

# Discussion Papers in Economics

## **Employment Status, Quality of Matching, and Retirement in Korea: Evidence from Korean Longitudinal Study of Aging**

by

Chulhee Lee and Jinkook Lee  
Discussion Paper No. 81  
May 2012

---

Institute of Economic Research  
Seoul National University

**Employment Status, Quality of Matching, and Retirement in Korea:  
Evidence from Korean Longitudinal Study of Aging\***

Chulhee Lee<sup>†</sup>  
Department of Economics  
Seoul National University  
599 Kwanak-ro, Kwanak-gu  
Seoul, South Korea  
[chullee@snu.ac.kr](mailto:chullee@snu.ac.kr)  
Phone: +82-2-880-6397  
Fax: +82-2-886-4231

Jinkook Lee  
Labor & Population  
Rand Corporation  
20 Park Plaza Suite 920  
Boston, MA 02116, USA  
[Jinkook@rand.org](mailto:Jinkook@rand.org)

May 2012

---

\* We thank Jim Smith and Randall Olsen for their helpful comments and suggestions. This research is supported by the National Institute of Aging, the National Institutes of Health (R21 AG027288).

<sup>†</sup> Corresponding author.

## **Abstract**

This paper explores how and why the probability of retirement differs between self-employed and wage-and-salary workers. It finds self-employed workers are less likely to retire than wage-and-salary ones, and that differences in retirement incomes, health, productivity, job characteristics, and compulsory retirement practices do not explain the disparity. This study suggests that the difference between self-employed and wage-and-salary workers in the quality of matching between the job and the worker (i.e., required and desired amount of work efforts) explains the later retirement of the self-employed. We note the implications of these findings for labor-force participation at older ages and how policies might boost employment of the elderly.

JEH Classification: J1.

Keywords: Retirement, Self-employment, Employment, Aging, Job Flexibility

## 1. Introduction

One of the most notable labor-market changes in developed countries over the last several decades has been the sharp decrease in the labor-force participation rate of older males. This has become a major social issue as the relative size of the aged population has grown in many countries. Decreasing labor-force participation by older workers could aggravate problems, such as labor shortages and financial pressure on pension funds, associated with population aging.<sup>3</sup> One possible policy response to these problems associated would be boosting employment of older workers. Better understanding the labor-market behavior of older individuals will provide a useful basis for effective policy solutions. Accordingly, many economists have undertaken recent research on retirement decisions and the causes of decreasing labor-force participation of older men.<sup>4</sup>

As one of the most rapidly aging countries in the world today, South Korea (hereafter Korea) faces many of these issues. At the same time, it is distinct from other OECD nations in many features of its labor market for older workers. For example, its labor-force participation rate for older men increased substantially from the mid-1960s to 1997 (Lee, 2007). Although it fell dramatically after the Asian financial crisis of 1997, the current level of labor-force participation of older Korean men remains substantially higher than that in other OECD countries.

In this paper, we explore the retirement behavior of older self-employed workers in Korea, focusing on how and why the probability of retirement differs between the self-employed and wage earners. In particular, we investigate how the quality of matching between the job and the worker, in terms of required versus desired amount of work efforts, differ between the self-employed and wage workers and whether such differences matter in their retirement decisions.

Addressing these issues is important to understanding the current patterns and

---

<sup>3</sup> According to Lee (2001), the expected length of male retirement in the United States has increased by sevenfold since 1850, representing up to 30 percent of the remaining life of the current labor-market cohort.

<sup>4</sup> A particularly large number of studies have focused on the impact of the implementation and expansion of social insurance programs on the labor force participation of older men (Boskin, 1977; Parsons, 1980, 1991; Hurd and Boskin, 1984; Krueger and Pischke, 1992; Lee, 1998; Gruber and Wise, 1999, 2004; Friedberg and Webb, 2005). Other influences, such as health, asset price, and various social insurance programs other than pensions, on retirement decisions have also drawn a great deal of attention (McGarry, 2004; Gruber and Madrian, 1995; Coile and Levine, 2006). A growing number of studies have examined how employment conditions, changing industrial structure, and technology have influenced retirement decisions (Bartel and Sicherman, 1993; Hurd and McGarry, 1993; Hurd, 1996; Friedberg, 2003; Aubert et al., 2006).

anticipating future changes in labor-market activity of elderly Koreans because the self-employed, particularly males, account for a much larger fraction of the labor force in Korea than in other nations with comparable economic development.<sup>5</sup> Well over half of male Korean workers aged 45 and older are self-employed.<sup>6</sup> Even in the non-farm sector, self-employed workers account for 41 percent of male non-farm workers aged 45 and older. Among male workers aged 65 and older, 49 percent are self-employed. Although not as important as it is for males, self-employment also accounts for a considerable fraction of the female workforce, including 28 percent of female non-farm workers at least 45 years of age.

Studying the patterns of work and retirement of the self-employed is not only a key to understanding some peculiar features of older workers in Korea but also will provide insights to the retirement pattern of self-employed in other countries like the United States where self-employment is gaining popularities, especially among older workers . As noted above, Korea boasts relatively high labor force participation for its older workers. High proportions of self-employed, as well as relatively immature social-insurance programs, are among the explanations for higher economic activity among older Koreans. In particular, the increase in labor-force participation among older Korean men prior to 1997 is largely attributable to the increase among older men in rural areas, where a much higher proportion of older workers are self-employed (Lee, 2007).

Korea appears to be distinct among developed countries not only in the relative size of its self-employed workforce but also in its structure and job characteristics. A considerable number of wage and salary workers switch to self-employment after leaving or losing their lifetime jobs. Self-employment may be a more favorable type of work for older persons than wage and salary employment because of its more flexible nature. Accordingly, Korean policymakers regard job creation in the self-employment sector as a means to boost the employment of older persons.

In this paper, we explore how much of the high labor-force participation rate of older Koreans is attributable to self-employment. To do so, we use data from the Korean

---

<sup>5</sup> Studies on self-employed workers have been growing in Korea, even as the proportion of the workers who are self-employed has shrunk in recent years (Ryoo and Choi, 1999, 2000; Ahn, 2000; Keum and Cho, 2000; Cheon, 2003; Ryoo, 2005). Among explanations for growth in the proportion of self-employed prior to the financial crisis of the late 1990s are (1) increased unemployment and reduced job security for middle-aged wage and salary workers (Sung and Ahn, 2004; Cheon, 2003) and (2) a long-term rise in the attractiveness of self-employment (Ryoo and Choi, 2000; Ryoo, 2005).

<sup>6</sup> The statistics on the size of self-employment in Korea are based on the authors' calculation using the micro sample of the 2005 census.

Longitudinal Study of Aging (KLoSA), for which second wave data was recently released. Much previous work on Korean retirement behavior has used other panel data sets, especially the Korea Labor and Income Panel Study (KLIPS) (Park, 2001, 2003; Kim and Yoo, 2004; Sung and Ahn, 2006; Choi, 2006). The key advantage of using the KLoSA for such analysis is its large sample size of older respondents. Its larger sample of persons at least 45 years of age enables us to analyze the retirement decisions separately for individuals of different personal characteristics or employment status, and to thereby consider more completely the issue of potential heterogeneity in retirement behaviors.

Although a number of previous studies have addressed diversity in the retirement process (Park 2001, 2003), their small sample sizes restricted their findings and implications. A recent study by Lee (2008), using the first-wave data of the KLoSA, examines how retirement expectations differ between self-employed and wage workers, but has problems resulting from cross-sectional data, especially reliance on indirect measures of retirement decisions (subjective scores on the probability of continuing to work for a certain number of years) and various endogeneity problems. This study is perhaps the first to analyze actual retirement behaviors of such narrowly-defined populations as the self-employed and wage-and-salary workers in Korea.

## **2. Related Literature**

Self-employed workers may remain in the labor market longer than wage-and-salary workers because of the more flexible nature of their work. Hurd (1996) notes that labor market rigidities caused by team production, fixed costs of employment, and social security may force many older wage workers to choose between full-time work and complete retirement. Because of the difficulties in adjusting the hours of work and wages to changing tastes and productivity associated with aging, wage earners retire earlier than they would if gradual retirement were an option. Most prime-age male wage and salary workers in the United States indicated that they could not work less if they wanted to in their current job (Gustman and Steinmeier, 1985). Some wage-and-salary workers partially retire at old age, but only by transferring to a different job, not being free to do so in their main job (Gustman and Steinmeier, 1984). Partial retirement is important even for those who do not face mandatory retirement (Gustman and Steinmeier, 1984). This suggests that the constraints requiring a minimum number of hours worked on the main job is perhaps a more important reason for partial retirement than the pressure towards retirement in the workplace.

Self-employed workers, because they are more able to undertake partial retirement from their present jobs, may enter full retirement later than wage workers. Quinn, Burkhauser, and Myers (1990) found that most older self-employed workers either reduced their work hours on their career job or became part-time workers while wage-and-salary workers mainly left the workforce. In the early-20<sup>th</sup>-century United States, self-employed farmers were much less likely to retire than non-farm wage earners (Lee, 2002). Gradual retirement was possible for self-employed farmers because they were able to reduce the hours and intensity of their work by adjusting acreage and crop-mix or by adopting mechanization (Pedersen, 1950).

In Korea, research on the labor-force participation of older persons has been growing over the last decade, reflecting the rising concern over population aging. Chang (2002), using the 2000-2001 KLIPS, reported that the odds of retirement were associated negatively with health and educational attainment and positively with real-estate wealth. She found the average retirement age of Korean males increased by two years from 1987 to 1997 and decreased after the financial crisis in 1998.

Cho and Kim (2005) investigate the nature of mandatory retirement in Korea using the data from the Workplace Panel Survey (WPS). They find that Korean corporations, especially after the financial crisis in 1998, use mandatory retirement to deal with exorbitant wage increases that outpace productivity and were in part generated by the traditional seniority-based wage system. They also found mandatory retirement for many firms—with, they suggest, the tacit approval of labor unions—alleviates backlogs in promotion by circumventing the rigidity of the personnel dismissal system under Korean labor law.

Sung and Ahn (2006), using the KLIPS, examine the determinants of the decision of older persons to work. They find that age and years of schooling are negatively related to employment of individuals aged 45 and older. Healthier persons are more likely to be employed than those who reported poor health. Local unemployment rate also strongly, and negatively, affects the probability of individual employment. They also found non-wage workers at the age of 45 were more likely to be employed than wage-and-salary workers, suggesting that job characteristics matter.

Analyzing a sample of two-earner households drawn from the KLIPS, Choi (2006) finds that pension wealth, other retirement incentives, and spouse's health and wage affect the retirement decisions of Korean men, but that spouse characteristics do not affect the retirement decisions of Korean women. Estimating the cross-wage elasticity of retirement for couples, Choi suggests that the leisure times of a couple complement each other, and that

effect is much stronger for men than women. For men, the substitution effect of the wages of their spouses dominates the income effect, whereas substitution and income effects cancel out for women.

Lee (2008), using the 2006 KLoSA, explores how and why retirement expectations differ between self-employed (SE) workers and wage-and-salary workers. The results generally confirm that the self-employed expect to remain in the labor market longer than wage-and-salary workers, a result not explained by differences in retirement income, health, productivity, job characteristics, and compulsory retirement practices. This suggests that the difference between the self-employed and wage-and-salary workers in the quality of matching between the job and the worker (i.e., required versus desired amount of work efforts) may instead explain the later retirement of the self-employed.

### 3. Conceptual Framework and Methods

The standard model of retirement behavior views a person as choosing to continue to work or to leave it by comparing his or her utility for each option.<sup>7</sup> The probability of retirement at a point of time may be determined by the expected net gains from retirement, denoted by  $R^*$ . The value of retirement is written as a linear function of a set of individual and job characteristics in the following reduced form specification:

$$R_i^* = \alpha(\bar{Z} - Z_i) + \beta N_i + \gamma X_i + \phi B_i + \varepsilon_i \quad (1)$$

We hypothesize that the costs and benefits of retirement are determined by the discrepancy between the amounts of minimum work effort (such as hours and intensity of work) required by a worker's job (denoted by  $\bar{Z}$ ) and the desirable amount of work efforts that the individual worker,  $i$ , would choose under no restriction (denoted by  $Z_i$ ).  $\bar{Z}$  is determined by various job-specific demand-side factors, such as production technology, managerial practices, and labor-market condition.  $Z_i$  is determined by the tastes and productivity of the individual worker,  $i$ . The value of retirement is also determined by the demographic and job characteristics of the worker (denoted as  $X_i$  and  $B_i$ , respectively) not fully captured by the term  $(\bar{Z} - Z_i)$  as well as retirement incomes (denoted by vector  $N_i$ ).

Aging diminishes a worker's physical strength and functional ability and reduces his or

---

<sup>7</sup> This section is largely drawn from the conceptual framework of Lee (2008). The present study is distinct in its analysis of the probability of retiring between 2006 and 2008, instead of the subjective expectations of continuing to work as surveyed in 2006.



her taste for work, decreasing the desirable amount of work effort ( $Z_i$ ). As long as the minimum work effort required by the job ( $\bar{Z}$ ) remains fixed, the discrepancy ( $\bar{Z} - Z_i$ ) increases, raising the value of retirement. Thus, the size of ( $\bar{Z} - Z_i$ ) depends on (1) the quality of matching between the worker and the job in terms of the desirable and required amount of work effort and (2) the ability of the worker to change the required work effort ( $\bar{Z}$ ) either within the same job or by switching jobs.

In this model, the difference in the probability of retirement between the self-employed and wage-and-salary workers is attributed to the differences by employment type in (1) retirement incomes ( $N_i$ ), (2) demographic and job characteristics ( $X_i$  and  $B_i$ ) representing, respectively, tastes for work and institutional pressure toward involuntary retirement, and (3) the quality of matching between the worker and the job ( $\bar{Z} - Z_i$ ). This last factor explains the more flexible nature of self-employment as the reason why self-employed workers remain in the labor market longer than wage and salary workers.

Based on this simple model, we offer the following hypotheses to explain the difference in the probability of retirement between the self-employed (SE) and wage-and-salary (WS) workers.

- (1) The SE are poorer than WS workers, and thus have to work longer to accumulate enough money for retirement (referred to as **H1**).
- (2) The SE are healthier and more productive than WS workers, and therefore, can work until a later age (**H2**).
- (3) Job characteristics (i.e. job satisfaction and work requirement) are more favorable for the SE than for WS workers (**H3**).
- (4) The SE can work longer than WS workers because of the absence of a mandatory or conventionally determined age of retirement (**H4**).
- (5) Because working conditions and the required minimum amount of work effort are more heterogeneous for the self-employed, it is relatively easy for the SE (especially those who have an unusual preference or capacity) to find a job well matched to them (**H5**).
- (6) Given greater job flexibility, the SE can adjust their work efforts to changes in their taste and productivity (**H6**).
- (7) If it is difficult to change work effort within an occupation or industry, then the SE

can more easily switch to a less demanding job than WS workers (**H7**).

Of course, these explanations are neither exhaustive nor necessarily mutually exclusive.

Below we examine the difference in the probability of retirement for self-employed and wage-and-salary workers, and determine which of the seven above hypotheses best explains the observed disparity. To do so, we analyze all individuals in KLoSA at least 50 years old who were a wage-and-salary or self-employed worker in 2006. We largely focus on employees working 30 hours or more per week to ensure we analyze only active workers not in the process of gradual retirement. Part-time employment at old age may indicate gradual retirement. Indeed, KLoSA respondents working less than 30 hours weekly in 2006 were nearly twice as likely to retire by 2008 as full-time workers were. We classify as retired a person who in 2008 did not work and answered “retirement” as their reason for not working.

#### **4. Differences in the Probability of Retirement between the Self-Employed and Wage-and-Salary Workers**

We first compare the probability of retirement for self-employed and wage-and-salary workers. Table 1 shows the percentage of workers in 2006 who had retired by 2008 by sex, age, and employment status. The results generally confirm the widely held belief that the self-employed remain in the labor market longer than wage-and-salary workers. Among self-employed workers at least 50 years old, 7.2 percent had retired by 2008; among wage-and-salary workers, 11.4 percent had retired. The difference was particularly sharp for male workers at least 65 years of age; among these, 10.1 percent of the self-employed, and 28.1 percent of wage-and-salary workers, had retired by 2008. Although this is by no means a surprising result, it provides the very first detailed evidence on the magnitudes and patterns of the differences in the probability of retirement between the self-employed and wage-and-salary workers.

Table 2 shows the percentage of workers who retired between 2006 and 2008 by some selected employment characteristics that may affect retirement decisions. Among older part-time workers (i.e., those who worked fewer than 30 hours per week) in 2006, 14.4 percent had retired by 2008; among older full-time workers, only 8.4 percent had retired. Part-time workers at least 65 years of age (26.4 percent) were most likely to retire. Even among those 50 to 54 years of age, part-time workers (9.1 percent) were more likely to retire than full-time ones (3.2 percent). These results support the conjecture that part-time jobs may bridge full-time employment and complete retirement.

Among the self-employed, agricultural workers (4.8 percent) were less likely to retire than nonagricultural workers (8.2 percent). Among self-employed females and individuals aged 60 and older, agricultural workers were only one-half to one-third as likely to retire as non-agricultural ones. The lower retirement rates of self-employed agricultural workers may be due to greater job flexibility that farming offers.

One key indicator of the economic status and employment conditions of SE is whether a self-employed person hires non-family members to run her or his business. The self-employed who are employers of other workers are likely more affluent and may be more able to substitute hired hands for their own efforts. Yet we find little difference in retirement among self-employed who hired employees (7.9 percent) and those who did not (7.1 percent). Among groups of self-employed workers hiring others, males and those less than 65 years of age were less likely to retire.

One of the most popular explanations for why self-employment can lead to later retirement is compulsory retirement policies, most commonly at age 55, for Korean firms, especially large corporations. Yet among all wage-and-salary workers at least 50 years of age, those whose employers do not have a forced retirement policy were slightly more likely to retire than those whose employers have such a policy. This suggests institutional pressure to retire may not be a significant contributor to the differences in retirement rates of the self-employed and of wage-and-salary workers. Still, for wage-and-salary workers 55 to 64 years old, mandatory retirement policy appears to have led to retirement rates about double those for other workers in the age group (perhaps because 55 is the most common age of mandatory retirement in Korea).

Among types of wage-and-salary workers, retirement was more common among the temporarily employed than the regularly employed or the daily employed. It is likely that many older workers among the temporarily employed were, in fact, partially retired.

Table 4 shows how much of the disparity in the probability of retirement between self-employed and wage-and-salary workers can be explained by differences in (1) retirement incomes ( $N_i$  in Equation 1) and (2) demographic and job characteristics ( $X_i$  and  $B_i$  in Equation 1), representing labor productivity and tastes for work. Table 3 defines the variables listed in Table 4. We conducted logistic regressions to determine the odds of retirement. Our focus was whether the greater likelihood of retirement for wage-and-salary workers persisted regardless of retirement income level and demographic and job characteristics.

We performed logistic regressions for data on the full sample of active workers (Col. 1

of Table 4) and a subsample excluding wage-and-salary workers subject to compulsory retirement (Col. 2 of Table 4). We performed the second regression to compare the retirement behaviors of the self-employed and wage-and-salary workers after eliminating the impact of mandatory retirement that affect only wage-and-salary workers. Explanatory variables include self-employment (SELFEMP), sex (MALE), age (AGE), years of schooling (SCHOOL), marital status (MARRIED), labor-market status of spouse (SP\_WORK), number of male adult children who work (MCHD\_WORK), number of male adult children who do not work (MCHD\_NOWORK), number of female adult children who work (FCHD\_WORK), number of female adult children who do not work (FCHD\_NOWORK), a dummy variable on self-reported poor health (HEALTH\_BAD), net wealth (WEALTH), expected present values of public pensions (PUBPEN) and private pensions including severance pays (PVTPEN), total amount of non-labor incomes (NLNCOME), hourly wages (HWAGE), and dummy variables on whether the respondent weekly worked 30 to 39 hours (HOURS30), 40 to 49 hours (HOURS40), 50 to 59 hours (HOURS50), 60 to 69 hours (HOURS60), 70 to 79 hours (HOURS70), or at least 80 hours (HOURS80).<sup>8</sup>

Age, years of schooling, hourly wage, and health are proxy variables for the individual's productivity in the labor market that determine the opportunity cost of retirement. Wealth, expected present values of public and private pensions, and total non-labor income are measures of future retirement incomes. Health, family structure, and hours of work may be associated with the preference for work. We include variables on marital status, labor-force participation of spouse and the number of children with particular characteristics to capture the potential effect of dependents or family support. A larger family, for example, will require a greater household income but also have a greater potential for earnings from more family members.<sup>9</sup>

---

<sup>8</sup> The preceding variables include many used in several previous studies (Parson, 1980; Hurd and Boskin, 1984; Krueger and Pischke, 1992; Costa, 1998; McGarry, 2004) on the timing of retirement. We considered the number of children under age 19 in addition to the variables on family structure reported in the paper. Unfortunately, several subsamples used for the regressions have no households with children under 19. Furthermore, its effect is statistically insignificant for all the specifications and subsamples employed in the analyses provided below. Adding it to the regressions makes little changes in the results for other explanatory variables. For these reasons, we report results of regressions excluding this variable.

<sup>9</sup> There is no a priori theory to tell the exact functional forms of the model. We tried various alternative specifications in the regression analyses, the results of which are not reported here. For educational attainment we used dummy variables on (1) no schooling, (2) elementary school, (3) middle school, (4) high school, and (5) college. We also included continuous variables in various forms such as polynomials and logarithms. Unless otherwise noted, the main implications of the

The result for the full sample (Col. 1 of Table 4) suggests that the self-employed are, when controlling for the other variables listed in Table 3, 68 percent less likely to retire than wage-and-salary workers are.<sup>10</sup> Excluding from the analysis wage-and-salary workers subject to mandatory retirement, it appears the self-employed are 70 percent less likely to retire. This suggests mandatory retirement policy does not explain the higher probability of retirement for wage-and-salary workers.

The personal characteristics most associated with a higher probability of retirement include being female, older, or having poor health. Having adult daughters who are not working also diminishes the probability of retirement. The results show some unexpected statistical relationships. For example, net wealth and the expected present value of public pensions<sup>11</sup> are negatively related to the probability of retirement, while the amount of hourly wage is positively associated with it.

The result for WEALTH, which had a small negative coefficient (and not positive as expected), needs some qualifications. We suspect this might be caused by bias resulting from individual heterogeneity. For example, a worker who has stronger tastes for work (not fully captured by the explanatory variables considered in this study) is likely to have accumulated a greater amount of wealth and work until a later age than a person with weaker preferences for work. An instrumental-variable approach correcting for this bias finds a positive (and more significant) effect of wealth on the probability of retirement.<sup>12</sup>

We also considered the effects of several job characteristics on the probability of

---

results based on various specifications were generally similar to the results of our baseline regressions.  
<sup>10</sup> 7.69 percentage points estimated from the magnitude of the marginal effect (-0.0769) of SELFEMP divided by the probability of retirement for WS workers (11.41%).

<sup>11</sup> The National Pension Scheme (NPS), enacted with the National Pension Act in 1988, extended compulsory coverage over time and become a universal scheme for the public in 2006. The expansion was gradual, first to cover workplaces with ten or more employees in 1988, followed by workplaces with five or more employees in 1992, and then covering rural workplaces with fewer than five employees, farmers, and fishermen in 1995, and the urban self-employed and urban workplaces with fewer than five workers in 1999. The NPS requires more than 20 years of contribution, and therefore only few elderly are current beneficiaries of the NPS. As of 2010, 19.1 million persons were enrolled in the NPS and 2.3 million received old-age pension benefits (NPS, 2010).

<sup>12</sup> We use variables regarding the place of residence and residence in an apartment as instruments. A larger fraction of individual wealth is housing wealth which varies greatly by place of residence. Korean apartments are more expensive than other types of houses with comparable characteristics. Place of residence and type of housing are not likely to be strongly correlated with unobservable individual characteristics influencing labor-force participation at older ages. Thus, these instrumental variables should help assess the effects of wealth on retirement decisions independent of other worker characteristics.

retirement.<sup>13</sup> We constructed an industry-occupation fixed effect model with dummy variables on two-digit occupational and industrial categories. Finally, we used several subsamples to check robustness. Table 5 summarizes these additional regressions. It suggests that job characteristics, satisfaction, occupation, and industry have little effect on the direction of the differences in the probability of retirement between the self-employed and wage workers. Nevertheless, the magnitudes of the disparities considerably differ by sex and age. It is notable that the coefficient for females is half that for males in terms of absolute magnitude, and that there is a U-shaped relationship between the absolute size of the coefficient and age.

Given the above results regarding personal characteristics, retirement incomes, and job characteristics, it appears the first four of our seven hypotheses above do not explain well differences between the self-employed and wage-and-salary workers in probability of retirement. Below, we analyze further data on our hypotheses regarding the match of jobs and workers as well as job flexibility.

## 5. Quality of Matching between the Job and the Worker

How might the different quality of job matching, denoted as  $(\bar{Z} - Z_i)$  in Equation (1), explain the difference in retirement expectations between the self-employed and wage-and-salary workers? A major obstacle to examining the quality of job matching is the difficulty in constructing a direct measure of it from available data. Some variables on job characteristics, especially measures of job satisfaction, could be related to the quality of matching between the worker and the job as well as the average quality of the job. This is especially likely to be true if respondents evaluate their jobs based on their own subjective feelings. If respondents were to objectively compare their own jobs with others in determining their job satisfaction, then their answers should reflect an average quality of the job rather than the quality of matching.

---

<sup>13</sup> Job-characteristic questions we examined include: (1) My job requires lots of physical effort, (2) My job requires lifting heavy loads, (3) My job requires stooping, kneeling, or crouching, (4) My job requires good eyesight, (5) My job requires intense concentration or attention, (6) My job requires skill in dealing with other people, (7) My job requires me to work with a computer, (8) My job requires me to do more difficult things than I am used to, (9) I am satisfied with the income I receive from my current job, (10) My job is stable, (11) I am satisfied with the working environment of my job, (12) I am satisfied with the job I do at my current job, (13) My job is stressful, and (14) I am satisfied with my current job. We constructed dummy variables with the value of “1” if the response to the question was positive (either “always or almost all of time” or “most of the time”) and “0” otherwise (either “some of times” or “None or almost none of the time”).

With no direct measure of the quality of job matching, we offer several pieces of circumstantial evidence to suggest that the self-employed are better matched with their jobs because they have more heterogeneous jobs and are more able to adjust work efforts as they age.

We first compare the dispersions of work efforts and rewards for the self-employed and for wage-and-salary workers. Suppose that the self-employed, because of their more heterogeneous jobs, have a wider range of combinations of minimum required work efforts ( $\bar{Z}$ ) and wages than wage-and-salary workers do. If so, then their work hours and wages will be more widely dispersed.

Table 6 provides the standard deviations of weekly hours of work, monthly earnings, and hourly wages in 2006 and 2008 for the self-employed and for wage-and-salary workers. It indeed suggests that the hours and earnings for the self-employed are much more widely dispersed than those for wage-and-salary workers. (The result remains the same for other measures of dispersion, such as the coefficient of variation.) These results also show the self-employed, in comparison to wage-and-salary workers, are more likely to work extremely long or short hours or to have very low or very high earnings. This suggests that the self-employed are better able to find a job requiring the amount of effort they choose to offer.

Table 6 also shows standard deviations in changes in hours and wages for self-employed and wage-and-salary workers between 2006 and 2008. Again, the results show wider dispersion for the self-employed than for wage-and-salary workers. This indicates the self-employed were more likely to increase or decrease a given fraction of work effort between 2006 and 2008. Of course, these measures might also indicate the unstable nature of self-employment. Nevertheless, we consider it likely that self-employment offers more flexibility in choosing a combination of work effort and compensation.

We also tested how well the self-employed can match the requirements of their jobs with their physical capacity and tastes for work. If they are better able to do this than wage-and-salary workers are, then job characteristics related to work requirements should be a weaker influence on their retirement decisions. Hurd and McGarry (1993) offer a similar rationale in interpreting the link between health and retirement. Finding no relationship between physical difficulty of the job and the probability of continuing to work, they suggest individuals may indeed match with jobs that accord with their abilities.<sup>14</sup>

To test whether the self-employed can better match the requirements of their jobs with

---

<sup>14</sup> Cited from McGarry (2004)

their physical capacity and tastes for work, we conducted logistic regression analyses separately for the self-employed and wage-and-salary workers. These are similar to those reported in Table 4 (but exclude the self-employment dummy variable). The results suggest that retirement decisions of the self-employed are not strongly related to weekly hours of work. For the self-employed, weekly hours of work appear to have no effect on the probability of retirement. Coefficients for all dummy variables on weekly hours of work are insignificant. For wage-and-salary workers, weekly hours of work affects retirement decisions. Those working either relatively short (40 to 49 hours) or very long hours (80 hours or more) are more likely to retire than those working 50 to 59 hours. These results are consistent with the hypothesis that the quality of matching between the job and the worker is better for the self-employed than for wage-and-salary workers. Another notable result is that for, the self-employed, the presence of adult daughters, especially those not working, strongly diminishes the probability of retirement.

The difference in job flexibility between the self-employed and wage-and-salary workers may be attributable to the greater ability of the self-employed to (1) adjust their work efforts in the same job (H6), and (2) switch to a less demanding job (H7). We attempt to determine the relative importance of each of these in the job flexibility of the self-employed. More specifically, we examine whether the greater ability of self-employed workers to change the number of hours they work is attributable to their ability to do so within the same job or to do so in different jobs.

We use the probability of diminishing hours of work by 20 percent or more between 2006 and 2008 as a measure of the ability of changing work effort in accordance with aging. We include in this analysis individuals who were self-employed or wage-and-salary workers in both 2006 and 2008, were at least 45 years old in 2006, and worked at least 30 hours weekly in 2006.

The probability that workers of a particular type reduced their hours of work by 20 percent or more between 2006 and 2008, denoted as  $P_j$ , can be presented as the weighted average of the probabilities of workers who had remained in the same work place ( $P_j^N$ ) and of those who had switched to another workplace ( $P_j^M$ ), with  $\phi$  used as the weight to be applied to the first probability.

$$P_j = \phi P_j^N + (1 - \phi) P_j^M \quad (2)$$

The difference between the self-employed and wage-and-salary workers in the probability of



diminishing the hours by 20 percent or more (denoted as  $\Delta P = P_S - P_W$ ) can be decomposed as:

$$\Delta P = (P^N - P^M)\Delta\phi + \phi\Delta P^N + (1-\phi)\Delta P^M \quad (3)$$

In Equation (3),  $S$  denotes the self-employed (SE),  $W$  denotes wage-and-salary (WS) workers,  $\Delta\phi = \phi_S - \phi_W$ , and  $\Delta P^N = P_S^N - P_W^N$ . The first term in the right-hand side of (3) represents the effect of the differences between the self-employed and wage-and-salary workers in the probability of switching jobs. The second and third terms show the effects of differences between the self-employed and wage-and-salary workers in the probabilities of diminishing work hours within the same workplace and by moving to a new workplace. If the different flexibility in changing jobs played an important role, as suggested by H7, then the magnitude of the first term should be relatively large. If the ability of adjusting work efforts within a job was the major factor, as H6 suggests, then the second and third terms should be relatively large.

Table 7 presents the estimates of the parameters given in Equation (3) and the result of decomposition for three age groups: ages 45 and older (Col. 1), ages 45-54 (Col. 2), and 55 and older (Col. 3). These results suggest that the self-employed are more likely than wage-and-salary workers to reduce their hours of work by 20 percent or more. The difference between the self-employed and wage-and-salary workers in the likelihood of diminishing work effort was larger for workers aged 55 and older (about 12 percentage points) than for those aged 45 to 54 (3.8 percentage points). More significantly, the results suggest that the difference between the self-employed and wage-and-salary workers in the probability of diminishing hours is explained entirely by the disparity between them in flexibility to adjust work efforts within a job. In particular, the difference in the probability of changing the hours among those not changing workplaces appears to be the most important explanation of why the self-employed 45 and older were more likely than wage-and-salary workers to decrease their hours.

This result is consistent with the finding of Gustman and Steinmeier (1984). They found that partial retirement is quite common among U.S. wage-and-salary workers, but that this occurred outside their main job because most wage-and-salary workers are not free to retire partially in the job they hold at prime age. It is thus not surprising that the difference between the self-employed and wage-and-salary workers in the probability of diminishing hours is largely attributable to differences in the flexibility they have within their jobs.

Another study by Gustman and Steinmeier (1985) found that partial retirement negatively affects the wage rate. In particular, they found that the decline in the wage rate associated with shorter hours of work is greater for partial retirement in a different job than in a job previously held. This suggests that, for modifying work efforts at an old age, self-employment offers more attractive options than wage-and-salary jobs do. These options include both greater possibility of such an adjustment and reduced costs associated with it.

## **6. Job Flexibility and Retirement**

Some of the evidence above suggests that self-employed workers are perhaps better able to match their work capacity and preference with job requirements. This may be a result of greater heterogeneity in jobs for the self-employed or the greater flexibility they have in choosing work efforts while remaining in the same job. We next consider whether higher quality of matching between job and work indeed diminishes the probability of retirement. We also consider whether differences in this matching by employment status can explain the differences between the self-employed and wage-and-salary workers in the probability of retirement.

An ideal approach to this question would be to relate a firm-level measure of the quality of matching to the retirement behaviors of workers employed in the firm. It would also be instructive to see how the probability of retirement differs for self-employed and wage-and-salary workers while controlling for such a firm-level measure of quality of matching. Unfortunately, we cannot calculate for each firm or workplace the likelihood of changing hours, which is our primary indirect measure of the quality of job matching. We therefore constructed an industry-level measure of the quality of matching indicating the proportion of workers whose hours of work diminished by more than 20 percent in each industry (IND\_HOURS20). We added this variable to our logistic regressions (as reported in Table 4) on retirement decisions. A clear drawback of this variable is that it cannot capture within-industry differences between self-employment and wage-and-salary jobs. Despite this serious limitation, the regression results reported in Table 9 are quite suggestive.

For the full sample, the reduction of hours by more than 20 percent has a strong negative effect on the probability of retirement. This indicates that workers in an industry with a greater flexibility of changing hours are less likely to retire than those employed in an industry with less flexibility. This supports the hypothesis that the quality of matching between the job and the worker is an important determinant of retirement decision.

Adding the measure of flexibility of hours does not reduce much the magnitude of the difference between self-employed and wage-and-salary workers in the probability of retirement. The absolute size of the marginal effect of the self-employment dummy diminishes only 8.3 percent (from -0.0767 reported in Column 1 in Table 4 to -0.0705 reported in Table 9). This might indicate that within-industry differences between self-employment and wage-and-salary jobs in terms of the quality of matching is more important than the industrial composition of these jobs.

Table 10 summarizes how the relationship between the measure of job flexibility and the probability of retirement varies by individual characteristics. It presents results of regression analyses for 20 different subsamples defined by employment status (SE and WS), gender, age (50-54, 55-59, 60-64, and 65 and older), and self-reported health (“Good,” Fair,” and “Poor”).

For the full sample (Column 1), a male worker’s retirement decision is much more responsive to variations in job flexibility than that of a female worker. For females, the effect of IND\_HOURS20 on the probability of retirement is very small and statistically insignificant.<sup>15</sup> There is apparently no influence of job flexibility on retirement decisions for workers less than 55 years of age, but the influence seems to be particularly strong for those 55 to 59 years old. For individuals aged 60 and older, the influence falls short of statistical significance and is smaller than that for workers 55 to 59.

The results of regressions for subsamples defined by self-reported health suggest that the effect of job flexibility on retirement is strongest for workers with “fair” health. The statistical effect of IND\_HOURS20 on retirement for those with “good” health is also strong, but its effect on workers with “poor” health is statistically insignificant.

The results for self-employed workers (Column 2) and wage-and-salary earners (Column 3) are roughly similar but with a few differences. The IND\_HOURS20 measure of job flexibility has a significant effect on male wage-and-salary workers and those with “fair” health. It does not have a significant effect for self-employed workers in these categories.

One might conjecture that greater job flexibility may be more helpful for extending the career of an older worker with poor health than for a younger and healthier person.

---

<sup>15</sup> Given that female workers should have stronger preferences for work flexibility than male workers, this is an unexpected result, for which we do not have a decisive explanation. Some conjectures: (1) female workers in the sample (mean age 57.6) are younger than male workers (mean age 59.3) and flexibility matters more for older workers; (2) only selected female workers with strong preferences for work remain in the labor market after age 50 their retirement decisions are less influenced by the flexibility of hours.

Nevertheless, our results suggest it matters more for retirement decisions of persons in the middle of age and health distributions. This may be because, for individuals who are quite old or severely limited by poor health, other determinants of retirement dominate those of job flexibility. For example, diminishing work efforts by 20 percent would not likely compensate for severe declines in productivity, deteriorating health, or other reductions in the quality of matching caused by aging.

## **7. Conclusions and Implications**

We have explored how and why the probability of retirement differs for the self-employed and wage-and-salary earners. Our results confirm that the self-employed remain in the labor market longer than wage-and-salary workers. We suggested seven possible hypotheses to explain these differences: H1) The self-employed are poorer than wage-and-salary workers and therefore have to work longer to accumulate enough money for retirement; H2) The self-employed are healthier and more productive than wage-and-salary workers and therefore can work until a later age; H3) The self-employed are more likely to have job characteristics more favorable for working in later life; H4) The self-employed can work longer than wage-and-salary workers because they do not have a mandatory or conventionally-determined retirement age; H5) Because the self-employed have more heterogeneity in working conditions and the required minimum amount of work effort in their jobs, it is easier for them to find a job matched to them; H6) Due to a greater job flexibility, the self-employed can better adjust their work efforts with changes in their tastes and productivity; and H7) Within a given occupation or industry, the self-employed can more easily switch to a less demanding job.

Our results provide little evidence supporting the first four hypotheses. Controlling for differences in personal and job characteristics such as health, education, wealth, earnings, measures of job satisfaction, industry, and occupation little affects differences between the self-employed and wage-and-salary workers in the probability of retirement. Compulsory retirement for wage-and-salary workers does not appear to affect the timing of retirement.

We have suggested some indirect evidence on the importance of the matching between the minimum work efforts required by jobs and the desirable amount of work effort workers would choose to provide. Our results suggest that the distributions of work efforts and wages are more widely dispersed for the self-employed than for wage-and-salary workers. This is consistent with the hypothesis that, because self-employment provides a wider range of

required minimum work efforts, the self-employed are more likely than wage-and-salary workers to be employed in a job well matched to their preferences or capacities. We have also found that the self-employed are more able than wage-and-salary workers to adjust their work efforts over time. Hours of work have a weaker influence on retirement of the self-employed than for wage-and-salary workers. These results suggest that the self-employed are better able than wage-and-salary workers to match the requirements of their jobs with their physical capacity and tastes for work.

We found that the difference between the self-employed and wage-and-salary workers in the probability of diminishing the hours of work is explained entirely by the differences in job flexibility or the ability to adjust the hours of work within a job (supporting H6). The difference between the two categories of workers in the effects of switching jobs (H7) was trivial.

Finally, our results suggest that workers employed in an industry with more flexibility to change the number of hours they work are less likely to retire. This supports the hypothesis that the quality of matching between job and worker is an important determinant of retirement.

There are several implications of our results. First, the type of employment is an important determinant of the timing of retirement if the differences in personal and job characteristics are considered. This implies that shifts in the employment structure, such as changes in the fraction of self-employees, should be a major cause of long-term change in the economic activity of older individuals. In particular, the high proportion of self-employed persons in Korea is likely to account for the relatively high labor-force participation rate of older people in Korea.

Second, if greater job flexibility rather than poverty is what influences the self-employed to remain in the labor market longer than wage-and-salary workers do, then self-employment could help boost employment of the elderly. Recent studies on the nature of selection into self-employment and the quality (i.e., educational attainment and occupational composition) of the self-employed in Korea offer somewhat mixed results on this possibility. Self-employed Koreans are highly heterogeneous, and include both highly-talented individuals who voluntarily enter self-employment with expectations of high returns and marginal workers with low-ability who are pushed out of formal wage-and-salary jobs (Keum and Cho, 2000). The questions remain which type is relatively more important, and how does the composition of the self-employed change over time.

A number of recent studies suggest that an increasing proportion of the self-employed select their job voluntarily, and that their quality relative to that of wage-and-salary workers is improving over time. Ryoo and Choi (2000) show that the labor flows into and from the self-employment sector, which is an indicator of the fragile labor-market status of SE, are largely confined to a relatively small group of marginal workers. They also found that the expected duration of self-employment has increased since 1990, suggesting that the employment stability of the self-employed has improved over time. Ryoo (2005) suggests self-employment has become more attractive in recent years and that the negative selectivity (i.e., pushed out of wage-and-salary jobs) of self-employed workers has decreased, and the relative quality of the self-employed improved, over time.<sup>16</sup> Desired flexibility on the job does appear to be a significant reason for self-employment: the KLoSA indicates that three of four self-employed workers choose their job voluntarily, with 41 percent of the self-employed saying they chose their job for its flexibility.<sup>17</sup>

Lastly, the reasons for the differences between the self-employed and wage-and-salary workers in retirement behaviors have implications for efforts to encourage the employment of the elderly. Our results suggest that eliminating mandatory retirement and practices of age discrimination may not be enough to increase the employment of older workers in wage-and-salary jobs. Instead, enhancing job flexibility so that employees can adjust their work efforts by accepting lower wages as their preferences, health, and productivity change, could better encourage labor-force participation among the elderly. Although this paper does not provide decisive evidence, the presence of heterogeneous jobs that offer a wide range of required work efforts, wages, and flexibility of work schedule may also help boost labor-force participation among older persons.

As Hurd (1996) noted, it would not be easy to find policies to reduce labor-market rigidities affecting workforce participation among older workers. Nevertheless, it may be desirable, at least for boosting the employment of older persons, to loosen such labor-market

---

<sup>16</sup> There is additional evidence suggesting that the quality of self-employed workers has improved over time. Since 1982, the educational attainment of the self-employed has increased more rapidly than that of wage-and-salary workers. Though most self-employed are employed in service and sales, the occupational composition of the self-employed has greatly improved. For example, the percentage of self-employed who are either professionals or semi-professionals increased from 4.1 percent in 1982 to 16.3 percent in 2004 (Keum and Yoon, 2005).

<sup>17</sup> The percentage distribution of each reply to the reason for self-employment is as follows: (1) Because I can earn more money (28.9 percent); (2) Because it is the work I wanted to do (4.9 percent); (3) Because it gives me more flexibility (41.3 percent); (4) Because of tax benefits (0.1 percent); (5) Because I could not get a wage job I wanted (10.1 percent); (6) Because it was difficult to get a wage job (13.1 percent); and (7) Other reasons (1.6 percent).

regulations as those that standardize wages, hours, and other work conditions across various jobs and within a particular job. It would also be helpful to drop the regulations that make it difficult for employers and employees to adjust work efforts and wages. For example, the requirements of providing fringe benefits and social insurances to employees make it difficult to diminish the hours of work by increasing the fixed costs of employment (Hurd 1996).

## References

Aubert, Patric, Eve Caroli, and Muriel Roger (2006): "New Technologies, Organization, and Age: Firm-Level Evidence," *Economic Journal* 116, F73-F93.

Bartel, A., and N. Sicherman (1993): "Technological Change and Retirement Decisions of Older Workers," *Journal of Labor Economics* 11(1), 162-183.

Boskin, M. J. (1977): "Social Security and Retirement Decisions," *Economic Inquiry* 15, 1-25. Chang, J. 2002. "Transition Paths from Work to Retirement," Paper presented at the OECD/KLI International Conference on Labor Market Policies in an Aging Era, Seoul.

Cheon, Byung-You (2003): "A Study of Selection of Self-Employment in Korea," *Korean Journal of Labor Economics* 26(3), 149-179.

Cho, Joonmo, and Sunwoong Kim (2005): "On Using Mandatory Retirement to Reduce Workforce in Korea," *International Economic Journal* 19, 283-303.

Choi, Seung-Hyun (2006): "Retirement Behaviors of Two Wage Earners Households," *Korean Journal of Labor Economics* 29 (1), 129-152.

Coile, Courtney, and Phillip Levine (2006): "Bulls, Bears, and Retirement Behavior," *Industrial and Labor Relations Review* 59(3), 408-429.

Costa, Dora. L. 1998. *The Evolution of Retirement*. Chicago; University of Chicago Press.

Friedberg Leora (2003): "The Impact of Technological Change on Older Workers: Evidence from Data on Computer Use," *Industrial and Labor Relations Review* 56(3), 511-529.

Friedberg, Leora, and Anthony Webb (2005): "Retirement and the Evolution of Pension Structure," *Journal of Human Resources* 40, 281-308.

Gruber J, and B. C. Madrian (1995): "Health Insurance Availability and the Retirement Decision," *American Economic Review* 87, 192-205.

Gruber J., and D. Wise (1999): *Social Security and Retirement around the World*, Chicago: University of Chicago Press.

\_\_\_\_\_ (2004): *Social Security Programs and Retirement around the World: Micro-Estimation*. Chicago: University of Chicago Press.

Gustman, Alan L., and Thomas L. Steinmeier (1984): "Partial Retirement and the Analysis of Retirement Behavior," *Industrial and Labor Relations Review* 37, 403-415.

\_\_\_\_\_ (1985): "The Effect of Partial Retirement on the

Wage Profiles of Older Workers,” *Industrial Relations* 24, 257-265.

Hurd, Michael. D. (1996): “The Effect of Labor Market Rigidities on the Labor Force Behaviors of Older Workers,” In David W. Wise, ed., *Advances in the Economics of Aging*, Chicago: University of Chicago Press, pp. 11-60.

Hurd, Michael. D., and M. J. Boskin (1984): “The Effect of Social Security on Retirement in the Early 1970s.” *Quarterly Journal of Economics* 99, 767-790.

Hurd M. D, and K. McGarry (1993): “The Relationship between Job Characteristics and Retirement,” NBER Working Paper 4558, National Bureau of Economic Research.

Keum, J., and J. Cho (2000): “Theory and Empirical Analysis of Selection into Self-Employed Jobs,” *Korean Journal of Labor Economics* 23 (S), 81-107.

Keum, J., and M. Yoon (2005): “Change and Trend of the Employment Structure of Self-Employment,” *Labor Review* 5 (May 2005): 15-30.

Kreuger, A. B., and J. Pischke (1992): “The Effect of Social Security on Labor Supply: A Cohort Analysis of the Notch Generation.” *Journal of Labor Economics* 10, 412-437.

Kim, Hak-Ju, and Kyung-Sook Yoo (2004): “Determinants of Reemployment of the Elderly Workers,” *Journal of the Korea Gerontological Society* 24 (2), 97-110.

Lee, Chulhee (1998): “Rise of the Welfare State and Labor Force Participation of Older Males.” *American Economic Review* 88, 222-226.

\_\_\_\_\_ (2001): “The Expected Length of Male Retirement in the United States, 1850-1990.” *Journal of Population Economics* 14, 641-650.

\_\_\_\_\_ (2002): “Sectoral Shift and Labor-Force Participation of Older Males in America, 1880-1940.” *Journal of Economic History* 62, 512-523.

\_\_\_\_\_ (2007): “Long-Term Changes in the Economic Activity of Older Males in Korea,” *Economic Development and Cultural Change* 56(1), 99-124.

\_\_\_\_\_ (2008): “Retirement Expectations of Older Self-Employed Workers in Korea: Comparisons with Wage and Salary Workers,” *Korean Economic Review* 24(1): 33-71.

McGarry, Kathleen (2004): “Health and Retirement: Do Changes in Health Affect Retirement Expectation?” *Journal of Human Resources* 39, 624-648.

NPS, National Pension Service (2010): Retrieved on December 12, 2010, from [http://www.nps.or.kr/jsppage/etc/data/data01\\_01.jsp](http://www.nps.or.kr/jsppage/etc/data/data01_01.jsp)

Park, Keong-Suk (2001): “The Effect of Work Status during Middle Life on the Retirement Process Later in Life Course,” *Korean Journal of Labor Economics* 24 (1), 177-205.

\_\_\_\_\_ (2003): “Labor Exit Process of Old Workers Aged 55 and Over: Implications for Typology of Retirement,” *Labor Policy Studies* 3(1), 103-140.

Parsons, D. O. (1980): “The Decline in Male Labor Force Participation,” *Journal of Political Economy* 88, 117-134.

\_\_\_\_\_ (1991): “Male Retirement Behavior in the United States, 1930-1950,” *Journal of Economic History* 51: 657-674.

Pedersen, H. (1950): “A Cultural Evaluation of the Family Farm Concept,” *Land Economics*



26, 52-64.

Quinn, Joseph, Richard Burkhauser, and Daniel Meyers (1990): *Passing the Torch: The Influence of Economic Incentives on Work and Retirement*. Kalamazoo, MI: Upjohn Institute.

Ryoo, Jaewoo (2005): "Earnings Opportunity in Self-Employment Sector and Workers' Self-Selection," *Economic Studies* 52, 5-32.

\_\_\_\_\_ (2000): "Labor Market Dynamics in the Self-Employed Sector in Korea," *Korean Journal of Labor Economics* 22 (1), 137-165.

Sung, Jaimie, and Jo-yup Ahn (2004): "Self-Employment as Bridge Employment," *Korean Journal of Labor Economics* 27 (2), 1-27.

\_\_\_\_\_ (2006): "What Makes the Older Work for Satisfactory Lives?" *Labor Policy Studies* 6 (1), 39-74.

Table 1: The Probability of Retirement between 2006 and 2008 by Employment Status (Percent)

	All aged 50+	Ages 50-54	Ages 55-59	Ages 60-64	Ages 65+
All	9.24	3.74	6.90	13.99	15.73
Self-employed	7.22	3.62	5.24	10.20	10.14
Wages	11.41	3.84	8.55	17.77	28.13
Male	6.97	1.04	3.39	11.53	14.29
Self-employed	5.13	1.41	1.04	7.79	9.35
Wages	9.14	0.75	5.79	15.60	26.32
Female	14.94	9.09	15.69	21.43	20.33
Self-employed	13.38	8.79	16.22	19.05	12.99
Wages	16.27	9.24	15.19	23.21	32.61

Source: The 2006 and 2008 KLoSA.

Table 2: Probability of Retirement between 2006 and 2008 by Selected Employment Characteristics (Percent)

Employment Characteristics		All	Male	Female	Ages 50-54	Ages 55-59	Ages 60-64	Ages 65+
All	Hours 30+	8.41	6.36	14.06	3.21	7.42	13.97	13.34
	Hours 0-29	14.38	11.60	18.64	9.09	3.13	14.10	26.37
SE	Hours 30+	6.26	4.20	12.78	3.00	5.36	9.46	8.25
	Hours 0-29	12.22	10.57	15.79	8.11	4.65	12.50	21.15
WS	Hours 30+	10.61	8.73	15.13	3.35	9.27	17.96	26.45
	Hours 0-29	17.65	13.79	21.31	10.34	0.00	16.67	33.33
SE	Non-agriculture	8.23	5.57	14.59	3.66	5.94	12.08	16.11
	Agriculture	4.82	4.27	7.84	3.23	2.08	4.26	5.83
SE	No employees	7.10	5.44	11.84	3.38	4.63	9.15	10.63
	Hiring employees	7.87	3.60	23.08	5.00	7.84	15.63	5.71
WS	No forced retirement	12.41	9.69	16.54	5.38	5.92	11.68	28.57
	Forced retirement	9.50	8.39	15.00	2.06	13.00	27.27	25.00
WS	Regularly employed	10.37	8.30	16.57	4.01	11.05	16.22	25.33
	Temporarily employed	18.06	21.62	14.29	6.98	3.23	30.30	32.43
	Daily employed	10.27	5.34	17.20	1.33	2.08	13.21	29.17

Source: The 2006 and 2008 KLoSA.

Table 3: Definition of Variables Used in the Regression Analysis

Variable	Definition
SELFEMP	= 1 if the person is self-employed, = 0 otherwise
MALE	= 1 if the person is male, = 0 otherwise
AGE	2006 Age
SCHOOL	The years of schooling
MARRIED	= 1 if the person is married, = 0 otherwise.
SP_WORK	= 1 if the person is married and his/her spouse work, = 0 otherwise.
MCHD_WORK	The number of male adult children (19 and older) who work
MCHD_NOWORK	The number of male adult children (19 and older) who work
FCHD_WORK	The number of female adult children (19 and older) who work
FCHD_NOWORK	The number of female adult children (19 and older) who work
HL_BAD	= 1 if self-reported health is poor or very poor, = 0 otherwise
WEALTH	Net household wealth (100 million Won)
PUBPEN	The expected present value of public pensions (100 million Won)
PVTPEN	The expected present value of private pensions (10 million Won)
NLINCOME	The total value of non-labor incomes (10 million Won)
HWAGE	The hourly wages (10 thousand Won)
HOURS30	=1 if the weekly hours of work is 30 to 39 hours, = 0 otherwise
HOURS40	=1 if the weekly hours of work is 40 to 49 hours, = 0 otherwise
HOURS50	=1 if the weekly hours of work is 50 to 59 hours, = 0 otherwise
HOURS60	=1 if the weekly hours of work is 60 to 69 hours, = 0 otherwise
HOURS70	=1 if the weekly hours of work is 70 to 79 hours, = 0 otherwise
HOURS80	=1 if the weekly hours of work is 80 hours or longer, = 0 otherwise

Note: The expected present value of public pension is computed based on each respondent's expectations about the amount of National Pension benefits and the age at which he/she begins to receive pensions. The expected present value of private pensions is calculated by summing up the expected present values of all private annuity insurances (computed from the information on the expected amounts of benefits and ages at which the respondent begins to receive them) and the expected value of severance pays (computed based on the amount of monthly wage, the length of tenure, and the timing of early liquidation of severance pay, if any). A discount rate of 3% is applied to the computation.

Table 4: Results of Logistic Regressions: Correlates of the Probability of Retirement

	(1) Full sample of SE and WS working 30 hours or longer in 2006 (Dependant mean = 0.082)			(2) Subsample excluding workers subject to mandatory retirement (Dependent mean = 0.080)		
	Mean	$\partial P / \partial x$	P-value	Mean	$\partial P / \partial x$	P-value
SELFEMP	0.504	-0.0769	<.0001	0.623	-0.0798	<.0001
MALE	0.735	-0.0884	<.0001	0.711	-0.0870	<.0001
AGE	58.926	0.0076	<.0001	59.811	0.0063	<.0001
SCHOOL	9.294	0.0017	0.3477	8.784	0.0024	0.2743
MARRIED	0.884	0.0328	0.1213	0.869	0.0282	0.2002
SP_WORK	0.392	-0.0151	0.3407	0.401	-0.0139	0.4216
MCHD_WORK	0.968	0.0011	0.8990	1.056	0.0047	0.6078
MCHD_NOWORK	0.400	0.0145	0.1941	0.362	0.0167	0.1863
FCHD_WORK	0.560	-0.0056	0.5736	0.580	-0.0045	0.6659
FCHD_NOWORK	0.737	-0.0171	0.0335	0.788	-0.0149	0.0751
HEALTH_BAD	0.176	0.0537	0.0004	0.196	0.0421	0.0090
WEALTH	2.270	-0.0025	0.0793	1.634	-0.0028	0.0712
PUBPEN	2.674	-0.0033	0.1083	1.793	-0.0100	0.0646
PVTPEN	1.147	0.0014	0.5886	0.367	-0.0183	0.1121
NLINCOME	0.680	0.0003	0.9204	0.658	-0.0001	0.9664
HWAGE	0.794	0.0183	0.0283	0.672	0.0203	0.0190
HOURS30	0.082	0.0201	0.4786	0.092	0.0239	0.4158
HOURS40	0.359	0.0369	0.0853	0.285	0.0316	0.1815
HOURS50	0.184	NI	NI	0.199	NI	NI
HOURS60	0.152	0.0313	0.2122	0.178	0.0373	0.1480
HOURS70	0.161	0.0363	0.1400	0.185	0.0365	0.1519
HOURS80	0.061	0.0410	0.1705	0.062	0.0384	0.2343
	Number of Observations = 1606 -2 Log L without covariates = 912.497 -2 Log L with covariates = 782.223 Chi-square = 107.915 P-value < .0001			Number of Observations = 1299 -2 Log L without covariates = 724.634 -2 Log L with covariates = 613.175 Chi-square = 88.918 P-value < .0001		

Source: 2006 and 2008 KLoSA.

Table 5: Results for Alternative Specifications and Subsamples

Description of specification or sample selection	(1) SE and WS working 30 hours or more in 2006			(2) Excluding WS workers subject to mandatory retirement from the sample used in (1)		
	N	$\partial P / \partial x$ for SE	P-value	N	$\partial P / \partial x$ for SE	P-value
With job characteristics	1606	-0.0633	<.0001	1299	-0.0701	0.0003
With job characteristics + industry	1606	-0.0696	0.0011	1209	-0.0701	0.0019
Males	1180	-0.0860	<.0001	924	-0.0816	<.0001
Females	426	-0.0680	0.1001	375	-0.0859	0.0461
Ages 50 to 54	562	-0.0417	0.0254	394	-0.0775	0.0015
Ages 55 to 59	409	-0.0259	0.4151	321	-0.0092	0.7669
Ages 60 to 64	267	-0.0751	0.1173	231	-0.0805	0.0831
Ages 65 and older	368	-0.2016	<.0001	353	-0.2034	<.0001
Nonagricultural workers	1326	-0.0617	0.0009	1022	-0.0734	0.0002
Excluding WS hiring employees	1472	-0.0910	<.0001	1165	-0.0991	<.0001
Excluding non-regular WS workers	1364	-0.0707	<.0001	1087	-0.0883	<.0001

Source: 2006 and 2008 KLoSA.

Note: Summary of 22 regressions in which all the independent variables employed in Table 4 are included (except the dummy variable for males for the regressions conducted separately for males and females) but omitted from the table.

Table 6: Comparison of Some Measures of Job Flexibility between SE and WS

	(1) Self-Employed	(2) Wage and Salary	(3) (1) / (2)
SD of 2006 weekly hours	14.918	12.616	1.182
SD of 2008 weekly hours	17.001	12.113	1.404
SD of 2006 earnings	373.856	123.967	3.016
SD of 2008 earnings	211.175	139.065	1.519
SD of 2006 hourly wages	2.009	0.769	2.612
SD of 2008 hourly wages	1.232	0.865	1.424
SD of the rate of change in hours	0.305	0.255	1.196
SD of the rate of change in earnings	1.273	0.629	2.024
SD of the rate of change in wages	2.037	0.751	2.712
% hours decreased by 10% between 06 and 08	43.466	34.652	1.254
% hours decreased by 20% between 06 and 08	29.194	20.550	1.421
% hours decreased by 30% between 06 and 08	17.701	11.350	1.560
% hours increased by 20% between 06 and 08	23.132	18.057	1.281
% earnings decreased by 20% between 06 and 08	37.257	13.672	2.725
% earnings increased by 20% between 06 and 08	32.437	31.642	1.025
% wages decreased by 20% between 06 and 08	35.589	16.939	2.101
% wages increased by 20% between 06 and 08	37.164	39.982	0.930

Source: 2006 and 2008 KLoSA.

Note: The sample is limited to the self-employed and wage and salary workers working 30 hours or more in 2006 who remained in the same employment status by 2008.

Table 7: Decomposition of the Difference between Self-employees and Wage and Salary Workers in the Probability of Diminishing the Hours of Work by 20 Percent or More from 2006 to 2008.

Variable	Ages 45 and older N= 2242	Ages 45-54 N=1287	Ages 55 and older N=?
$P_S$	0.292	0.232	0.345
$P_W$	0.206	0.194	0.228
$\phi_S$	0.982	0.972	0.990
$\phi_W$	0.887	0.895	0.871
$\phi$	0.933	0.925	0.942
$P_S^N$	0.290	0.230	0.342
$P_S^M$	0.400	0.286	0.667
$P_W^N$	0.200	0.189	0.223
$P_W^M$	0.252	0.244	0.265
$P^N$	0.245	0.206	0.298
$P^M$	0.272	0.250	0.309
$\Delta P$	0.086	0.038	0.117
$(P^N - P^M)\Delta\phi$	-0.003	-0.003	-0.001
$\phi\Delta P^N$	0.084	0.038	0.112
$(1 - \phi)\Delta P^M$	0.010	0.003	0.023
$\varepsilon$	-0.005	0.000	-0.017

Note. See text for the definition of each variable. The parameters are calculated from the 2006 and 2008 KLoSA. The sample is limited to workers who worked for 30 hours or longer in 2006.



Table 8: Results of Logistic Regressions: Correlates of the Probability of Retirement for SE and WS

	(1) The Self-Employed (Dependant mean = 0.056)			(2) Wage and Salary (Dependent mean = 0.109)		
	Mean	$\partial P / \partial x$	P-value	Mean	$\partial P / \partial x$	P-value
MALE	0.756	-0.0738	<.0001	0.713	-0.1110	<.0001
AGE	60.775	0.0028	0.0355	57.049	0.0137	<.0001
SCHOOL	8.700	0.0009	0.6895	9.897	0.0026	0.4093
MARRIED	0.876	0.0015	0.9511	0.892	0.0751	0.0397
SP_WORK	0.443	0.0179	0.3330	0.340	-0.0321	0.2389
MCHD_WORK	1.131	0.0013	0.8789	0.803	0.0001	0.9931
MCHD_NOWORK	0.360	-0.0023	0.8639	0.442	0.0350	0.0530
FCHD_WORK	0.609	-0.0206	0.1136	0.511	0.0110	0.4565
FCHD_NOWORK	0.867	-0.0292	0.0044	0.605	0.0001	0.9920
HEALTH_BAD	0.201	0.0444	0.0112	0.149	0.0634	0.0115
WEALTH	1.815	-0.0152	0.0160	2.732	-0.0016	0.5054
PUBPEN	1.496	-0.0033	0.5458	3.870	-0.0027	0.2325
PVTPEN	0.041	-0.3170	0.9865	2.271	0.0058	0.2388
NLINCOME	0.540	-0.0001	0.9682	0.822	-0.0004	0.9378
HWAGE	0.719	0.0219	0.0332	0.871	-0.0082	0.7990
HOURS30	0.091	0.0260	0.3452	0.072	0.0050	0.9245
HOURS40	0.230	0.0157	0.5286	0.491	0.0649	0.0684
HOURS50	0.218	NI	NI	0.151	NI	NI
HOURS60	0.187	0.0394	0.1082	0.118	0.0032	0.9447
HOURS70	0.213	0.0112	0.6519	0.109	0.0360	0.3989
HOURS80	0.062	-0.0373	0.4668	0.060	0.0760	0.1018
	Number of Observations = 809 -2 Log L without covariates = 347.471 -2 Log L with covariates = 278.753 Chi-square = 50.761 P-value < .0001			Number of Observations = 797 -2 Log L without covariates = 549.538 -2 Log L with covariates = 451.676 Chi-square = 75.932 P-value < .0001		

Source: 2006 and 2008 KLoSA.

Table 9: Results of Logistic Regressions: Flexibility of Hours and the Probability of Retirement

	SE and WS working 30 hours or more in 2006 (Dependant mean = 0.082)		
	Mean	$\partial P / \partial x$	P-value
SELFEMP	0.510	-0.0705	<.0001
IND_HOURS20	25.416	-0.0018	0.0433
MALE	0.739	-0.0827	<.0001
AGE	58.990	0.0074	<.0001
SCHOOL	9.277	0.0014	0.4680
MARRIED	0.885	0.0346	0.1078
SP_WORK	0.392	-0.0135	0.4220
MCHD_WORK	0.970	0.0035	0.6881
MCHD_NOWORK	0.400	0.0154	0.1754
FCHD_WORK	0.562	-0.0036	0.7163
FCHD_NOWORK	0.740	-0.0150	0.0640
HEALTH_BAD	0.175	0.0527	0.0005
WEALTH	2.272	-0.0027	0.0671
PUBPEN	2.695	-0.0035	0.0898
PVTPEN	1.107	0.0004	0.8877
NLINCOME	0.689	0.0001	0.9822
HWAGE	0.790	0.0182	0.0279
HOURS30	0.079	0.0174	0.5484
HOURS40	0.356	0.0355	0.0961
HOURS50	0.186	NI	NI
HOURS60	0.154	0.0250	0.3212
HOURS70	0.163	0.0383	0.1175
HOURS80	0.062	0.0379	0.2038
	Number of Observations = 1579 -2 Log L without covariates = 893.383 -2 Log L with covariates = 759.616 Chi-square = 108.058 P-value < .0001		

Source: 2006 and 2008 KLoSA.

Note: Workers for whom the information on industry is missing (N=23) and those who were employed in domestic service (N=6) are excluded from the sample because the variable IND\_HOURS20 could not be computed for them.

Table 10: Flexibility of Hours and the Probability of Retirement: Results for Subsamples  
( $\partial P / \partial x$  for IND\_HOURS20)

Description of sample selection	(1) All individuals working 30 hours or more in 2006			(2) Self-employed workers working 30 hours or more in 2006			(3) Wage and salary workers working 30 hours or more in 2006		
	N	$\partial P / \partial x$	P-value	N	$\partial P / \partial x$	P-value	N	$\partial P / \partial x$	P-value
All	1579	-0.0018	0.0433	806	-0.0008	0.4451	773	-0.0027	0.0805
Males	1167	-0.0021	0.0204	610	-0.0013	0.1614	557	-0.0030	0.0646
Females	412	-0.0003	0.9020	196	-0.0005	0.8854	216	-0.0001	0.9815
Ages 50 to 54	546	-0.0007	0.4818	220	-0.0000	0.3338	326	-0.0016	0.2948
Ages 55 to 59	403	-0.0038	0.0445	199	-0.0034	0.1696	204	-0.0030	0.3316
Ages 60 to 64	230	-0.0042	0.1033	124	-0.0030	0.2634	139	-0.0041	0.3632
Ages 65 and older	367	-0.0035	0.1104	263	-0.0018	0.3661	104	-0.0106	0.0676
Good health	810	-0.0021	0.0560	383	-0.0010	0.3976	427	-0.0022	0.2633
Fair health	492	-0.0039	0.0120	261	-0.0011	0.5418	231	-0.0059	0.0370
Poor health	277	-0.0027	0.3594	162	-0.0031	0.3534	115	-0.0037	0.4648

Source: 2006 and 2008 KLoSA.

Note: Summary of 20 regressions in which all the independent variables employed in Table 9 are included (except the dummy variable for males for the regressions conducted separately for males and females) but omitted from the table.

## Discussion Papers in Economics Seoul National University

For a listing of papers 1-70 please contact us by e-mail [ecores@snu.ac.kr](mailto:ecores@snu.ac.kr)

71. Youngsub Chun and Toru Hokari, "On the Coincidence of the Shapley Value and the Nucleolus in Queueing Problems," October 2006; *Seoul Journal of Economics* 20 (2007), 223-237.
72. Bong Chan Koh and Youngsub Chun, "Population Sustainability of Social and Economic Networks," October 2006.
73. Bong Chan Koh and Youngsub Chun, "A Decentralized Algorithm with Individual Endowments for the Probabilistic Serial Mechanism," October 2006.
74. Sunghoon Hong and Youngsub Chun, "Efficiency and Stability in a Model of Wireless Communication Networks," July 2007.
75. Youngsub Chun and Eun Jeong Heo, "Queueing Problems with Two Parallel Servers," November 2007.
76. Byung-Yeon Kim and Youngho Kang, "The Informal Economy and the Growth of Small Enterprises in Russia," September 2008.
77. Byung-Yeon Kim, "Informal Economy Activities and Entrepreneurship: Evidence from RLMS," September 2008.
78. Youngsub Chun and Boram Park, "Population Solidarity, Population Fair-Ranking, and the Egalitarian Value," April 2010.
79. Youngsub Chun and Boram Park, "Fair-Ranking Properties of a Core Selection and the Shapley Value," August 2010.
80. Donghyu Yang, "Regional Integration, Collective Security, and Trade Networks: West German and Japanese Economies under Allied Occupation," May 2012.