

勞 動 經 濟 論 集
 第27卷(1), 2004. 4, pp. 77~105
 © 韓 國 勞 動 經 濟 學 會

Toward A New Scheme for Unemployment Protection*

- UI Benefit vs. Self-insurance Through Borrowings -

Jungyoll Yun**

Given the limitations of UI benefit and self-insurance through precautionary savings, this paper suggests a new scheme of income support for the unemployed, which offers unemployed workers not only UI benefit but also borrowings from their future pension incomes. Allowing individuals to have effective self-insurance through pension-borrowing, this scheme provides them with consumption-smoothing and reduction in risk burden while maintaining search incentives of the unemployed. Simulation study based upon household panel data in Korea suggests that a heavy reliance should be set upon self-insurance through pension-borrowings rather than upon UI benefit, even for the low-income individuals who are subsidized under UI system. This result provides us with insightful implications for a social safety net in (fast-growing) developing countries, where people cannot afford a good amount of UI benefit or of precautionary savings against unemployment although they expect their incomes to be much higher in the future. Indeed, it is consumption-smoothing effect of self-insurance through pension-borrowings, as well as its incentive-maintaining effect, that makes it a promising alternative of social safety net in developing countries

—Key Words: Unemployment Insurance, Pension-Borrowing,
 Self-Insurance, Consumption-Smoothing, Incentive

투고일: 2004년 2월 16일, 심사일: 2004년 2월 19일, 심사완료일: 2004년 4월 9일

* This paper was presented for the International Workshop on Severance Pay Reform, Laxenburg, Austria, 2003.

I am grateful to Robert Holzmann, Hugo Hopenhayn, Milan Vodopivec and Joe Stiglitz for helpful discussions. Financial supports from the World Bank and the Korea Labor Institute are also gratefully acknowledged.

** Ewha University(jyun@mm.ewha.ac.kr)

I . Introduction

One of the important income support programs for the unemployed in Korea is unemployment insurance. The level of income protection against unemployment by UI, however, is quite limited in terms of compensation and coverage. There are a couple of reasons for this. First, UI benefit tends to weaken search incentives of the unemployed individuals and thus to prolong unemployment duration.¹⁾ This incentive effect, which has been confirmed in many empirical studies, leads the government to set limits on the level and payment duration of UI benefit. Second, there is little demand for unemployment insurance on the part of individuals in Korea. This is mainly due to some non-economic reasons, such as mistrust for the government and individual myopia, etc..

As UI is ineffective for these reasons the other option left for the unemployed individuals is self-insurance through their own savings. Individuals can voluntarily make precautionary savings against unemployment risk while they work. Although self-insurance through savings would not entail any incentive cost like UI benefit, it may pose a couple of important problems. First, individuals may not save enough to get well-prepared for unemployment because they may be myopic or because they expect the government to support them if they are unemployed without savings (moral hazard reason). This suggests that the precautionary savings against unemployment has to be mandated by the government. In fact, many developing countries implement mandatory savings program against unemployment such as severance pay system.²⁾ Severance pay, under which employers are mandated to

1) As for the issues on search incentive problem of UI benefit there have been a large volume of theoretical and empirical researches. See Devine and Kiefer(1991) for a good summary of the literature.

make contributions for their workers against their separation, can be viewed as a mandatory (precautionary) savings program for self-insurance against unemployment. To the extent that the severance pay is not funded frequently in reality, however, it may not serve as a good income support program for the unemployed.

The second problem is that the self-insurance through savings may involve considerable amount of distortion (in terms of consumption-smoothing over time) on the part of individual workers as they try to secure the desired level of consumption during unemployment. This would be particularly serious in developing countries where people cannot afford sufficient amount of savings before getting unemployed.³⁾

Given the limitations of UI benefit and self-insurance through precautionary savings, we can devise another type of self-insurance, which is the self-insurance through lifetime savings, i.e., through future savings as well as past savings. Put it in a different way, unemployed individuals may be allowed to borrow against their future savings such as their pension savings as modeled in Stiglitz-Yun(2002).

A corporate pension can also serve as a good self-insurance program for the unemployed, because an individual is allowed to withdraw some money out of his pension fund in case of unemployment. If the severance pay is converted into a corporate pension program, as recently proposed by the Korean government, therefore, it would be welfare-enhancing as it introduces self-insurance through future pension savings.⁴⁾

-
- 2) Provident Fund, although it is not a program against unemployment, is another type of mandatory savings program against various risks in some East Asian countries such as Singapore, Malaysia and Hong Kong. See Asher (1994).
 - 3) This is mainly because people suffer from low income in developing countries. What makes things worse in these countries is that capital markets are more imperfect than in advanced countries. For more general discussions on precautionary savings in imperfect capital market, see Costain (1999) and Lentz and Tranas (2001).
 - 4) The conversion of severance pay into a corporate pension scheme would also help solve other problems that we currently have with our social insurance system. A corporate pension, which is a funded pension plan, for example, can greatly alleviate the difficulty facing our pay-as-you-go pension system. This is because it is not going to be affected by

With the severance pay system being converted to a corporate pension, we would have two programs available to the unemployed in Korea - unemployment insurance benefit and the withdrawals from corporate pension fund. One can then ask what amount of withdrawals from the corporation pension should be allowed, or more precisely, what combination of UI benefit and withdrawals from the pension would be desirable. This is the very issue we explore in this paper.

The issue on the optimal mix of UI benefit and pension withdrawals has been theoretically analyzed by Stiglitz-Yun(2002), who, after identifying the advantages and disadvantages of the two types of unemployment benefits, argue that the optimal mix should involve a heavy reliance on pension withdrawals. Stiglitz-Yun demonstrates that UI benefit provides better insurance against unemployment, whereas pension withdrawal provides better intertemporal consumption smoothing and search incentives to individuals. One of the most important determinants of the optimal mix is the size of unemployment risk relative to one's lifetime income. Since the unemployment risk is fairly small relative to lifetime income for an individual in reality, the advantage of consumption smoothing by pension withdrawals gets large while the advantage of insurance by UI benefit gets small.⁵⁾

Following the theoretical arguments by Stiglitz and Yun (2002), this paper conducts a simulation study based upon Economically Active and Population Survey (1998-2002) to figure out the optimal mix of UI benefit and pension withdrawals in Korea. The simulation study shows that the optimal mix involves very little portion of UI benefit or that most of unemployment benefit should be financed by pension withdrawals. In particular, it demonstrates that pension withdrawals is favored over

the recent aging trend and because it can favorably affect individual savings and work decisions(See Lindback and Perrson (2003) on this issue). Also, a funded pension system can provide larger amount of pension benefit to retirees than an unfunded system for a given contribution rate, because, in general, the rate return to capital is higher than the rate of economic growth(McMorrow and Roeger, 2002). The transitional cost involved in conversion of an unfunded system to a funded one, which is one of the important obstacles to the conversion, would not be serious in this case.

5) Note that the risk burden imposed upon individuals by unemployment shock can be made small as the income loss is spread over the lifetime through consumption smoothing.

UI benefit even for the low-income workers, who tend to be subject to high unemployment incidence and thus tend to be subsidized by high-income workers under the UI system.

This paper is organized as follows. The next section describes briefly the main theme of the theoretical arguments on the integrated UI. Section 3 simulates lifetime profiles of wage and unemployment for individuals based upon a panel data set of Korean households. Section 4 characterizes the welfare-maximizing mix of UI benefit and pension withdrawal using the simulated profiles of wage and unemployment, and Section 5 concludes this paper by discussing implications and limitations of the analysis.

II. Theoretical Arguments for Integrated UI

1. Background of Integrated UI

One of the most important income support programs for the unemployed in many countries is unemployment insurance. Despite its importance, however, the unemployment insurance can hardly be successful in providing individuals with sufficient amount of income protection against unemployment. In fact, UI system offers very limited level of UI benefit for the limited unemployment spell in many countries.

One of the main reasons for this shortfall of UI benefit is because it causes the incentive costs, that is, because it attenuates search incentives of the unemployed and thus prolongs their unemployment duration. This adverse effect of UI has been widely supported by empirical evidences in many countries.

The insufficiency of UI benefit brings about serious welfare consequences for workers. It will result not only in incomplete consumption smoothing across states, i.e., in incomplete insurance against unemployment, but also in incomplete

consumption smoothing across time. The latter effect of UI benefit, which has not been dealt with in the existing literature on optimal UI,⁶⁾ needs to be taken seriously as well.

Intertemporal consumption smoothing is clearly welfare-enhancing for those with concave preference. It also improves welfare as it reduces the risk burden of unemployment for a risk averse individual; by smoothing out his consumption to spread out any income reduction caused by unemployment over the lifetime, an individual can make unemployment risks less burdensome.

Given the limited amount of UI benefit, an individual may be able to smooth out his consumption over time by his own savings. In other words, an individual can make some precautionary savings against possible unemployment shocks in the future, making his consumption profile flatter over time. But the precautionary savings an individual make prior to unemployment shock may not be sufficient enough to perfectly smooth out his consumption profile. This would be especially true because unemployment shock tends to occur in earlier times of an individual career rather than in later times. Put it in a different way, precautionary savings may be costly as an individual tries to save sufficient amount of money in advance before unemployment shock.

Distortionary aspect of precautionary savings leads us to consider borrowings as a means of intertemporal consumption smoothing. Borrowings, together with savings, will enable individuals to fully smooth out their consumption profile over the lifetime without creating any distortion, rendering welfare costs associated with limited UI much less serious. In other words, individuals can have effective and non-distortionary self-insurance through borrowings (against future savings) as well as past savings.

The problem is, however, that capital market is not perfect in reality, so that an individual may not be able to borrow against his future income. It is partly because of the imperfect capital market that the limited UI benefit results in serious welfare

6) See Hopenhayn and Nicolini (1997), etc..

consequences for workers, so that the government intervention is necessary.

If the government offers individuals borrowings, it may want to secure good collateral for each borrower. A natural candidate for that would be individual pension which is mandated by the government. In other words, the government can allow unemployed individuals to borrow against their future pension incomes. An individual, when unemployed, would then be supported not only by UI benefit but also by borrowings against his pension. In this respect UI is integrated with a pension program, and this program will be called integrated UI system in this paper.

2. Optimal Design of Integrated UI

Basically the integrated UI combines unemployment insurance with self-insurance through individual lifetime savings. There are some factors we need to consider in designing the optimal mix between the two, which are related to the advantages and disadvantages of UI benefit and self-insurance financed by pension. An important advantage of UI benefit is apparently to provide insurance against unemployment shock, i.e., to reduce consumption difference between different states. But it has obvious disadvantage in terms of search incentive on the part of unemployed workers, i.e., of prolonged unemployment. As for intemporal consumption smoothing, UI benefit is also inferior to self-insurance through pension-borrowings.

The optimal amount of UI benefit is determined so as to balance out its positive effect against the negative effects compared to self-insurance. As discussed before, the problem of incomplete consumption smoothing caused by the limited UI benefit can be effectively dealt with by borrowings against pension. For example, the consumption smoothing over time through pension-borrowings will alleviate risk burden imposed upon individuals. This suggests that the optimal level of UI benefit would be significantly reduced under the integrated UI system, compared to that under the ordinary (unintegrated) UI program.

Taking these effects into account, we can argue that we need to rely less on UI benefit (or more on pension borrowings) for unemployment support as individuals

become less risk-averse and as unemployment spell is more sensitive to job search. Another important determinant of the optimal mix between UI benefit and pension-borrowings is the relative size of unemployment risk. As the unemployment risk gets smaller relative to lifetime income, more of unemployment support should come from pension borrowings rather than UI benefit. This is because the advantage of UI benefit gets small when the risk burden on individuals caused by a given amount of income loss gets small as it is spread out over the longer period of time.

In particular, Stiglitz-Yun(2002) showed that as the size of unemployment risk becomes vanishingly small, an unemployed individual has full unemployment benefit financed by pension borrowings only and full search incentive, while bearing no risk burden associated with income loss due to unemployment. In other words, when unemployment risk is very small we do not need UI to provide income support for the unemployed and we can achieve an ideal outcome with full incentive and no risk burden. As shown in the simulation study of this paper, the integrated UI may involve a fairly small amount of UI, if any, for the plausible set of parameter values.

Another important factor for the optimal mix of UI and pension borrowings is the slope of wage income profile, which would change the optimal mix toward more of pension borrowings and less of UI. Individuals facing steeper wage profile would like to have more borrowings from their future pension when unemployed because they expect to have large amount of future incomes. In this respect, for individuals with high education, who tend to have steeper wage income profile than those with low education, the optimal mix would involve more of pension borrowings relative to those with low education.

One important point related to the above argument is that the integrated UI or self-insurance through borrowings against future savings would become more effective as the economy is expected to grow rapidly, which is often the case in many developing countries. For those with low income who cannot afford a good amount of UI benefit or of self-insurance through precautionary savings, it would improve welfare greatly if unemployed individuals are allowed to withdraw some

fund out of their future incomes.

There are other factors that may affect the optimal mix, one of which is the need for public mandatory pension. One rationale for the public mandatory pension system is moral hazard on the part of individuals. That is, an individual expecting to be bailed out by the government when he has no income during retirement may not save sufficiently enough for his retirement. If individuals are required to maintain a certain level of pension for the moral hazard reason, this would set a limit to the amount of pension borrowings.

The participation incentives on the part of individuals would be another consideration we need to take in designing the integrated UI. Participation would be mandatory for regular workers, who are mandated to contribute to public pension fund which acts as a collateral for borrowings under the integrated UI. As for non-regular workers who may be able to avoid contributing to public pension, however, their participation incentives need to be seriously considered. In particular, it would be possible that a non-regular worker may decide to leave the integrated UI system after borrowing a large amount of money against his future pension. This adverse incentive on the part of non-regular workers would severely limit the amount of pension borrowings for the unemployed in the informal sector. The effectiveness of integration would, therefore, depend upon how much attractive the public pension is for the non-regular workers.

Finally, distributional concern associated with integration may affect the desired level of pension borrowings. It seems to be believed that financing unemployment benefit for an individual by his own lifetime income is regressive because low-income workers tend to have higher probability of being unemployed than high-income workers. We can think of two counter-arguments against this belief, however. First, to the extent that the integrated UI allows individual to borrow when needed, it could be more beneficial to low-income workers who tend to be in greater need of borrowings than high-income workers because of their lower amount of savings. The argument proposed by Bjorklund(1993) that the distribution of lifetime income across individuals is more disperse than income distribution at a

given point in time would make this counter-argument more convincing.⁷⁾ Second, even when the integration turns out to be regressive, the government can intervene to redistribute pension among individual so as to undo any distributional inequity caused by integration.

3. Toward Integrated Social Insurance

The idea of integrated UI can be applied to integration of other social insurances — such as medical insurance, disability insurance — with pension. Integrated medical insurance, for example, would enhance welfare because, compared to unintegrated medical insurance, it can provide individual with more effective consumption smoothing and can improve trade-off between incentive and risk burden. We can then think of what we call an integrated social insurance, under which several social insurances are integrated with a pension.⁸⁾

As more of social insurances get integrated with a pension, then the optimal amount of pension borrowings for a shock should decrease because the size of total risk covered by integrated social insurance gets larger. One may then ask whether or not any social insurance has to be excluded from the integrated social insurance. The answer to this question will be no, i.e., that basically no social insurance should be excluded from the system. The reason for this is two-fold. First, for us to achieve effective consumption smoothing any income reduction caused by a shock should be taken as reduction in lifetime income. Second, the amount of pension borrowings in case of a particular shock should be determined contingent upon the size of pension expected at that point. When an individual expects to have relatively large amount of pension during his retirement because he has not experienced any shock, for example, the amount of pension borrowing offered in case of a shock to come in the future should be set to be large.

7) This issue is also discussed in OECD (1996).

8) Folster (2001) and Folster and Trofimov (1999) did some empirical studies on the relevance of this system based upon Swedish data.

The second aspect of integrated social insurance implies its advantage of the state-dependency, which is to allow an individual to efficiently use his pension fund for self-insurance. The level of self-insurance against a particular shock under this system would be determined based upon the occurrences (and the expected occurrences) of shocks in the past and future and upon the expected amount of pension available at the time of retirement. The level of self-insurance against a medical shock, for example, should be set to be large for those who have not experienced other shocks so as to secure relatively large amount of pension fund. This advantage of state-dependency implies that the benefit of the integrated social insurance is determined by the correlation among the shocks. If all the shocks are perfectly correlated to each other, for example, then the benefit of joint integration would be minimal. In general the benefit of integration would be inversely related to the correlation among the shocks.

III. Simulation of Lifetime Histories of Wage and Employment Status

1. Data

The data set used in this study is based upon Economically Active Population Survey (EAPS), a monthly household survey administered by Korea Statistical Office, and its Supplementary Survey (SS). A given sample continues to be used for four or five years. Since it started in 1963, it has replaced one sample by a new one in every four or five years. Thus, it is basically an accumulation of 5-year (or 4-year) panel data sets. The survey EAPS asks respondents about their individual characteristics such as gender, age, schooling, marital status and about their work histories, job characteristics, and their search activities during unemployment. We use EAPS done from January, 1998 to December, 2002.

One major problem with EAPS is that it does not contain any information about individual income. Thus the government has recently administered another survey supplementary to EAPS, called Supplementary Survey (SS), once a year since 1998, which includes wage information for the respondents. Thus we will use SS done in September/1998, June/1999, August/2000, August/2001, and August/2003, each of which corresponds to EAPS 1998-2002, respectively. We construct a data set by merging EAPS with SS on the basis of individual household ID, his/her gender and birth date.

Since all the observations are not free from defects, some defected ones had to be discarded. We will first select only the male individuals who completed their schooling and continued responding to the survey for more than six consecutive months during the five-year period for our analysis. This selection procedure yields 24,673 observations for the high-education group (college and over) and 64,224 observations for the low-education group (high school and lower), which constitutes the sample for the estimation of unemployment incidence (Sample 2). An individual is taken as unemployed in a particular year when he gets unemployed for more than one month in that year.⁹⁾ It is assumed that any unemployment spell starts at the beginning of the year when it occurs.¹⁰⁾ For the estimation of unemployment duration for the unemployed individuals, we focus on those with unemployment experiences to end up with the sample of 3,055 high-ed. individuals and 9,961 low-ed. individuals (Sample 3).

For the estimation of lifetime wage income we exclude from Sample 2 those who did not state their incomes or those who were out of labor force for more than 2 years. This will reduce the sample size to 18,004 and 40,847 for the high-education and for the low-education group, respectively (Sample 1). Note that the wage income data is adjusted by GDP deflator. The basic statistics of these samples are

9) In this study we ignore the possibility that an individual is out-of-labor-force, which is very small in the sample we have because it consists of male individuals aged 25-60.

10) When an unemployment spell spans two consecutive years, the spell is assumed to start at the beginning of the first year. Also, when an unemployment spell is longer than one year, the remaining spell (over the year) is assumed to occur in the next year.

Table 1. Basic Statistics For The Three Samples

| Sample | Ed. | sample size | Mean (Standard Deviation)* | | | | | Mean Age (S.D.) |
|----------|------|-------------|----------------------------|-------------------|-------------------|-------------------|--------------------|-----------------|
| | | | 1998 | 1999 | 2000 | 2001 | 2002 | |
| Sample 1 | High | 18,004 | 165.23 (107.34) | 160.50 (83.00) | 171.59 (82.19) | 179.78 (84.15) | 194.19 (118.70) | 38.06 (8.25) |
| | Low | 40,847 | 120.51 (95.34) | 117.19 (59.46) | 119.71 (55.14) | 126.33 (60.18) | 136.45 (65.54) | 42.17 (9.11) |
| Sample 2 | High | 24,673 | 0.127 (0.333) | 0.131 (0.338) | 0.102 (0.302) | 0.100 (0.300) | 0.076 (0.266) | 38.23 (8.64) |
| | Low | 64,224 | 0.183 (0.386) | 0.180 (0.384) | 0.126 (0.332) | 0.114 (0.318) | 0.084 (0.278) | 43.00 (9.63) |
| Sample 3 | High | 3,055 | 0.411 (0.284) | 0.347 (0.257) | 0.344 (0.270) | 0.324 (0.253) | 0.278 (0.200) | 33.68 (8.14) |
| | Low | 9,961 | 0.374 (0.270) | 0.306 (0.239) | 0.280 (0.230) | 0.263 (0.217) | 0.234 (0.180) | 40.30 (9.83) |

Note: * Sample 1: monthly wage income in 10,000 KRW(Korean Won)
 Sample 2: 1 (or 0) if unemployed (or if employed)
 Sample 3: measured in year

shown in Table 1.¹¹⁾

2. Estimation of Lifetime Wage Income

In simulating the lifetime wage income for an individual we first estimate how the years of individual experiences and technological progress (represented by the number of calendar year) affect individual wage incomes. For this purpose we regress wage income on experience EXP (\equiv age-25), year dummies and TECH (\equiv calendar year-1998) using a random-effect model to control for individual-specific effects. Letting W_{it}^j be the wage income for an individual i with t years of experience in j -th education group ($j=H, L$), we have the following estimation results:

11) The sample selection procedure will inevitably give rise to some bias and thus lead to bias in estimation. Although this procedure would probably discard more of lower income individuals in each sample of education group than of higher income individuals, the sample selection problem might be more serious for low-education group than for high-education group. This paper does not control the possible selection bias.

$$\log W_{it}^H = 4.4417 + 0.0618EXP - 0.0012EXP^2 + 0.0439TECH + B_1^H \cdot Y$$

(0.0127) (0.0018) (0.0001) (0.0020)

(1)

$$\log W_{it}^L = 4.3710 + 0.0407EXP - 0.0012EXP^2 + 0.0442TECH + B_1^L \cdot Y$$

(0.0115) (0.0014) (0.0001) (0.0016)

(2)

where Y, B_1^j are vectors of year dummies and their coefficients, respectively, and the numbers in parenthesis are standard errors of the coefficient estimates.

Setting $TECH$ and year dummies to be zero, we can get the estimated wage incomes by experience for each education group *in a given year presumed to be 2002*. Figure 1 or 2 depicts the predicted wage income by experience for each education group, and contrasts the actual (average) wage income by experience in the year 2002. We can see from these figures that the actual wage incomes are well predicted over the years of experience by the estimated values.

Figure 1. Wage Income By Experience (High-Ed. Group)

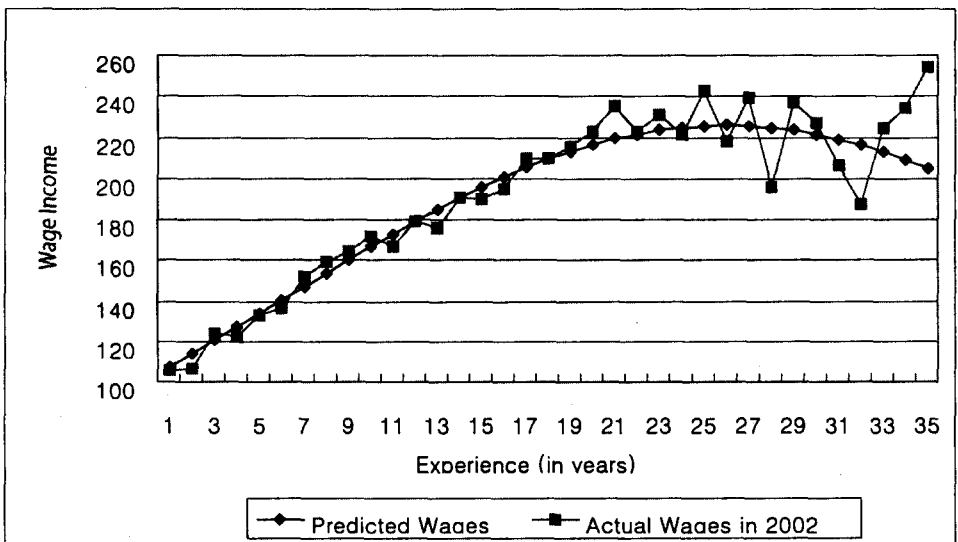


Figure 2. Wage Income By Experience (Low-Ed. Group)

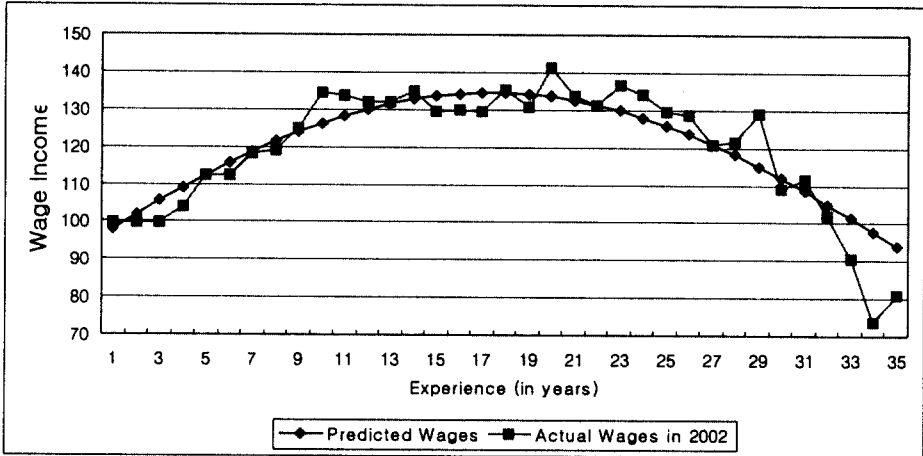
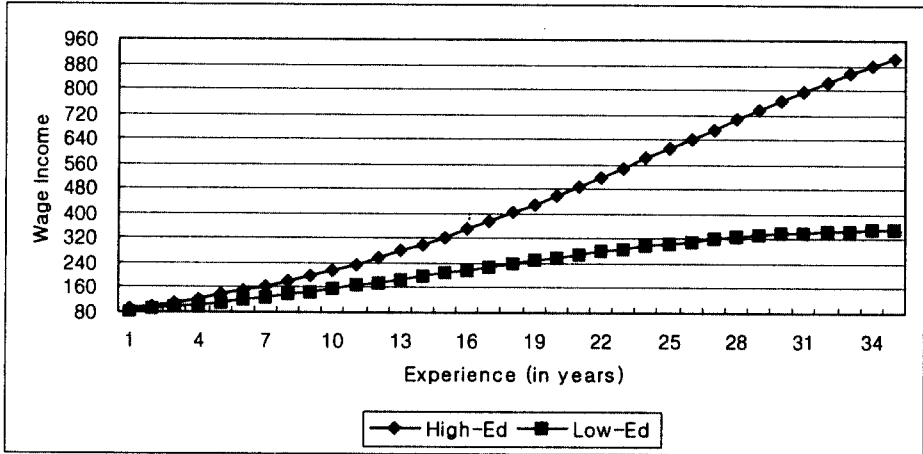


Figure 3. Lifetime Wage Income Profile



Note that the lifetime wage income profile an individual can expect to have is different from the one in Figure 1 or 2 in that the former should also contain the wage increase associated with the technological advancement in addition to that associated with experience. We can obtain the lifetime income profile for an individual by setting $TECH = EXP-1$ in (1) and (2). Figure 3 depicts the lifetime

wage income profile for each education group. Notice that the slope of the wage profile is steeper for each education group than that in Figure 1 or 2. It should also be noted that high education individuals tend to have steeper wage profile than low-education individuals.

As for the lifetime unemployment incidence for an individual, we estimate a following logit model

$$\text{Probability (Unemployment} | Z_i) = \frac{\exp(Z_i)}{1 + \exp(Z_i)},$$

and we get

$$\hat{Z}_i^H = -2.1901 - 0.2687EXP + 0.0059EXP^2 + B_2^H \cdot Y$$

(0.1297) (0.0159) (0.0005) (3)

$$\hat{Z}_i^L = -2.9845 - 0.0999EXP + 0.0017EXP^2 + B_2^L \cdot Y$$

(0.0931) (0.0097) (0.0003) (4)

where B_2^j is a vector of coefficients for year dummies Y . By setting year dummies to be zero, we obtain from the estimated equation (3) and (4) a profile of unemployment incidence $P_i^j(j=H, L)$ by experience t for each education group j in the year presumed to be 2002.

As for the unemployment duration for an unemployed individual, a following duration model is set up to estimate the hazard rate, i.e., the probability that an unemployed individual gets reemployed after a certain period of unemployment. In particular, we estimate an exponential model

$$f(t; \lambda) = \lambda \exp(-\lambda t),$$

where λ is the hazard rate, which is assumed to be constant during a spell of unemployment. Estimating the hazard rate for an unemployed individual, we have

$$\lambda_t^H = 1.2723 + 0.0065EXP - 0.0004EXP^2 + B_3^H \bullet Y$$

(0.0530) (0.0066) (0.0002)

(5)

$$\lambda_t^L = 1.4582 + 0.0004EXP - 0.00003EXP^2 + B_3^H \bullet Y$$

(0.0376) (0.0036) (0.00001)

(6)

where B_3^j is a vector of coefficients for year dummies Y .

Setting year dummies to be zero, we can predict from (5) and (6) a profile of hazard rate $\hat{\lambda}_t^j$ by experience t or each education group j in the year presumed to be 2002. We can then compute the expected unemployment duration D_t^j for each year t of experience by

$$D_t^j = \int t^i f(t^i; \hat{\lambda}_t^j) dt^i$$

Note that D_t^j is the expected unemployment duration of an *unemployed* individual in the j -th education group, and that it needs to be distinguished from the expected

Figure 4. Unconditional Unemployment Spell (High-Ed. Group)

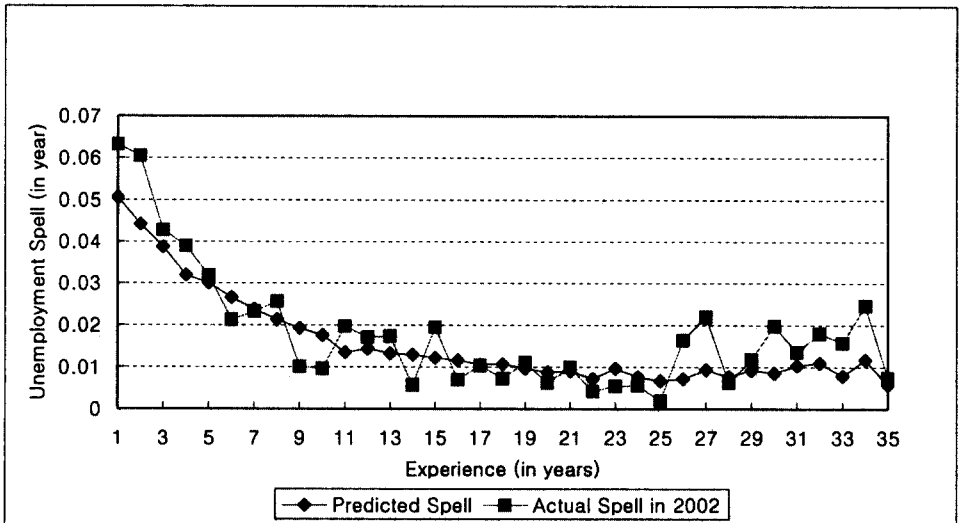
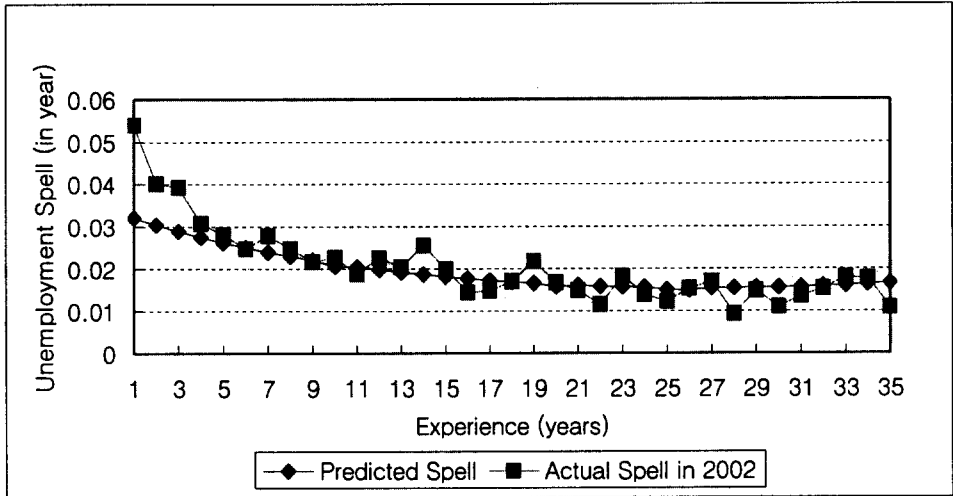


Figure 5. Unconditional Unemployment Spell (Low-Ed. Group)



unemployment duration of any individual (*employed or unemployed*), which can be measured as $I^j(t) = D_t^j \cdot P_t^j$. Figure 4 or 5 depicts a profile of *unconditional* expected unemployment duration, I_t^j , for each education group j , and contrasts it with the actual (average) unemployment duration, showing that the latter profile is well predicted by the estimated profile.

IV. Optimal Mix of UI and Pension-Borrowings

Using the simulated lifetime profiles of wage, unemployment incidence and duration we obtained, we will figure out the optimal mix of UI and pension-borrowings for a given amount of unemployment benefits for each education group. In doing this we will assume that the replacement rate of unemployment benefit is fixed as b_u and that there is no limit to the duration of UI benefit.¹²⁾

12) This assumption is not consistent with the actual UI system in Korea, where there is a

Let us describe UI and pension systems in detail. As for UI system which can be characterized by replacement rate b_u and UI tax rate T_u , the following would be true:

$$\begin{aligned} & b_u \left\{ f^H \sum_{t=1}^T W_{it}^H I_t^H (1+r)^{1-t} + f^L \sum_{t=1}^T W_{it}^L I_t^L (1+r)^{1-t} \right\} \\ & = T_u \left\{ f^H \sum_{t=1}^T W_{it}^H (1-I_t^H)(1+r)^{1-t} + f^L \sum_{t=1}^T W_{it}^L (1-I_t^L)(1+r)^{1-t} \right\} \end{aligned} \quad (7)$$

where T is the retirement age of an individual, f^j ($j=H,L$) is the portion of education group j , and $I_t^j \equiv P_t^j \cdot D_t^j$. The LHS and RHS of (7) represent the expected UI benefit and the expected UI tax revenue, respectively. The pension system, which is characterized by the replacement rate b_p and pension tax rate T_p^j ($j=H,L$), on the other hand, should satisfy the following condition:

$$T_p^j \sum_{t=1}^T W_{it}^j (1-I_t^j)(1+r)^{1-t} = b_p \sum_{t=T+1}^N W_{Tt}^j (1+r)^{1-t}, \quad (8)$$

where N is the age at which an individual dies. The condition (8) represents the pension budget constraint of the government for each education group.

Under the integrated UI only those who have experienced unemployment during their working careers are supposed to repay the borrowings by their pension savings. For the simplicity of analysis we assume in this paper that all the individuals who have experienced unemployment have the same unemployment record during their careers.¹³⁾ Let q^j be the portion of those having unemployment experiences. Then, we have

limit (about 6 months) to the benefit duration. This assumption, which is made just for the simplicity of simulation analysis, would not affect the main result of this paper because it will make UI benefit relatively favorable than under the current UI system in Korea.

13) This assumption would enable us to ignore complexities resulting from the heterogeneity in unemployment record among those having unemployment experiences.

$$\sum_{i=1}^T W_i^j I_i^j (1+r)^{1-i} = q^j \sum_{i=1}^T W_i^j D_i^j (1+r)^{1-i} \quad (9)$$

for each $j=H, L$. If all the unemployment benefits are financed by pension-borrowings, then the amount of repayment per year during one's retirement, which is denoted by $R^j W_{TT}^j$ (where R^j is called deduction rate for education group j), should satisfy the following.

$$b_u \sum_{i=1}^T W_u^j I_i^j (1+r)^{1-i} = q^j R^j \sum_{i=T+1}^N W_{TT}^j (1+r)^{1-i},$$

indicating that the expected UI benefit (LHS) is equal to the expected repayment from pension (RHS) for j -th education group.

Let a be the portion of unemployment benefit that is financed by UI given the replacement rates of UI benefit and pension, implying that UI tax rate and deduction rate would be aT_u and $(1-a)R^j$ ($j=H, L$), respectively. What is important in this setting is that unemployment duration I_i^j is positively related to the portion a of UI benefit. The relationship between I_i^j and a is assumed to be as follows.

$$I_i^j(a) = I_i^j(1)(1 - (1-a)\gamma), \quad (10)$$

where T indicates the sensitiveness of unemployment duration to UI benefit.¹⁴⁾

Note that I_i^j is taken as the current unemployment duration shown in the data set, because all the unemployment benefit is currently financed by UI, i.e., $a=1$. Thus, the relationship (10) quantifies how the unemployment duration would become shortened compared to the current level as a decreases, i.e., as more of unemployment benefit gets financed by pension-borrowings instead of UI benefit.

Finally, we set the payoff function of an individual to be

14) Empirical studies on the incentive effects of UI benefit have shown that the elasticity of unemployment duration with respect to UI benefit is around 0.1 or less than 1 (see Levine and Kiefer (1991)). It can be shown that T is greater than the elasticity of unemployment duration with respect to UI benefit.

$$V = \sum_{t=1}^N U(X_t)(1+r)^{1-t}$$

where r is the discount rate for utility which is the same as interest rate, X_t is the amount of consumption in year t , and

$$U(X_t) = \frac{X_t^\delta}{\delta}$$

Note that individual utility function is of constant relative risk-aversion, which is $1-\delta$.

The expected utility of an individual under the integrated UI with the portion of UI being a would then be

$$V_i^j(a) = \sum_{t=1}^T U(W_{t,t-1}(1-aT_u - T_p^j))(1-I_t^j(a))(1+r)^{1-t} + \sum_{t=1}^T U(b_u W_{t,t-1})I_t^j(a)(1+r)^{1-t} \\ + \sum_{t=T+1}^N \{q^j U((b_p - (1-a)R^j)W_{T,T-1})(1+r)^{1-t} + (1-q^j)U(b_p W_{T,T-1})(1+r)^{1-t}\}$$

The optimal mix a_j^* of integrated UI for the j -th education group will be the one that maximizes the expected utility $V_i^j(a)$:

$$a_j^* = a(\delta, \gamma, r, b_u, b_p, j) \tag{11}$$

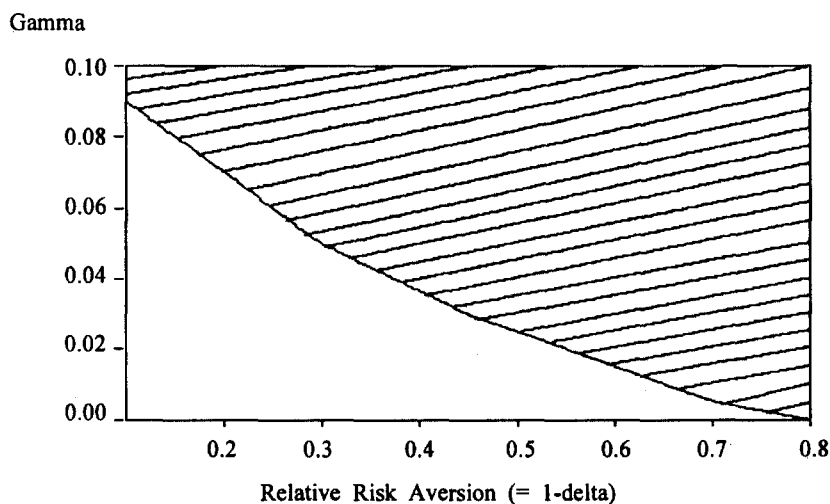
The relative preference for UI benefit over pension-borrowings, which is represented by the mix a , varies with education groups. High-education group of workers may in general prefer pension-borrowings to UI benefit because of the following reasons. First, high-education group of workers are supposed to subsidize low-education group under the UI, because the former group is in general less subject to unemployment shock than the latter group while the same UI tax rate is applied to both of the two groups. Second, high-education group of workers, who have steeper wage profile than low-education group, are more in need of intertemporal consumption smoothing than the other group. Since pension-borrowings is more effective in consumption smoothing than UI benefit, therefore, it should be preferred by high-education group. In addition to these aspects of the optimal mix

for each group of workers, we will examine other important factors determining a^* .

Setting $r=0.05$, $b_u, b_p=0.4$, we can simulate the optimal mix a_j^* for each education group given the parameter values of δ, γ , which is shown in Figure 6. The simulation results on the optimal mix indicate that most of unemployment benefits should be financed by pension-borrowings rather than UI benefit. For high-education group of workers, in particular, there is no need for reliance on UI benefit under any circumstance. That is, pension system can take care of unemployment risk entirely as well as retirement risk for high-education group.

As for the low-education group, there are certain circumstances under which some amount of UI benefit is desirable. Figure 6 indicates that some amount of UI may be necessary as relative risk aversion is low and/or elasticity of unemployment duration with respect to UI benefit (represented by γ) is low. Note, however, that the parameter values of γ and relative risk aversion that are required for the desired level of UI benefit to be positive are too low to be realistic; the relative risk-aversion is assumed to be 3-4 in many literatures and the elasticity of unemployment duration are estimated to be around 0.1 in many studies.¹⁵⁾ It is

Figure 6. Region (Shaded Area) for No UI Benefit ($a^* = 0$) (Low-Ed Group)



15) See Devine and Kiefer (1991).

suggested, therefore, that even for the low-education group of workers unemployment benefit had better be financed by pension borrowings rather than UI benefit.

One of the welfare-enhancing effects of pension-borrowings compared to UI is that pension-borrowings would not weaken individual search incentives. This point is shown in Figure 6, where as γ (indicating incentive effect of UI) gets higher, it is more likely that UI had better be completely replaced by pension-borrowings. Figure 6 also shows that pension-borrowings may still be superior to UI even when $\gamma=0$, i.e., when UI does not involve any disincentive effect, if individual risk-aversion is not too low.

This suggests another kind of welfare-enhancing effect of pension-borrowings, which is intertemporal consumption smoothing. This paper presumes that, in each year, the amount of consumption is the same as that of income, reflecting the fact that consumption is constrained by income in each period due to imperfect capital market. Thus, there is great need for consumption smoothing on the part of individuals, which can be more effectively met by pension borrowings rather than by UI benefit. The amount of welfare improvement by consumption smoothing is positively related to the concavity of utility function or to the degree of relative risk-aversion. Thus, pension-borrowings would become more favored as individuals get more risk-averse.

One important point we have to address finally is that insurance effect of UI benefit is outweighed by consumption-smoothing effect of pension-borrowings. As outlined in Section 2, the risk burden of unemployment becomes small as income loss by unemployment is spread out over the long retirement period by pension-borrowings. This would be especially true when the size of unemployment risk is fairly small compared to one's lifetime income, which is evidenced by the data set used by this paper.¹⁶⁾ Thus, although both of the two effects positively depend upon risk-aversion of individuals, the difference in size between the

16) This is also confirmed in the case of US by Feldstein-Altman (1998).

consumption-smoothing effect of pension-borrowings and the insurance effect of UI benefit is increasing in risk-aversion. This is not consistent with Stiglitz-Yun(2002), who argue that the reliance on UI benefit should be heavier as individuals get more risk averse. This is mainly because consumptions are completely smoothed out over time (except while unemployed) by savings and borrowings in Stiglitz-Yun(2002), so that additional pension-borrowings may not yield any positive welfare effect.

One related point is that the consumption smoothing effect of pension-borrowings is closely related to perfectness of capital market. The preference for pension-borrowings over UI benefit, therefore, would become greater as the capital market is more imperfect or as consumption is more constrained by income. This also suggests that capital market imperfection may lead to a heavy reliance on pension borrowings, which would be reinforced by individual risk-aversion.

IV. Conclusion

This paper examines a new scheme of income support for the unemployed, what we call integrated UI, which offers unemployed workers not only UI benefit but also borrowings from their future pension incomes. Allowing individuals to have self-insurance through pension-borrowing, the integrated UI provides them with consumption-smoothing and reduction in risk burden in the presence of unemployment risks. Following the theoretical arguments by Stiglitz-Yun(2002) for the integrated UI, this paper outlines the factors that affect the optimal mix between pension-borrowings and UI benefit. Using household panel data of Korea, this paper also simulates the integrated UI to figure out the desired mix between UI and self-insurance through borrowings.

Since the integrated UI deals with consumption, income and savings in the context of lifetime, the empirical analysis of this system should be based upon a data set containing lifetime histories of income and employment status. With EAPS

(Economically Active Population Survey) in Korea, a 5-year (household) panel data set, therefore, we first estimate the effects of individual experience upon wage income, unemployment incidence and unemployment duration in order to simulate their lifetime profiles. Using the estimated profiles we analyze the optimal mix between pension-borrowings and UI benefit for a given set of parameter values.

Focusing on the two parameters — relative risk-aversion and sensitiveness of unemployment duration with respect to UI benefit (τ) — in particular, this paper identifies the parameter space over which UI is not necessary, i.e., over which all the unemployment benefits should be financed by pension-borrowings. The results of this paper demonstrate that under plausible circumstances the current UI benefit has to be completely replaced by pension-borrowings, even for the low-education group who are to be subsidized by high-education group under UI system. This also suggests that welfare-enhancing effects of pension-borrowings associated with search incentive and intertemporal consumption-smoothing are so strong that they outweigh the positive effects of UI - insurance benefit¹⁷⁾ and possible subsidy provided to low income workers under UI system.¹⁸⁾

The strong consumption-smoothing effect of self-insurance through borrowings suggests a new direction we might take in devising a social safety net in developing countries. People in developing countries cannot afford a good amount of UI benefit and of precautionary savings against unemployment, while they are subject to frequent unemployment shocks. On the other hand, they expect their incomes to be

17) Note that insurance effect of UI becomes small in the presence of self-insurance through borrowings and savings, because the size of unemployment risk is fairly small compared to lifetime income.

18) If we restrict ourselves to much lower income workers of the low education group, however, UI benefit might be favored over pension borrowings for them. This is because they can get considerable amount of subsidy under UI while consumption-smoothing effect of borrowings would be small due to their limited amount of pension savings. Integration of UI with pension may not be effective for this group of workers. This possibility, however, would not affect the overall relevance of integrated UI to the extent that much larger portion of workers, including low-education workers subsidized under UI, favor pension-borrowings over UI benefit, as is evidenced by our simulation study.

much higher in the future because their economies tend to grow rapidly, but capital markets in those countries are fairly imperfect. If they are given the opportunities to withdraw some of their future savings under this circumstance, they would be able to cope with unemployment risks very effectively through self-insurance. Indeed, it is consumption-smoothing effect of self-insurance through pension-borrowings, as well as its incentive-maintaining effect, that makes it (or the integrated UI) a promising alternative of social safety net in developing countries.

Another point to be made finally is that welfare effect of integrated UI has an important implication for the conversion of severance pay into corporate pension system, which is to be implemented sometime this year in Korea. As a corporate pension system provides individuals with self-insurance through pension-borrowings, we need to have an appropriate coordination between unemployment benefit from the system and the existing UI benefit. This is exactly the issue that the integrated UI deals with; the optimal mix we have examined in this paper would indicate the desired coordination between the two sources of unemployment benefits. A corporate pension scheme proposed by the Korean government tends to downplay the role of corporate pension fund as unemployment benefit. According to the proposed scheme, an unemployed individual is allowed to make some withdrawals from his or her pension only after six months of unemployment.¹⁹⁾ In other words, an unemployed individual is to be supported by the current UI system in the first place before resorting to the corporate pension. This does not seem to be consistent with the insight provided by this paper, that is, that much of unemployment benefit had better be financed by pension-borrowings rather than UI benefit.

19) It should be noted at this moment that the currently proposed scheme of corporate pension has not clearly specified its role as an unemployment benefit yet, and that the argument suggested above is just based upon a tentative proposal of unemployment protection program in the corporat pension scheme.

References

- Asher, M.G. *Social Security in Malaysia and Singapore - practices, issues and directions*, Institute of Strategic and International Studies, Malaysia, 1994.
- Bjorklund, Anders. "A Comparison between Actual Distributions of Annual and Lifetime Income: Sweden 1951-92." *Review of Income and Wealth* 39 (4) (December 1993): 377-386.
- Costain, J. "Unemployment Insurance with Endogenous Search Intensity and Precautionary Savings." Working Paper, Universität Pompeu Fabra, 1999.
- Devine, T. and N. Kiefer. *Empirical Labor Economics*. New York: Oxford University Press, 1991.
- Feldstein, Martin and Daniel Altman. "Unemployment Insurance Savings Account." NBER Working Paper 6860, 1998.
- Folster, S. and G. Trofimov. "Social Insurance based on Personal Savings Account: A Theoretical Analysis." Working Paper, Stockholm: The Swedish Research Institute of Trade, 1999.
- Folster, S. "An Evaluation of Social Insurance Savings Account." mimeo, Stockholm: The Swedish Research Institute of Trade, 2002.
- Greenwald, B. and J. E. Stiglitz. "Externalities in Economies with Imperfect Information and Incomplete Markets." *Quarterly Journal of Economics* 102 (2) (May 1986): 219-254.
- Hopenhayn, H. and J. Nicolini. "Optimal Unemployment Insurance." *Journal of Political Economy* 105 (2) (April 1997): 412-438.
- Lentz, R. and T. Tranas. "Job Search and Savings; Wealth Effects and Duration Dependence." Working Paper, Northwestern University, 2001.
- Lindback, A. & M. Perrson. "The Gains from Pension Reform." *Journal of Economic Literature*. 41 (1) (March 2003): 74-112.

McMorrow, K. & W. Roeger. "EU Pension Reform: An Overview of the Debate and an Empirical Assessment of the Main Policy Reform Options." *Economic Papers*, European Commission, 2002.

OECD. *Employment Outlook*. Paris: OECD, 1996.

Stiglitz, J. & J. Yun. "Integration of Unemployment Insurance with Retirement Insurance." NBER Working Paper, No. 9199, September 2002.

abstract

실업자 보호정책의 개편 방향: 실업급여와 연금 통합을 중심으로

윤 정 열

본고는 저축을 통한 자가보험이나 실업급여가 현실적으로 제한되어 있는 상황에서 실직자에게 실업급여뿐 아니라 미래 연금을 담보로 한 대출을 허용하는 새로운 실업자 보호 제도를 제시하고 그 실증적 효과성을 패널자료에 의해 분석하고 있다. 이 제도는 실직자들이 미래 소득을 담보로 대출을 받아 효과적 자가보험을 갖도록 함으로써 실업급여에 비해 구직유인을 유지하게 할 뿐 아니라 소비 균등화 및 실직위험 부담 완화를 꾀할 수 있도록 한다. 본고는 경제활동인구조사에 근거한 1998~2002년 패널자료를 이용하여 시뮬레이션하였고 그 결과 기존 실업급여제도 하에서 보조를 받고 있는 저학력 계층도 실업급여보다는 연금담보 대출을 더 선호한다는 사실을 보고하고 있다. 이 결과는 연금담보 대출의 소비 균등화 및 구직유인 강화에 의한 후생증대 효과가 매우 강력함을 시사하고 있으며, 제한적인 효과밖에 갖지 못하는 기존 실업급여제도를 대체할 수 있는 새로운 실직자 보호정책 대안이 될 수 있음을 보여주고 있다.

주제어: 실업보험, 자가보험, 연금대출, 소비 균등화, 구직유인