 for those over 60. The margin of decline of labor productivity in the service industry was decidedly smaller than that of the manufacturing industry.

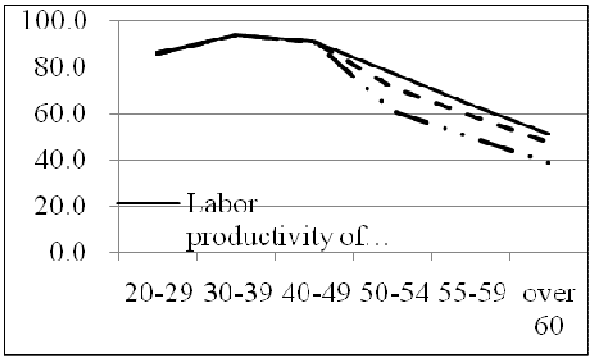

Figure 2. Labor Productivity in Manufacture Sectors

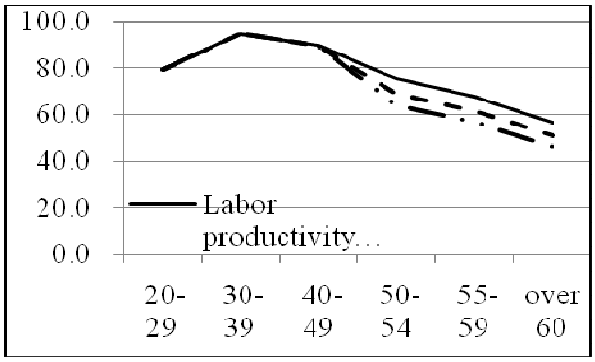

Figure 3. Labor Productivity in Service Sectors

Meanwhile, the labor productivity anticipated after retirement at the current age in the case of the manufacturing industry gradually declined--from 80.6 for workers in their 40s to 47.61 for those over 60. On the other hand, in the service industry, labor productivity declined gradually from 76.3 for workers in their 40s to 51.1 for those over 60. The majority of workers determined that their productivity after retirement would be reduced relative to the productivity they achieved in their current careers. A similar trend was noted in Case 2.

The Value Added Effect of the Extension of Mandatory Retirement Age

The following is the premise underlying the analysis of value added by labor of the extension of the mandatory retirement age according to inter-industry analysis.

- The current state of wage levels reflects wages based on productivity for the overall economy.
- In the constituents of value added by labor, those workers above 20 years of age are regarded as employed workers.

In the analysis shown in Figure 2 - 3, the retirement age was divided into 50, 55, and 60, and the value-added effect of the increase of labor productivity in the case of mandatory retirement age extension was calculated. The value-added effect of mandatory retirement age extension by case in industry overall is shown in Table 3.

Table 3

Value Added Effect of Mandatory Retirement Age Extension Unit: Billion Kwon, %

	Total value added (a)	**Labor value added (b)**	**Labor value added: retirement**			**Labor value added: extension**		
			retirement age 50 (c)	**retirement age 55 (d)**	**retirement age 60 (e)**	**extension age 50 f=b-c**	**extension age 55 g=b-d**	**extension age 60 h=b-e**
Case 1	574,066	263,270	257,085	260,260	262,026	6,186	3,010	1,244
	% to Labor value added					2.35 (f/b)	1.14 (g/b)	0.47 (h/b)
	% to Total value added					1.08 (f/a)	0.52 (g/a)	0.22 (h/a)
Case 2	574,066	263,270	261,006	262,248	262,868	2,264	1,022	403
	% to Labor value added					0.86 (f/b)	0.39 (g/b)	0.15 (h/b)
	% to Total value added					0.39 (f/a)	0.18 (g/a)	0.07 (h/a)

The total value added of Korean industry overall in the year 2000 (value added by labor + value added by capital) reached the figure of 599.6 trillion Korean won (Kwon). Excluding agriculture, fisheries, and mining industries (which were not included in this study), the total value added contributed by the manufacturing and service industries was 574.07 trillion Kwon. Among the total value added of the manufacturing and service industries, the value added by labor amounted to 263.3 trillion Kwon.

We shall now assess the results of calculation for Case 1. First, in the case in which the worker retires after the age of 50, the sum of the value added by labor created by workers (excluding those over 50) in the current career and the value added by labor that could be created by retired workers in other careers, expressed as the value added by labor in the case of retiring at 50, is 257.09 trillion Kwon. In this case, if the mandatory retirement age is continuously extended from 50, the contribution to value added by the labor of workers in the extended mandatory retirement age bracket in their current careers, expressed as the age 50 extension effect, is calculated by subtracting the value added by labor in the case of retiring at 50 from the total value added by labor. The age 50 extension effect is 6.19 trillion Kwon. The weight of this extension effect in total value added is 1.08% and the weight this effect carries in value added by labor is 2.35%.

Second, in the case of retirement at age 55, the value added by labor created by current workers and retired workers was calculated at 260.26 trillion Kwon. In this case, the value added by labor contributed by workers under extended retirement conditions at the age of 55 in their current careers was calculated at 3.01 trillion Kwon. The weight of the age 55 extension effect in total value added is 0.52%, and its weight carried in value added by labor is 1.14%.

Third, in the case of a retirement age of 60, the value added by the labor created by current workers and retired workers is 262.02 trillion Kwon. However, the value added by labor contributed by the workers under extended retirement conditions at the age of 60 in their current careers is 1.24 trillion Kwon. The weight of the effect of the extension to age 60 relative to the total value added is 0.22%, and its weight carried in value added by labor is 0.47%.

Next, in the calculation results for Case 2 (overall mean value), for a retirement age of 55, the effect of value added by labor is 1.02 trillion Kwon, which corresponds to 0.29% of the value added by labor and 0.18% of the total value added. Generally, in most cases, workers retired at 55. Here, the age 55 extension effect is appropriate.

In summary, from the perspective of a retirement age of 55, for both Cases 1 and 2, the extension of mandatory retirement age from 55 exerts a value added effect ranging from a minimum of 1.02 trillion Kwon to a maximum of 3.01 trillion Kwon. The value added effect of industry is shown in Table 4.

Table 4

Value Added Effect of Mandatory Retirement Age Extension in Sectors (Case 1) Unit: billion Kwon, %

Sector	Total value added (a)	Labor value added (b)	Labor value added: retirement			Labor value added: extension		
			retirement age 50 (c)	retirement age 55 (d)	retirement age 60 (e)	extension age 50 f= b-c	extension age 55 g= b-d	extension age 60 h= b-e
1	15,962	4,574	4,467	4,527	4,555	107	47	19
2	13,926	7,823	7,637	7,732	7,785	186	90	37
3	4,230	1,793	1,755	1,777	1,786	38	16	7
4	3,341	2,210	2,166	2,191	2,204	44	19	7
5	17,427	1,311	1,290	1,301	1,307	21	9	4
6	21,790	8,600	8,392	8,497	8,561	209	103	40
7	5,832	2,710	2,655	2,686	2,700	55	24	10
8	12,169	4,038	3,949	4,000	4,024	89	38	15
9	20,486	10,843	10,572	10,712	10,788	271	131	55
10	38,906	12,870	12,629	12,771	12,832	241	99	38
11	1,747	969	945	958	965	24	11	5
12	17,876	9,039	8,849	8,957	9,010	190	82	29
13	3,402	1,850	1,803	1,828	1,840	47	22	10
14	14,359	2,435	2,382	2,410	2,431	53	24	4
15	43,639	26,660	25,749	26,209	26,470	911	451	190
16	44,011	18,333	18,110	18,201	18,264	222	132	69
17	16,658	9,771	9,556	9,669	9,722	214	101	48
18	21,345	12,509	12,166	12,374	12,474	342	135	35
19	19,815	7,170	7,084	7,148	7,162	85	22	7
20	43,628	24,937	24,533	24,748	24,863	404	189	74
21	53,842	3,167	3,052	3,082	3,117	116	85	50
22	44,095	19,252	18,825	18,970	19,102	428	282	150
23	62,602	50,095	48,579	49,398	49,838	1,516	697	257
24	15,961	11,848	11,730	11,791	11,827	119	58	21
25	6,524	3,379	3,326	3,360	3,372	53	19	7
26	10,494	5,084	4,882	4,960	5,027	202	124	57
Total	574,066	263,270	257,085	260,260	262,026	6,186	3,010	1,244
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
% to Labor value added						2.35	1.14	0.47
						(f/b)	(g/b)	(h/b)
% to Total value added						1.08	0.52	0.22
						(f/a)	(g/a)	(h/a)

If the mandatory retirement age is extended beyond 55, in Case 1, the industry that receives the biggest value added effects are the public administration and education services industries. The result of this is that more workers continue to work after the age of 55 relative to other industries, or that the wage level of workers over the age of 55 is higher relative to other industries, or that the decline in the productivity of these workers is less profound. Additionally, the decline in labor productivity following retirement tends to be greater for workers in this industry in comparison to others. Furthermore, workers in these industries will be relatively advantaged in a scenario in which the mandatory retirement age is extended.

The rankings are as follows: construction (911 billion Kwon), business services (42.8 billion Kwon), real estate and leasing (40.4 billion Kwon), metal products & general machinery (27.1 billion Kwon), electrical and electronic devices (24.1 billion Kwon), and chemical products (20.9 billion Kwon). According to the above results, the value-added effect of the extension of the mandatory retirement age is relatively higher in most of the service industries, and relatively lower in the manufacturing industries. This indicates that workers who retire after the age of 55 work in the service industry rather than being reemployed in the manufacturing industry. In the case of Case 2, the value-added effect by industry was similar to that of Case 1.

Table 5

Value Added Effect of Mandatory Retirement Age Extension in Sectors (Case 2) Unit: Billion Kwon, %

		Total value added (a)	Labor value added (b)	Labor value added: retirement			Labor value added: extension		
				retirement age 50 (c)	retirement age 55 (d)	retirement age 60 (e)	extension age 50 f= b-c	extension age 55 g= b-d	extension age 60 h= b-e
1	Foods, beverages and Tobacco	15,962	4,574	4,558	4,566	4,571	16	8	3
2	Fiber, wearing and Leather products	13,926	7,823	7,795	7,808	7,816	28	15	6
3	Wood, paper products	4,230	1,793	1,787	1,790	1,792	6	3	1
4	Printing, publishing and Duplication	3,341	2,210	2,204	2,207	2,209	7	3	1
5	Petroleum and Coal products	17,427	1,311	1,307	1,309	1,310	3	2	1
6	Organic basic chemical products	21,790	8,600	8,569	8,583	8,594	32	17	7
7	Nonmetallic mineral products	5,832	2,710	2,702	2,706	2,708	8	4	2
8	Primary iron and Steel products	12,169	4,038	4,025	4,032	4,036	13	6	3
9	Fabricated metal and General machinery	20,486	10,843	10,802	10,821	10,833	41	22	9
10	Electronic, electric equipment	38,906	12,870	12,834	12,854	12,864	36	16	7
11	Precision instruments	1,747	969	965	967	968	4	2	1
12	Transportation equipments and Parts	17,876	9,039	9,011	9,026	9,034	28	14	5
13	Furniture and Other manufacturing products	3,402	1,850	1,843	1,846	1,848	7	4	2
14	Electric services, gas and Water supply	14,359	2,435	2,411	2,425	2,433	23	10	2
15	Construction	43,639	26,660	26,263	26,484	26,590	397	176	70
16	Trade	44,011	18,333	18,238	18,282	18,307	94	51	25
17	Foods service and Hotel	16,658	9,771	9,677	9,731	9,753	94	39	18
18	Transportation and Warehousing	21,345	12,509	12,355	12,455	12,496	153	54	13
19	Communications and Broadcasting	19,815	7,170	7,130	7,161	7,167	39	8	3
20	Finance and Insurance	43,628	24,937	24,759	24,863	24,910	177	74	27
21	Real estate	53,842	3,167	3,120	3,134	3,149	47	33	18
22	Business services	44,095	19,252	19,073	19,143	19,197	179	109	55
23	Public administration and Education	62,602	50,095	49,427	49,821	50,001	668	274	94
24	Health and Social service	15,961	11,848	11,796	11,826	11,841	52	23	8
25	Culture, entertainment	6,524	3,379	3,355	3,371	3,376	24	7	2
26	Other social services and Non-classifiable activities	10,494	5,084	4,999	5,036	5,063	86	48	21
Total		574,066 (a)	263,270 (b)	261,006 (c)	262,248 (d)	262,868 (e)	2,264 (f)	1,022 (g)	403 (h)
% to Labor value added							0.86	0.39	0.15
							(f/b)	(g/b)	(h/b)
% to Total value added							0.39	0.18	0.07
							(f/a)	(g/a)	(h/a)

Conclusion and Policy Suggestions

This study assessed the value-added effect of the labor productivity due to the implementation of an extended mandatory retirement age, in order to evaluate the economic ripple effect (indirect effect) of the mandatory retirement age extension system via inter-industry analysis. For instance, a certain age was established as the mandatory retirement age; after assessing the current labor productivity and the labor productivity after retirement, the non-reduction of labor productivity owing to the extension of the mandatory retirement age was converted into value added.

According to the results of this study's empirical results, labor productivity in the current career reached the peak in the workers' late 30s, and declined as workers moved into their 40s and 50s. This degree of decline was higher in the manufacturing industry than in the service industry. For instance, the labor productivity of the manufacturing industry in Case 1, measured on a scale of 100, was as follows: 94.03 for workers in their 30s, 87.04 for those in their 40s, and after a gradual decline 49.71 for those over 60. Meanwhile, the labor productivity of the service industry was 94.8 in the 30s, 88.5 in the 40s, and after a gradual decline dropped to 54.8 for workers over 60. The decline in the margin of labor productivity for the service industry was relatively smaller than that of the manufacturing industry. In the case in which an Age Discrimination in Employment system was applied at the age of 55, the value-added effect of this system would be, at minimum, 1.27 billion dollars, and at maximum, 3.2542 billion dollars annually.

The economic ripple effect of the extension of estimated mandatory retirement age is rather immense. As the social benefits of the extension of mandatory retirement age are so huge, the government should take great care in calibrating the associated regulations. Additionally, the extension of the retirement age should begin with the service sector, in order to minimize the loss of productivity. Despite the huge social benefits that can be derived from the legal extension of the retirement age, employers may often be antagonistic to the extension of retirement age; this is particularly true in corporations experiencing personnel backlogs and suffering from heavy personnel costs due to their high percentage of over-50 workers, who are also generally more likely to employ the mandatory retirement system as a means of employment adjustment. Additionally, companies suffering from high personnel costs for longtime employees due to their implementation of a seniority-based salary system also tend to strongly oppose efforts to extend the legal limit of the mandatory retirement age.

In order to assuage corporate concerns, the social benefits anticipated to derive from the extension of retirement age may help finance employers' cost burdens. First, policy efforts toward wage flexibility should be kept ahead of the retirement age extension. Korean wage structures, including seniority-based wage payments, render unnecessary a careful accounting of workers' job performance; in return, workers are not generally incentivized to augment their job skills. Corporations hire new recruits on the basis of their educational backgrounds and job types: for example, in ordinary office work for college graduates, general office work, and production, college graduates assigned to office work are promoted in accordance with fixed positional tracks. Under these circumstances, the mandatory retirement age is likely to be available as a means of adjusting employment within a closed internal labor market structure, where the workers' separations are less likely. Therefore, wage levels based on labor productivity followed by the extension of the mandatory retirement age should bring about benefits for the national economy. In order to encourage employment among aged workers, wage levels based on productivity must be maintained in the labor market in order to establish an institutional device capable of naturally reflecting supply and demand for labor. The Japanese-style wage peak system, in which wages are frozen or cut for older workers, can be balanced by judicious extensions of the retirement age.

This study involves the general limitations of an input-output model. For example, the study considers the input coefficient to be fixed, assumes maintenance of full employment, and does not consider the displacement effect or substitution effect that may derive from the continuous employment of aged workers with extensions of the mandatory retirement age. This study excludes any considerations of the possible reduction effect of the employment of other age groups, such as younger workers, due to the employment of older workers occurring as the consequence of labor market imbalance.

References

Berzinskiene, D. (2005). Model of Population Employment Estimation. *Inzinerine Ekonomika-Engineering Economics*(4), 43-49.

Han, X. (1995). Structural change and labor requirement of the Japanese economy. *Economic Systems Research* 7, 47-65.

Cho, Joonmo. (2004). Flexibility, Instability and Institutional Instability in the Korean Labor Market. *Journal of Policy Modelling* 26, 315-351.

Cho, Joonmo. (2005). Human Resource Management, Corporate Governance structure and Corporate Performance in Korea: A Comparative Analysis of Japan, U.S. and Korea. *Japan and World Economy* 17, 417-430.

Joonmo, Cho., & Sungwoong, K. (2005). On using Mandatory Retirement System to reduce Wokforce in Korea. *International Economic Journal* 19, 283-303.

Joonmo, Cho. (2007). International Comparison of Retirement: Korean Labor Institute.

Joonmo, Cho., & Jaeho, K. (2009). Dualism in Job Stability of the Korean Labour Market: The Impact of the 1997 Financial Crisis. *Pacific Economic Review* 14, 155-175.

Lassila, J., & Valkonen, T., (2002). Retirement Age Policies and Demographic Uncertainty in Lituania: A Dynamic CGE Analysis. Workshop on Welfare and the Labour Market in the EU.

Korean Labor Institute. (2007). Survey on Korean Collective Agreements: Korean Labor Institute.

Libby Brooke. (2003). Human resource costs and benefits of maintaining a mature-age workforce. *International Journal of Manpower* 24, 260-283.

Shannon, M., & Grierson, D. (2004). Mandatory retirement and older worker employment. *Canadian Journal of Economics* 37, 528 - 551.

McNaught, W., & Barth, M.C. (1992). Are older workers "good buys?". a case study of Days Inns of America.

Anderson, M., Yaojun, Li, Bechhofer, F., McCrone, D., & Stewart, R. (2000).Sooner rather than later? Younger and middle-aged adults preparing for retirement. *Ageing & Society* 20, 445-466.

Martens, O., & Pukeliene, V. (2007). Recent Trends of the Lithuanian Labour Market and Their Managerial Implications. *Taikomoji Ekonomika, Sisteminiai Tyrimai*, 1(1), 115-128.

Cesyniene, R. (2005). The Most Recent Trends and Emerging Values in Human Resource Management: Comparative Analysis. *Inzinerine Ekonomika-Engineering Economics* 4(44), 50-55.

Clark, R. L., & Gehent, L. S. (2008). Mandatory Retirement and Faculty Retirement Decisions. *Industrial Relations* 47, 153-163.

Luis, R. A., & Wolff, E. N. (1996). Productivity Growth, Import Leakage and Employment Growth in Puerto Rico. *Economic Systems Research*, 8, 391-413.

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Darbo našumo pridėtinės vertės efektas didinant privalomą pensijų amžių: Korėjos pavyzdys

Santrauka

Mažėjant darbingumui ir didėjant amžiaus trukmei, Korėja tampa senstančios visuomenės šalimi. Sparčiai daugėja vyresnių kaip 65 metai žmonių. Mažėja jaunų 20 metų amžiaus žmonių. Manoma, kad korėjiečių, kurių amžius – 50–64 metai, daugės. Didės ir vyresnių žmonių poreikis dirbti, nes trūksta pensijinio amžiaus pertvarkymo nutarimų ir kitų socialinių saugumo priemonių atnaujinimo. Sparčiai plėtojantis medicinos technologijų ir sveikatos sritims pensinis amžius didėja (tai lemia šių sričių pasiekimai) ir vyresnio amžiaus žmonės pradeda aktyviau dalyvauti darbinėje veikloje. Svarbi problema, susijusi su visuomenės senėjimu, yra privalomas pensijų sistemos tobulinimas. Korėjos darbdaviai daug metų bandė pakeisti šią sistemą. Laikoma, kad privalomas 55 metų pensinis amžius yra per mažas, nes tokio amžiaus žmonės dar pakankamai darbingi. Toks požiūris vyrauja daugelyje šalių, tarp jų ir moderniojoje Korėjoje.

Privaloma pensijų sistema Korėjoje remiasi įdarbinimo sutartimi, kuriose neatsižvelgiama į darbuotojų sugebėjimus ir norą tęsti darbą po to, kai sulaukiama reikiamo pensinio amžiaus. Pagal Korėjos darbo nuostatas kompanijos parengia darbo reikalavimus arba kolektyvines sutartis. Jeigu darbo sutartyje tiksliai neapibrėžiamas darbinis amžius, 55 metai jau yra pensinis amžius.

Korėjoje privalomas pensinis amžius – 55 metai – priimtas 1970 m. Tuo metu 55 metai buvo visai realus išėjimo į pensiją amžius, nes senėjimo amžiaus riba buvo žemesnė. Tačiau privaloma pensinio amžiaus riba Korėjoje, kurioje neatsižvelgiama į darbuotojo gebėjimus ir galimybes dirbti, skiriasi nuo pensijų sistemos JAV, kurioje pensinis amžius griežtai apibrėžtas Amžiaus diskriminavimo ir įdarbinimo akte. Tą patį galima pasakyti ir apie Europos valstybėse galiojančias sistemas, pagal kurias, sudarant tam tikras sutartis draudžiama diskriminuoti pensinio amžiaus žmones. Japonijos privalomo pensinio amžiaus sistema yra panaši į Korėjos sistemą, tačiau net ir Japonijoje pagal įstatymus draudžiama išleisti žmones į pensiją nesulaukus 65 metų. Korėjoje ankstyvas išėjimas į pensiją nėra draudžiamas.

Korėjos vyriausybė nustatė teisinę svarbą, pagal kurią išplečiama pensinio amžiaus riba, leidžianti įdarbinti ir vyresnio amžiaus žmones. Šiame straipsnyje, atlikus empirinius tyrimus grindžiamas darbo našumo pridėtinės vertės efektas išplečiant privalomą pensinį amžių. Tyrimas remiasi pramonės šalių analize, kuri aiškiai parodo ekonominę šių pakitimų naudą. Skirtingose pramonės srityse buvo nustatytas tam tikras amžius kaip privalomas pensinis amžius, todėl, atlikus analizę, buvo galima palyginti pensinio amžiaus padidinimo pranašumus ir pridėtinės vertės efektą.

Tyrimai parodė, kad didžiausia karjera paprastai pasiekiama apie 30 metus, o apie 40 ir 50 metus darbingumas mažėja. Tai akivaizdžiau pramonės srityse negu aptarnavimo sferoje. Darbo našumas pramonės srityse buvo toks: 94,03 – 30 metų amžiaus darbuotojų; 87,04 – 40 metų amžiaus darbuotojų ir 49,71 – 60 metų amžiaus darbuotojų. Aptarnavimo srityse darbo našumo rodikliai buvo tokie: 94,8 – 30 metų amžiaus darbuotojų; 88,5 – 40 metų amžiaus darbuotojų; 54,8 – 60 metų amžiaus darbuotojų.

Ekonominė pensinio amžiaus didinimo ribos nauda yra didžiulė. Tą patį galima pasakyti ir apie socialinę naudą, todėl Korėjos vyriausybė turėtų rimtai svarstyti pensinio amžiaus didinimo ribos problemą. Pensinį amžių reikėtų pradėti didinti aptarnavimo sektoriuje. Tai padėtų iki minimumo sumažinti gamybinius nuostolius.

Nepaisant pensinio amžiaus teisinio didinimo socialinės naudos, kai kurios darbdavių grupės prieštaravo tam požiūriui. Jam ypač nepritarė korporacijos, kurios turėjo įvairių sunkumų. Kai kurios iš jų manė, kad darbuotojai, kurie turėjo per 50 metų yra pensinio amžiaus. Tos korporacijos, be abejo, remia privalomo pensinio amžiaus sistemos įgyvendinimą. Tam nepritaria ir kompanijos, kuriose dirba daug vyresnio amžiaus darbuotojų. Tokių kompanijų vadovams sunku rasti sprendimą dėl privalomo pensinio amžiaus nustatymo.

Daugelis pavyzdžių rodo, jog Korėjoje būtina įvesti lanksčią pensinio amžiaus sistemą, kad būtų galima apsispręsti tiek darbdaviams, tiek darbuotojams. Korporacijos samdo naujus darbuotojus pagal jų išsilavinimo laipsnį. Privalomas pensinis amžius turėtų būti įvestas kaip priemonė įvairiems darbo rinkos poreikiams suderinti. Daugelis problemų būtų sprendžiamos esant skirtingiems atlyginimų lygiams, kuriuos galėtų kontroliuoti pensinio amžiaus ilginimo politika, naudinga nacionalinei ekonomikai. Skatinant vyresnio amžiaus žmonių įdarbinimo galimybes, atlyginimų lygiai turėtų būti taikomi darbo rinkoje, nes tai padėtų sukurti institucinius mechanizmus reguliuojant darbo jėgos pasiūlą ir paklausą.

Šis tyrimas apima ir daugelį apribojimų, kurie paprastai atsispindi panašiuose modeliuose. Šiame tyrime įdėjimų koeficientas yra pastovus dydis ir susijęs su visu įdarbinimu, o darbuotojų perkėlimo arba pakeitimo atvejai ir jų įtaka nėra nagrinėjama. Be abejo, tokia įtaka akivaizdi nuolat įdarbinant pagyvenusius žmones. Šiame tyrime neaptariamas ir kitų amžiaus grupių įdarbinimo poveikis, pvz., jaunesnių darbuotojų pasirinkimo problema esant didesnėms galimybėms įdarbinti vyresnio amžiaus žmones pagal padidinto pensinio amžiaus ribas.

Raktažodžiai: *privalomo pensinio amžiaus padidinimas, ekonominis efektas, amžiaus diskriminacija įdarbinant, darbo našumo funkcija, aukščiausio atlyginimo sistema.*

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