

# The Causes of Early Retirement: Social Security Generosity or Population Aging

Chong-Bum An <sup>a\*</sup> and Ji Un Jung <sup>b</sup>

<sup>a</sup> Sungkyunkwan University, Seoul, Korea

<sup>b</sup> Sungkyunkwan University, Seoul, Korea

## Abstract

Responding to the acceleration of early retirement tendency and the fall of the labor force participation rate, most OECD countries have introduced various policy measures of reducing the generosity of social security system. This paper attempts to distinguish the effects of institutional factor like the generosity of the pension policy and environment factor like rapid population aging. Using the 1969-2005 OECD countries data, we analyze the macroeconomic effects of the changes in pension policy and aging on retirement. The result shows that early retirement can be explained more by the population aging than the social security generosity.

*Key words:* Early Retirement, Social Security Generosity, Population Aging

*JEL classifications:* H3, H5, J2

## I. Introduction

Further decreases in labor force participation rate of the elderly and early retirements are recognized as global trends with advancement of aging society. The participation rate of those aged over 65 years was 20.29 % on average among OECD nations in 1963 and it fell by

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\* Corresponding author, Tel: +82-2-760-0435, Fax: +82-765-8138, E-Mail: [cban@skku.edu](mailto:cban@skku.edu)

50% to reach 11.12% in 2004, whereas the population of those 65 and older have increased around 65% for the last four decades from 13.11% to 20.79%. Early retirements are also verified by decreases in average retirement age of each nation.

In such regards that early retirements have been intensified mostly in advanced countries, analysis on the causes and extensive studies on policy proposals have been undertaken. A large number of such studies have concluded that too much generosity of pension system is the major reason behind, which initiated various reforms of pension systems afterwards. Benefit rates thought to be high were cut, while contribution rates were raised. Other various reforms have been taken to induce more work: penalty application to curb early retirement, more credits for delayed retirement, and elevated age levels for full retirement.

This paper points out that many studies have failed to distinguish institutional causes from environmental ones in their analyses on causes of early retirement. In other words, by not separating an environmental factor, ‘population aging’, from generous pension system, which is an institutional cause, they have focused only on pension systems to suspend early retirement. Rapid advancement of graying societies has resulted in excessive older labor forces, which might act as one of the main causes for early retirement. However, as ignoring the aging factor, they only tried to correct generosity of the system. Therefore, it is necessary to disentangle the institutional cause of generous pension systems from the environmental cause of rapid aging, and to anew the analyses of early retirement of major OECD members.

In order to separate two such different causes, we use panel data between 1969 and 2005 of OECD nations. In particular, social security wealth shall be calculated to reflect pension systems of each nation more accurately in specific years in order to identify generosity of the systems. By observing labor demand, labor supply and change in pension policy as three factors to decide labor force participation of middle-old ages, we attempt to analyze macroeconomic effects of aging and change of pension policy.

## **II. Early Retirement and Pension Reform of OECD Nations**

### **1. Population Aging and Early Retirement of OECD Nations**

As society grows old, falling labor force participation rate of middle-old ages and early retirement in OECD nations have been recognized globally. The Table 1 shows percentage of the population aged over 65 and their labor participation rate of each OECD country between 1963 and 2004. Portion of people aged 65 years and more indicates aging of a society, while the labor participation rate of the age group does for early retirement trends. Between 1963 and 2004, the rate of people over 65 years old have increased about 65%, from 13.11% to 20.29%, and the participation rate has declined by 50% from 22.06% to 11.12%.

**Table 1. Labor Force Participation Rate and Proportion of the Elderly over 65  
Years of OECD**

	percentage	
	65+ LFP	Share of Elderly over 65
1965	21.8	13.1
1970	15.9	15.6
1975	13.0	16.7
1980	12.0	17.1
1985	9.9	17.8
1990	10.3	17.8
1991	11.0	17.2
1992	11.3	17.3
1993	11.0	17.7
1994	11.1	17.9
1995	10.8	18.5
1996	10.8	18.8
1997	11.0	19.0
1998	11.0	19.1
1999	11.0	19.3
2000	11.0	19.4
2001	11.0	19.7
2002	11.0	19.8
2003	11.0	20.0
2004	11.1	20.3

Source: OECD statistics

## 2. Efforts of Weakening the Early Retirement Trend through Pension Reforms

Each OECD country has come up with policy measures as labor force participation rate has dropped. Such measures mainly targeted at improving their pension system and have led to pension reforms in preparation for financial shortages as aging advances (Table 2).

**Table 2. Classifications: Pension Reforms of OECD in Aging Society**

Policy Option	Countries
Increasing the Eligible Age	- Increasing Eligible Age (only female) Australia, U.K., etc  - Increasing Eligible Age (male/ female)  11 countries: Italy, U.S. etc.
Reinforcement for ER Penalty, DR Credit	- 10 countries: France, Germany, Italy, U.K., etc.
Reinforcement for voluntary early retirement- condition before mandatory retirement age	9 countries: France, Germany, etc.
Decreasing accrual rates	- Austria, Japan, etc.

There are three main measures to suspend early retirement; first, elevating Early Retirement Age (ERA) and Normal Retirement Age (NRA); second, deduction of pension benefits in case income levels from new employment are above certain level, as adjusted by Retirement Earnings Test (RET)<sup>1</sup>; and third, intensifying Early Retirement Penalty (ERP) or increased Delayed Retirement Credit (DRC). The next Table 3 is a qualification for old-age pension of OECD countries and a comparison of FRA and ERA.

<sup>1</sup> Two effects are expected: first, existence and strong RET might delay retirement period (A); second, RET has no effect on retirement period but reduce possibilities of labor market participation after retirement or lower the level of labor supply (B). In case of A>B, early retirement can be curbed with strong RET, while for A<B, more retiree labor force participation could be promoted with eased RET.

**Table 3. Normal Retirement for Pension Benefits and Early Retirement Age of OECD**

	Male								Female			
	Early Retirement Age				Normal Retirement Age				Normal Retirement Age			
	1969	1979	1989	2003	1969	1979	1989	2003	1969	1979	1989	2003
Australia	-	-	-	55	65	65	65	65	60	60	60	62.5
Austria	-	-	-	-	65	65	65	65	60	60	60	60
Belgium	60	60	60	60	65	65	65	65	60	60	60	63
Canada	-	-	60	60	66	65	65	65	66	65	65	65
Czech	-	-	-	58.5	-	-	-	61.5	-	-	-	59.5
Denmark	-	-	-	-	67	67	67	65	67	67	67	65
Finland	-	-	60	62	65	65	65	65	65	65	65	65
France	60	60	-	-	65	65	60	60	65	65	60	60
Germany	-	63	63	63	65	65	65	65	65	65	65	65
Greece	-	-	60	60	60	60	65	65	55	55	60	65
Hungary	-	-	-	-	-	-	60	62	-	-	55	62
Iceland	-	-	-	65	67	67	67	67	-	-	-	67
Ireland	-	65	65	65	70	66	66	66	70	66	66	66
Italy	55	55	55	57	60	60	60	65	55	55	55	65
Japan	60	60	60	60	65	65	65	65	65	65	65	65
Korea	-	-	-	55	-	-	60	60	-	-	60	60
Luxembourg	62	62	60	60	65	65	65	65	62	60	65	65
Mexico	-	-	-	-	-	65	65	65	-	65	65	65
Netherland	-	62	60	60	65	65	65	65	65	65	65	65
Norway	-	-	-	-	70	67	67	67	70	67	67	67
New Zealand	60	-	-	-	65	60	60	65	65	60	60	65
Portugal	-	-	-	55	65	65	65	65	65	62	62	65
Slovak	-	-	-	-	-	-	-	60	-	-	-	57
Spain	-	60	60	60	65	65	65	65	55	65	65	65
Sweden	63	60	60	61	67	65	65	65	67	65	65	65
Switzerland	-	-	-	63	65	65	65	65	62	62	62	63
Turkey	60	-	-	-	65	55	55	60	55	50	50	55
U.K.	-	-	-	-	65	65	65	65	60	60	60	60
United States	62	62	62	62	65	65	65	65	65	65	65	65

Source: "THE LABOUR FORCE PARTICIPATION OF OLDER WORKERS- The effects of pension and early retirement schemes", OECD Economics Department, May 2004.

The Table 4 is about penalties and credits for retirement. In case of the US and Canada, penalties for early retirement and credits for delayed retirement are provided at the same rate year-around. On the other hand, Germany applies fewer penalties to early retirement than credits for delayed retirement. While Canada's rates of annual early retirement penalties and delayed retirement credits are both 6%, those of Germany are 3% and 5%, respectively, being more generous in penalties but giving less credit incentives.

**Table 4. Penalties and Credits for Retirement of Each Nation**

	Eligible Year	Penalty/ Benefit
U.S	Early Retirement Penalty	Before age 62: -7.5% (per year)
	Delayed Retirement Credit	After age 67: +7.5% (per year)
Canada	Early Retirement Penalty	Age 60-65: -0.5% (per month)
	Delayed Retirement Credit	Age 65-75: +0.5% (per month)
Germany		Before age 65: -0.003 for full entry
	Early Retirement Penalty	factor(1.0)
		After age 65: -0.005 for full entry
	Delayed Retirement Credit	factor(1.0)

주) Social Security Programs throughout the World: Europe, 2002

Social Security Programs throughout the World: the Americas, 2003

[www.socialsecurity.gov](http://www.socialsecurity.gov)

### III. Existing Studies on Causes of Early Retirement

As most members of OECD have witnessed intensified early retirement, analysis on the causes and extensive studies on policy proposals have been underway. Nevertheless, most

studies concluded that too much generosity of pension system has lead to early retirement, which acted as a starting point to various forms of pension reform. Such studies are categorized into macroeconomic and microeconomic analyses.

## **1. Macroeconomic Studies**

Following studies are based on aggregate data: Pechman et al. (1968) use samples of aggregate data of 19 countries in 1960 to estimate OLS and showed labor participation rate is disproportional to retirement wages; Feldstein (1977) estimates OLS from labor market participation rate of those above 65 years and their average wages per income, based aggregate data of 12 countries between 1954 and 1960 to conclude that higher retirement rates arise out of higher wage levels; Modigliani and Sterling (1983) analyze data between 1960 and 1970 of 21 OECD member nations to show social security system has a great influence on retirement.

Altmann (1981) suggests pension is not in sync with average wages of men aged between 55 and 64, and although as pension level increases, labor participation rate of those more than 65 years old decreases, it is difficult to judge the influence in all cases.

In addition, studies of Hurd (1990) and Ruhm (1995) show how social security systems acts on labor participation patterns for each age level and conclude that retirement rates skyrocket around the age of 62. Hurd (1990) adds such patterns are influenced only by social security wealth with no other institutional or economical causes. Blau (1994) indicates, based on quarterly data of the US, men remain at the labor market for three more months after their 65<sup>th</sup> birthday and the hazard rate of them during the period is 2.5 times higher than other times.

## **2. Microeconomic Studies**

Microeconomic studies use micro data like household surveys to analyze behavior patterns of each respondent from their choice in each policy alternatives<sup>2</sup>. Lee (1974) and Ann (1991) take conversion recurrence analysis to find that social security system has positive influences on retirement decisions and working hours before retirement, and especially

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<sup>2</sup> We mainly presents with literature on policy effects.

decisions for early retirement increase working hours prior to retirement. Moreover, Ann (1993) analyzed effects of the social security system in time for decision-making of retirement timing and working hours. As a result, it turns out that labor force supplies are higher among early retirees than delayed ones before retirement, but there are more delayed retirees than early ones after retirement. In addition, studies on possibilities of different working hours before and after retirement decisions show if there is any disincentive for retired workers, including reduced social security benefits, labor before retirement increases while it decreases after retirement.

Gruber and Coile (2000, 2002) analyze, using Health and Retirement Survey (HRS), incentives of social security for continued labor of the elderly in the US. They identified labor incentives by calculating social security benefits that each age group between 1980 and 1997 could earn through additional labor into today's value. The result suggests that male laborers aged between 55 and 61 have less tax burden for their work, have almost zero tax when they're 62 to 64, while those between 65 and 69 burden larger taxes if they work. Such implicit tax, therefore, acts as a disincentive for American men who continue to work after normal retirement age at 65.

Mitchell and Phillips (2002), from their analysis on how cuts or removal of early retirement benefits act on life cycle wealth and retirement pathways, find that reduced early retirement benefits have minimal effects on the percentage of early retirement. On the other hand, Gustman and Steinmeire (2002) investigate patterns of early retirement through structural dynamic stochastic model. It turns out that annual benefits received until the age of normal retirement has more aggravated losses than annual retirement interests, and since additional wages received for delayed retirement are insufficient, there arises more urge to retire early. In addition, their studies show if early retirement age limits are raised to 64 years, normal retirement rates double.

Panis et al. (2002) experiments effects from policy changes, such as elevated early retirement age and normal retirement age and 12% more charges on early retirement penalties. The results indicate unless early retirement age changes, adjustments in normal retirement age and early retirement penalties have little influence. Such results are similar what Mitchell and Phillips (2002) suggest: a monthly penalty increase by 1% leads to 16% reduction in retirement

benefits to be received at the age of 62, but the impacts too small to raise labor force participation rate.

On the basis of option value model of Stock and Wise (1988a, 1988b, 1990), Gruber and Wise (2004) carry out international comparison studies among 12 countries<sup>3</sup> of OECD with policy options like regular reforms and change of eligible age limits. The results suggest all countries show reduced male labor forces aged between 56 and 65 when the eligible age is extended for three years, and Italy in particular marks 23% to 36% cuts in the labor forces of the age group.

#### **IV. A New Attempt to Analyze Causes of Early Retirement**

##### **1. A New Frame for Analysing the Causes of Early Retirement: Generous Social Security System and Aging**

This paper emphasizes the need to separate the institutional cause from the environmental one: generous pension system from rapid aging. First, we estimate expected social security wealth to identify generosity of the pension system as an institutional cause. As the first attempt in the relevant studies to estimate expected social security wealth of each member nation from 1969 to 2005, it serves as a model to track changes of pension systems for each nation and year. It is significant to summarize complex changes of pension systems as changes of generosity and compare them as an index to understand pension systems. Studies so far have used such parameters as contribution rate, income replacement rate, and normal retirement age to represent generosity of pension programs. However, this paper points out analyses on the effects of each parameter's change in early retirement have neglected that early retirement is the result of interactions of each parameter. Therefore, our goal is to estimate expected social security wealth to identify nonlinear effects by mutual actions of parameters.

##### **2. Assumptions to Estimate Social Security Wealth**

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<sup>3</sup> Netherlands, Denmark, Germany, US, Belgium, Sweden, Spain, Italy, Britain, Japan, France and Canada

In order to measure generosity of the social security system, social security wealth clearly reflecting changes of each pension program of OECD nations needs to be estimated. First, a representative worker with an average wage should be selected for every nation and year, and when yearly wage inflation is controlled, more accurate generosity of pension system or social security wealth that considers changes of pension system only can be estimated. Nevertheless, if contribution and benefit rates are applied flat, analysis shall be limited. Therefore, to overcome such limits, this paper assumes wage calculations in two steps. One is to consider an average wage of manufacture workers by the report of OECD (2005) as the wage of each representative for every nation, while yearly wage changes until 1969 shall be calculated as nominal wage growth rate (A). Then, an average nominal wage growth rate (A) shall be applied for each year. Since nominal wage grows at a fixed rate for every year, changes of social security wealth from wage growth can be controlled at certain rates.

Second, it is necessary to control contribution period for benefit entitlement for an average worker of each nation and year. This study, for the purpose of generosity calculation, has presumed that a representative worker (average wage earner) buys a pension policy for the next 20 years, contributes to it and receives full pension in each year. In addition, considering an average contribution periods and years of OECD members, the year to buy a policy that guarantees appropriate benefits to the level of full pension shall be assumed.

Third, estimates of social security wealth that reflect generosity of the system can be reached by comparing the amount of contribution and the present value of pension to be received until expected years. That is how indexation rule (0%) and discount rates (2%) are presumed, for expected contributions from each year as a present day to the time of retirement, and for benefits to be received at the retirement and afterwards. In the future, using such indexation rule of each OECD nation, social security wealth could be estimated.

Social Security wealth of OECD countries are calculated from contributions and benefits for each parameter and changes of pension system, and the present value of contributions is determined by the length of periods from pension buying until retirement, while that of benefits to be received after retirement is set at the time of pension buying.

### **3. Variables**

LFP (Labor Force Participation) refers to an index indicating labor participation rate of the elderly that shows early retirement and separation from the labor market. For analysis, this paper uses LFP of those over 65 years old in 22 OECD nations between 1969 and 2005 as provided by OECD statistics. The labor force participation rate of the elderly aged 65 and more is calculated out of total population of 65-year olds.

UR (Unemployment Rate) as it reflects economic cycle, refers to the unemployment rates of 22 OECD countries between 1969 and 2005 that are provided by OECD statistics. SE (Share of Population by Elderly) as a population aging variable, refers to the rate of the elderly over 65 years old from each population of 26 OECD members. We use the data between 1969 and 2005 from World Development Indicator (WDI) of World Bank.

SSW (Social Security Wealth) is the rate of yearly expected social security wealth for each nation as compared to the average wage in 2005. Such wealth denominated in each currency should be unified for a correct analysis, but such measure would include exchange rate effects and therefore not appropriate for the purpose of the paper. Instead, we use weight (A/B) of social security wealth (A) for each year per the 2005 average wage (B) provided by OECD (2005) as a variable. The Table 6 is an average of variables used for analysis for each nation from 1969 to 2005.

**Table 5. Variables**

Variables	Description	Unit
LFP	65+ Labor Force Participation	%
UR	Unemployment Rate	%
SE	Share of Elderly	%
SSW	Expected Social Security Wealth	%
ER	Probabilities of Early Retirement	1 or 0
DRC	Delayed Retirement Credit	1 or 0

**Table 6. Summary Statistics**

Unit: %, age

	SSW	Average LFP	Average UR	Average SE	Average life expectancy
Austria	0.90	2.89	4.09	14.92	74.17
Belgium	0.65	8.83	8.83	14.91	74.63
Canada	1.31	7.08	8.79	10.58	76.15
Czech	1.94	4.68	6.51	13.06	71.85
Denmark	0.13	4.68	6.51	13.06	71.85
Finland	2.29	5.29	6.79	14.46	74.84
France	1.48	4.65	7.93	14.22	74.38
Greece	1.21	7.34	8.92	13.75	75.40
Hungary	0.82	3.06	8.11	13.85	69.91
Italy	3.43	4.15	8.67	14.41	76.54
Japan	0.20	25.28	2.78	11.95	78.21
Luxembourg	0.58	1.84	2.70	13.52	73.98
Netherland	0.46	3.33	6.08	12.19	76.19
New Zealand	2.22	7.60	6.44	10.55	74.60
Norway	1.55	18.11	3.33	14.95	77.15
Portugal	0.64	16.58	6.03	12.79	72.32
Slovak	1.50	1.34	15.63	11.18	72.73
Spain	3.36	4.95	13.92	12.98	76.47
Sweden	3.07	10.09	4.35	16.51	77.74
Switzerland	1.98	13.50	2.80	13.96	77.54
U.K.	2.24	5.35	7.76	15.07	75.49
United States	2.33	12.92	6.14	6.16	74.99
average	1.56	8.04	6.98	13.14	75.01

## V. Estimation Results and Implications

### 1. Data

30 OECD countries have been selected as samples for cause analysis of early retirement. However, final samples were reduced to 22, and the other 8 countries include South Korea where elderly pension system is yet to be established, and Ireland, Mexico, Poland

and Turkey to which average wages aren't applicable due to their denomination. Besides that, since variable of each country have different set of time, the final analysis data are made up of unbalanced panels. In particular, for the labor force participation rate of those 65 years and over as the dependent variable, we have Austria (1994-2005), Belgium (1983-2005), Canada (1976-2005), The Czech Republic (1993-2005), Denmark (1983-2005), Greece (1983-2005), Hungary (1992-2005), Luxemburg (1983-2005), New Zealand (1986-2005), Slovakia (1994-2005), and Switzerland (1991-2005).

## 2. Estimation Results

In order to find out how population aging and generous social security program affects on labor force participation of the elderly and early retirement, we use panel data analysis. Moreover, to better reflect original features of each country's social security system, we estimate fixed effect model in consideration of individual-specific effects<sup>4</sup>.

**Table 7. Results from Panel Regression on 65+ LFP**

	spec1	spec2	spec3	spec4	spec5	spec6
const	23.37788 *** (-0.7063)	17.05508 *** (-0.4713)	22.64091 *** (-0.7213)	22.84759 *** (-0.72)	21.44943 *** (-0.7061)	21.56778 *** (-0.6871)
UR1	-0.39149 *** (-0.0368)	-0.44815 *** (-0.0392)	-0.36317 *** (-0.0371)	-0.34226 *** (-0.0376)	-0.34322 *** (-0.0355)	-0.29842 *** (-0.0354)
SE	-0.74509 *** (-0.0583)		-0.63316 *** (-0.0639)	-0.56213 *** (-0.0681)	-0.8015 *** (-0.065)	-0.70449 *** (-0.0655)
SSW		-0.59559 *** (-0.0706)	-0.2907 *** (0.0725)	-0.34529 *** (-0.0744)	-0.11841 (-0.0729)	-0.18294 ** (-0.0718)
ER				-0.98512 *** (-0.3399)		-1.89101 *** (-0.3329)
DRC					2.511206 *** (-0.3361)	3.097931 *** (-0.3429)
$R^2$	0.8938	0.8782	0.8968	0.8983	0.9063	0.9115

Standard Errors in parentheses

\*\*\*p< 0.001, \*\*p<0.05 5%, \*p<0.1

<sup>4</sup> At the result of Hausman Test, as null hypothesis insisting fixed effects don't exist has been rejected, fixed effects are valid.

In conclusion, possibilities of early retirement provide opportunities of early retirement, while benefits for delayed retirement curb early retirement trends. When compared between population aging and generosity of social security system that reflects pension reforms, aging has higher influences on the elderly labor force participation and early retirement (Table 7). It turns out that early retirement induced by increased social security wealth or income effects is not remarkable, but the market environment due to population aging has intensified trends of early retirement. This means that population aging, regardless of estimated model, continues to show positive influence, while social security wealth does not, and a similar conclusion is reached through elasticity analysis.

**Table 8. Elasticity Analysis for Each Specification**

	spe1	spec2	spec3	spec4	spec5	spec6
UR	-0.39149	-0.44815	-0.36317	-0.34226	-0.34322	-0.29842
Elasticity	-0.34538	-0.39537	-0.26327	-0.30195	-0.3028	-0.26327
SE	-0.74509		-0.63316	-0.56213	-0.8015	-0.70449
Elasticity	-6.6E+08		-1.17325	-0.93616	-1.33481	-1.17325
SSW		-0.59559	-0.2907	-0.34529	-0.11841	-0.18294
Elasticity			-0.03612	-0.06818	-0.02338	-0.03612

The Table 8 is the result of elasticity of each variable in search for influences of each variable of OECD nations has on labor participation rate of the older men, on the basis of estimation (spec 1-6). Unemployment rate, rate of the elderly over 65 years, and responsive rate of those over 65 years to changes of social security wealth compared to the 2005 average wage have been calculated by OECD averages. The result shows that 1% change of unemployment rate reduces 0.630% labor participation rate of the elderly, and when the rate of the elderly population goes up 1%, their participation rate at the market declines by 1.87%.

Moreover, as social security wealth as compared to the 2005 average wage increases by 1%, 0.0064% more elderly citizens participate at the labor market.

The following table is the level of elasticity of each nation calculated by figures of estimation 3 and it shows low elasticity on average and for each nation of OECD (Table 9). It is another supporting evidence of the previous analysis results that generous social security wealth has little effects on the labor force participation rate of the elderly.

**Table 9. Elasticity Analysis for Each Nation**

	$E\left(=\frac{\Delta LFP65}{\Delta UR} \cdot \frac{UR}{LFP65}\right)$	$E\left(=\frac{\Delta LFP65}{\Delta SE} \cdot \frac{SE}{LFP65}\right)$	$E\left(=\frac{\Delta LFP65}{\Delta SSW} \cdot \frac{SSW}{LFP65}\right)$
Austria	-0.4221784	-3.635683	-0.056792
Belgium	-0.29842	-1.1896253	-0.013461
Canada	-0.3704044	-1.0517562	-0.033737
Denmark	-0.4149895	-1.9646289	-0.004966
Finland	-0.3831155	-1.927389	-0.079121
France	-0.5085576	-2.1527085	-0.058174
Greece	-0.3622731	-1.3192779	-0.030056
Hungary	-0.7906635	-3.1879251	-0.049089
Italy	-0.6240393	-2.4475646	-0.151303
Japan	-0.0327741	-0.3331347	-0.001476
Luxembourg	-0.4374619	-5.1624997	-0.057578
Netherland	-0.545519	-2.5811555	-0.025213
New Zealand	-0.2530497	-0.9784841	-0.053517
Norway	-0.0548552	-0.5813956	-0.015696
Portugal	-0.108513	-0.543495	-0.007012
Slovak	-3.4918053	-5.8964251	-0.205239
Spain	-0.8396892	-1.8489322	-0.124384
Sweden	-0.1286198	-1.152788	-0.055591
Switzerland	-0.0619004	-0.728483	-0.026782
United Kingdom	-0.4328137	-1.9826129	-0.0766
United States	-0.1417623	-0.3359688	-0.032942
average	-0.2632722	-1.1732486	-0.036123

Here is the comparison of the results of the paper with existing micro-macroeconomic studies. First of all, as compared to microeconomic studies of Gruber and Coile (2000) and Michell and Phillips (2002), it is interpreted that if early retirement is possible (with penalties), even though pension benefits are reduced, retiring early is more beneficial to pensioner than staying at the labor market, which eventually brings about negative effects at the participation rate of the elderly. Besides that, it is similarly concluded that reduced benefits from early retirement have little influence on the rate of early retirement and that decreases in pension benefits from intensified early retirement penalties have very little effects on the increase of the labor force participation rate. On the other hand, existing macroeconomic studies like Feldstein (1977) and Modigliani and Sterling (1983) agree that social security system has a great impact on retirement. Still, since their studies do not take the environmental cause of population aging into consideration, bias of the results cannot be excluded.

Through the analyses, this paper concludes with different results from existing studies, in particular from microeconomic studies: it is expected that social security reforms that reduce generosity in order to curb early retirement or elevate more labor force participation of the elderly would not prove effective. It is also confirmed once again, if population aging, which existing macroeconomic studies neglect, is controlled, pension system reforms would have less impacts than the environmental cause.

## **VI. Conclusion**

For the last decades, it has been taken for granted that reduced labor participation of the elderly arises out of generous pension system. That is why many nations, including OECD members, have put forward to correct and reform each of their generous systems, although such action have failed to stop continuous decline of the labor force participation of older men. Nevertheless, be it micro or macroeconomic, no studies have yet analyzed causes of reduced elderly labor force from generous social security system and population aging.

This paper summarizes its analyses as follows. First, changes of social security program through pension reforms do not bring about clear-cut influences on the labor participation of the elderly, as previous reforms have little effects on the participation or curbing

on early retirement. Second, population aging and changes in the labor market not only affects greatly in the labor participation and early retirement of the elderly but exerts higher impacts than pension reforms.

As have existing microeconomic studies proved, pension reforms have little influence in suspending early retirement, except delays of the normal retirement age, to increase more participation of the elderly labor force. In addition, it turns out from this paper that changes of social security wealth or system from pension reforms of OECD nations have small effects in increasing the labor force participation rate, while population aging has rather higher effects. Nevertheless, although population aging has more impacts than pension reforms, pension system has still room to make improvements. It is important to make a better system before it is implemented like South Korea, and as population aging has only started, it is also significant to come up with measures at the labor market.

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