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ABSTRACT

Firms may encourage their workers to retire early, as early retirement can be a “soft” way to renew or to reduce the work force. Experience-rating the cost of early retirement produces incentives for firms to avoid the lay-offs of the aged. Using a natural experiment, we show that this experience-rating actually does reduce the lay-offs of the older workers. As unemployment occurring late in a career generally leads to early retirement, the experience-rating then also reduces early retirement. The goals of increasing the employment rates of the older workers could therefore be supported by experience-rating the early retirement costs.

JEL-classification: J14, J26, J63

Keywords: Early retirement, experience-rating, unemployment of the aged

CONTENTS

1	Introduction	7
2	Institutional setting.....	9
	Early retirement schemes in Finland	9
	Pension reform in 2000	10
	Effects of the reform on early retirement incentives.....	12
3	Data	15
	Sample	15
4	Empirical strategy.....	18
5	Results	20
	Regression results.....	22
6	Conclusion	26
	Appendix	27
	References	28

1 Introduction

Extensive literature on the effect of the economic incentives on retirement treats the retirement decision essentially as a labor supply issue. Workers who approach the retirement age evaluate their prospective wage and pension streams, and choose the retirement age that maximizes their expected lifetime earnings or utility. Substantial empirical evidence indicates that the incentives provided by the social security systems have an impact on the age of the labor force withdrawal. Pensions that are actuarially unfair encourage early retirement, and countries with more generous social security benefits tend to have a lower average retirement age. (Gruber and Wise, 1998)

Employer behavior has received much less attention in the retirement literature. In a pure labor supply model, the workers are free to choose the retirement date that is optimal for them. Yet firms may also offer incentives to encourage their workers to retire early. Early retirement can therefore provide a “soft” way to reduce or to renew the workforce.

Early retirement that is firm-induced can take different forms, depending on the institutional setting. Hutchens (1999) suggests that the early retirement provisions of the US Social Security System can be used as a form of unemployment insurance. Since social security benefits are not experience-rated, early retirement benefits effectively subsidize workforce reductions. Even more explicit subsidies exist in other countries. For example, the long-term unemployed in Germany, before a recent pension reform, could retire at the age of 60.

In this paper, we analyze retirement via long-term unemployment in Finland, where the social security system enables the unemployed to withdraw from the labor market already at the age of 55. This “benefit tunnel” starts off with unemployment insurance benefits and continues with unemployment pension benefits until old-age retirement at the age of 65. An interesting feature of this tunnel is a partial experience-rating of the unemployment pension benefits. Early retirement expenses are therefore partly charged to the employer.

To structure an argument in which both the employer and the employee behavior matter in retirement, we adopt the ideas of Feldstein (1976, 1978), Topel (1984), and Hutchens (1999). Accordingly, we consider retirement as a joint decision by employees and employers. In other words, employees behave as in a labor supply model, and make their withdrawal decisions based on the expected benefits. Employers, in contrast, influence these decisions, because they act as gatekeepers to the unemployment-related benefits. While the employee decisions are influenced by the level and the availability of the benefits, the employer decisions are also influenced by the share of the benefits that is charged to the firm. We therefore expect the early retirement to depend both on the amount of the benefits and the degree of experience-rating of these benefits.

To test this effect, we use data from the 2000 pension reform in Finland. This reform reduced the unemployment-related early retirement benefits and changed the experience-

rating schedule for them. Both the decrease in benefits and the change in the degree of experience-rating differed across employees and employers. In particular, the decrease in benefits only affected workers who were eligible for extended benefits (those who were older than 55 years of age). Experience-rating, in turn, increased considerably in the largest firms, while it increased less, was unchanged, or even decreased in other firm sizes. Since the reform affected different employer-employee categories differently, we can identify the effect of the reform by comparing the changes in the early exit rates in the different categories of worker age – firm size.

Our analysis shows that the experience-rating of the early retirement benefits matters. The reduction in the withdrawal rates was larger in the firms that faced larger increases in the cost of early retirement. This finding has no benchmark in the early retirement literature, but it is consistent with the previous research on the effects of the experience-rating on an employee's entry to unemployment (Topel 1983 and 1984, Card and Levine 1994, and Anderson and Meyer 1994 and 2000). Hence, our key contribution is to show that the experience-rating of the unemployment-related early retirement benefits may have similar effects on the experience-rating of the unemployment insurance benefits. This result supports the claim that firms may influence the retirement decisions of their employees.

The rest of this paper is organized as follows. In Section two, we describe the relevant details of the early retirement schemes in Finland, and the changes that took place in the pension reform in year 2000. In Section three, we present our data, and in Section four, we lay out our empirical strategy. The empirical results are in Section five, and the final section concludes.

2 Institutional setting

Early retirement schemes in Finland

The official retirement age in Finland is 65. Yet only a small fraction of workers actually stay in the labor force until this age. This is mainly due to the early retirement schemes, most important of which are the disability and the unemployment pensions. In 2002, about 75 percent of the 60 to 64 -year -olds received some early retirement benefits. Forty percent of these early retirees received disability pension benefits, and 27 percent received unemployment pension benefits.¹ (Statistical Yearbook of Pensioners in Finland, 2003)

In this essay, we focus on the unemployment pensions because the employer role in them is indisputable. A worker needs first to be laid off before he can retire with unemployment related benefits. Those who retire in Finland because of unemployment first receive unemployment insurance benefits; at the age of 60, they become eligible for the unemployment pension benefits and finally, at the age of 65, they receive old-age pension benefits.

The Finnish unemployment insurance (UI) pays out two types of benefits: an earnings-related and a flat-rate.² There is no cap on the earnings-related benefits, but the replacement rate is strongly decreasing in previous earnings. For the median income worker, the gross replacement rate of the UI benefits is 55%. The maximum duration of the unemployment insurance benefits is 500 days for all other age groups, except for the aged unemployed. A worker who is at least 57 years old when his unemployment insurance benefits expire is entitled to an extension of the benefits until the age of 60.

The eligibility requirements for the unemployment pension benefits are that the worker is at least 60 years old, and has received unemployment insurance benefits for a minimum of 500 days. The amount of the unemployment pension benefits is approximately equal to the amount of the old-age pension benefits. All pension benefits depend on past earnings and employment history. In general, each year in employment adds 1.5% to the pensions, so that a forty-year career provides a pension that is 60% of the base wage. Under the current rules, this base wage is the average wage over the last ten years of each employment contract.

Accounting for both the unemployment insurance benefits and the unemployment pension benefits implies that a worker who loses his job after the age of 55 is entitled to unem-

¹ Another large group are the old public sector pension schemes where the retirement age was 63.

² In order to receive the earnings-related unemployment benefits, a worker needs to be a member of an unemployment insurance fund. According to the Working life barometer, approximately 80% of the employees in Finland were UI fund members in year 2000. Unemployed who are not entitled to UI benefits can receive labour market support. This equals the flat-rate UI benefit, but is means-tested.

ployment-related benefits until old-age retirement. This system is commonly known as “the unemployment tunnel”. The tunnel creates powerful incentives to withdraw permanently from the labor market up to ten years before the official retirement age. As we will demonstrate below, the entry rate to unemployment increases dramatically at the age of 55, and the workers who become unemployed after this age rarely return to work.

The administration and funding of the UI benefits and the unemployment pension benefits differ. The earnings-related unemployment benefit system is administered by 42 UI-funds. These funds receive a subsidy from the government as well as contributions from their members. The UI system is not experience-rated and, hence, the employer has no liabilities for the UI benefits.

The pension system in Finland is administered by private pension providers. These providers collect universally set, mandatory pension contributions from both employees and employers. The employer contribution rates can vary with the age of the worker and the size of the firm, and the employer contributions to the early retirement benefits are partially experience-rated. This degree of experience-rating depends on the firm size. The smallest firms, those with less than 50 employees, do not have experience-rating, as these firms pay a fixed tariff rate for each employee.³ In larger firms, the contribution rate is partially experience-rated and partially based on a rate that is age-dependent and set for a firm with exactly 50 employees. When a worker retires with an unemployment pension, the present value of the expected early retirement benefit stream is pre-funded, and the former employer pays a fraction of this fund. This cost structure is designed to encourage firms to avoid lay-offs of the older workers.

Pension reform in 2000

In order to constrain early retirement, the trade unions and the Finnish government implemented two important changes in the unemployment pension scheme in the year 2000. First, the accrual rates of the unemployment pension benefits were reduced. Before 2000, the unemployment pension was calculated almost as if the unemployed had been working up to their old-age retirement. After 2000, the benefit calculations took employment history into account only up to the age the employee began receiving the unemployment pension. The reform thus reduced the incentives for early retirement, and the maximum reduction in a pension was 4.0 percentage points.⁴

The second part of the reform changed the firm liabilities of the unemployment pension (and the disability pension) benefits. Before the year 2000, firms with more than 300 em-

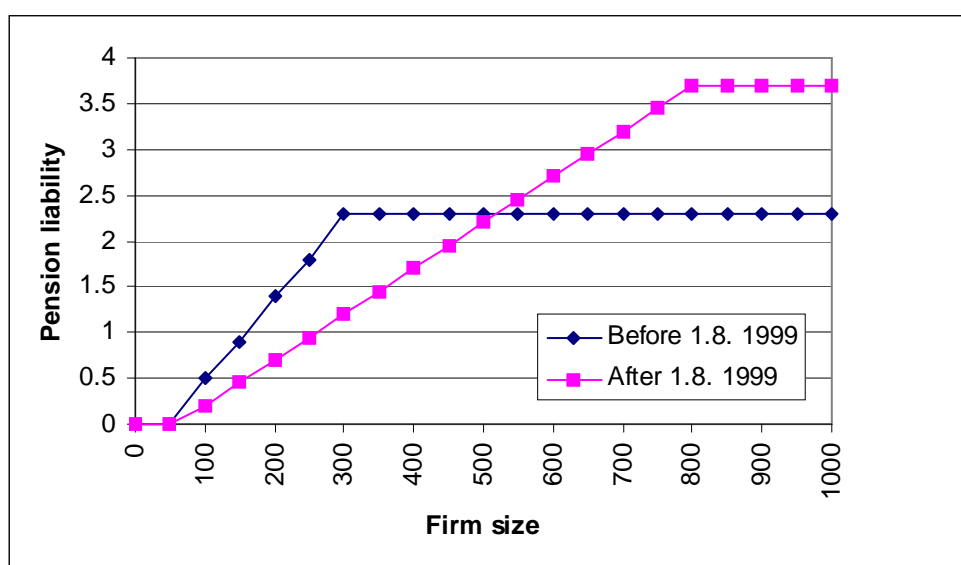
³ In 2000, the small employer contribution rate was 17.32 percent of the gross wage.

⁴ This reduction was done only on the unemployment pension benefits. The old age pension benefits were not reduced in the reform.

employees paid 50 percent of the present value of the unemployment pension benefits. The liability share of the firms with 50 – 300 workers increased linearly with the firm size from zero to 50 percent of the expected benefits. In 2000⁵, the new maximum liability share was set at 80 percent of the present value of the expected early retirement benefits, and this maximum applied to firms with more than 800 employees.⁶ The liability shares for the smallest firms (<50 employees) were unchanged, and the pension liabilities for the firms with 50-800 employees were adjusted so that the firm share of the benefits increased linearly with the firm size in this range.

Figure 1 shows the pension costs for a firm when a 60-year old former employee starts to receive an unemployment pension. We see that after the reform in 2000 (August, 1999), the largest firms pay slightly less than four years' pension payments. (The unit of the y-axis is a multiple of the annual pension benefits.) This corresponds to 80 percent of the present value of the pensions paid between the ages 60 and 65, taking into account the expected survival rates.

Figure 1: Pension cost for the firm when a 60-year -old former employee begins to receive the unemployment pension (as a multiple of the annual pension benefits)



Note: Calculations are based on the actuarial rules of a major pension insurance company, Ilmarinen.

⁵ The law was changed on January 1, 2000. The new rules, however, applied retrospectively to all dismissals after the August 1, 1999.

⁶ The liability share for the disability pensions before the year 2000 was 100 % at maximum, and this maximum affected those firms with more than 1000 employees. The reform hence equalized the experience-rating schedules for both the disability and the unemployment pensions. Because of the non-experience-rated unemployment benefits, the unemployment pension is cheaper for a firm than the disability pension also post-reform.

Figure 1 illustrates that the firm size affects the change in the cost of the unemployment pension benefits. In particular, unemployment pensions became substantially more expensive for large firms. For example, the maximum cost increase for the firms with more than 800 employees amounted to approximately 1.5 years of pension payments. Given that the pension is approximately 50 to 60 percent of the previous earnings, this cost increase corresponds almost to an annual salary. In contrast, the changes in the firm-size thresholds implied that the unemployment pensions became somewhat less expensive for the firms that had between 50 and 500 employees. Firms with less than 50 employees were unaffected by the reform.

Effects of the reform on early retirement incentives

A useful summary measure of the net incentives created by the pension system is a layoff subsidy, defined as the share of the worker benefits that are not covered by the firm liabilities (Topel 1983 and 1984). We calculate this subsidy for a median income worker using the Finnish social security rules for the expected worker benefits and firm liabilities.

We first define the worker replacement rate as the expected stream of social security benefits from the time of lay-off until old-age retirement, divided by the corresponding wage. For the social security benefits, we calculate the unemployment insurance and the unemployment pension benefits that a worker is entitled to, were he to be laid-off at a specific age. To get the subsidy, we subtract the firm liabilities from the so-calculated benefit stream. To yield a subsidized replacement rate, we also divide the subsidy by the corresponding wage stream. This subsidized rate then depends on the age of the worker at dismissal, the size of the firm and the year of the lay-off. Table 1 reports this subsidized replacement rate for selected age and firm size categories pre- and post-reform.

Table 1: *Subsidized replacement rates for dismissals for a median income worker by age and firm size*

		Firm size			
Age		<50	250	500	>800
50	1999	0.30	0.30	0.30	0.30
	2000	0.30	0.30	0.30	0.30
55	1999	0.57	0.47	0.45	0.45
	2000	0.55	0.50	0.44	0.37
60	1999	0.58	0.44	0.41	0.41
	2000	0.56	0.49	0.41	0.31

Notes: Figures are calculated by subtracting the firm share of the costs from the expected employee benefit stream, and dividing this by the corresponding wage stream. The expected benefit stream is calculated as the present value of all expected benefits from the age at dismissal to the old-age retirement at the age of 65 (hence, adding up the unemployment insurance benefits and the unemployment pension benefits). The calculations are made for a median income worker (2000 €/month), and the discount rate is the one used in the year 2000 by the insurance companies, 4.25%.

The above table shows that the subsidy is 30 percent of the corresponding wage stream when a 50-year-old worker is fired. This subsidy is the same in all firm categories and does not change in the reform. All 50-year old workers are eligible for the UI-benefits merely for two years, and thereafter they receive labor market support. They are not eligible for the unemployment pension, but rather receive the labor market support up to the age of 65. As there are firm liabilities only in the unemployment pensions, there are no liabilities for a 50-year old, and the subsidized rate in this case merely equals the replacement rate paid to the unemployed.

The smallest firms (the left column) are not experience-rated. For this reason, the subsidized rate in this firm category equals the replacement rate of the worker. The replacement rate increases dramatically from 30 percent to 57 percent when the workers are 55 at the time of the dismissal. If workers are fired at this age or after, they are eligible for the extended unemployment insurance benefits and the unemployment pension. Both the unemployment insurance benefits and the unemployment pension benefits are considerably higher than the fall-back social insurance benefit, the labor market support. After the dramatic jump in the subsidy at the age of 55, the differences in the subsidized rate are small and depend on the age at dismissal. The small differences result from the differences in the amount of the unemployment insurance benefits and the amount of the unemployment pension benefits, and the differences in time each of these benefits is received. For example, workers who are 55 when laid-off, first receive the UI-benefits for five years, and then the unemployment pension benefits for five years. Those who are dismissed at the age of 60, in turn, receive the UI-benefits for two years and the unemployment pension benefits for three years.

The decline in the replacement rates after the reform for employees in small firms is caused by the change in the accrual rules of the unemployment pension. Nevertheless, the decrease in the replacement rate is smaller than the decrease in the pension because a part of the total unemployment period is covered by the unemployment insurance benefits which did not change in the reform.

The effect of the experience-rating can be seen in the table in the subsidized rates for the older age groups across the different sizes of firms. The subsidized rate in the large firms is smaller than the replacement rate for the worker, because the employer is partly liable for the unemployment pension benefits. For example, the replacement rate for a 55-year-old pre-reform is 57 percent, but the public subsidy is 45 percent. This difference reflects the firm coverage.

The bottom rows also illustrate how the reform changed the subsidies. For the largest firms, the subsidized rate decreased by ten percentage points, mainly due to the increase in the degree of the experience-rating. By comparison, the subsidized rates for the lay-offs actually increased for some firm size - worker age categories, because the firm liabilities for the unemployment pension benefits were reduced. This is the case, for example, for those firms with 250 employees. For these firms, the subsidized rates increased between three and five percentage points, depending on the worker's age.

3 Data

The data that we use to evaluate the effect of the year 2000 pension reform are a sample from the Employment Statistics of Statistics Finland. The Employment Statistics is based on 30 different administrative registers that cover the whole population. The data contain information on individual characteristics (including wage and pension benefits), employment and unemployment spells, and some information on the employers, based on the last employment spell during the year.

For our purposes, the two key registers are the register of the job seekers of the Ministry of Labor and the employment register of Statistics Finland. The job seekers register contains detailed information on the unemployment spells (for example, the starting date of the spell). Since only registered unemployed are eligible for unemployment benefits in Finland, the register covers all unemployed who receive benefits. This register also includes the reason for the entry into unemployment, allowing us to distinguish between voluntary quits and dismissals for different reasons.

The employment register contains data on each employment spell. The register also includes an employer identification code for each worker. These codes are not released for confidentiality reasons, but some information on the employer is added to the individual data. Most importantly for our purposes, the added information includes a size category of each employer. This is the information we use to calculate the firm pension liabilities. Other details on the employment contract include the starting and possible ending date of the contract, and the pension act under which the contract is insured.⁷

Sample

For the estimations, we used a sample of about 430,000 individuals between the ages of 45 and 74 in 1996. This is a 25 percent random sample of the age groups in question, and it was drawn from the Employment Statistics by Statistics Finland. To analyze the pension reform of the year 2000, we created two data samples, one comprising of all on-going employment spells in the beginning of 1999, and another one, with all on-going employment spells in the beginning of the year 2000.

We made six comparable restrictions on our pre- and post-reform sample. First we restricted the samples to those who were employed during the last week of the previous year, and who were insured under the largest pension act, the Employee's Pension act (TEL). We

⁷ There are seven major pension acts covering different sectors. We focus on workers covered by the Employee's pension act (TEL), which covers about 55 percent of all employment in Finland (about 90 percent of private sector employment).

further selected only those individuals who were between 50 and 63 years of age at the beginning of the year, and did not die during our sample period. We then dropped all individuals who received some pension benefits in the previous year (for example, part-time pensions). In order to concentrate on the exits from permanent employment, and to avoid problems related to limited liability rules (concerns employment which lasts less than three years), we also removed anyone whose current employment began within three years before the beginning of our sample (that is, after January 1st of 1996 and 1997). We then defined the entry into unemployment from the information on a new unemployment spell starting some time in 1999 and 2000. We calculated the entry rates by worker age and firm size as a fraction of all those who became unemployed during the year. Finally, we merged the pre-reform and post-reform samples into one data set with the year dummies.

After imposing all the restrictions, we had 45,582 ongoing employment spells in the beginning of 1999. Of these, 2,664 individuals experienced at least one unemployment spell during that year. Consistent with the hypothesis that unemployment spells at an older age tend to become long and eventually lead to early retirement, 2,041 of the spells were still in progress at the end of 1999 (25 had retired) and 1,715 did not end by the end of our observation period (104 retired).⁸ For our post-reform sample, the year 2000, we had 47,214 ongoing employment spells in the beginning of the year. 2,126 unemployment spells began that year, and 1,482 of them did not end before the end of 2000 (8 have retired). The rest of the descriptive statistics of the dataset are found in the appendix.

Because our data ends in 2000, we could not verify how many of the new entrants into unemployment never returned to work. To support the claim that unemployment at the end of the career often leads to a permanent exit from the labor market, we would need to have followed these same individuals over several years. As this was not possible, we used the same data source to examine what happened to those who entered unemployment earlier. To illustrate our point, we selected those whose unemployment spell began in 1996 and who qualified for the continuing high benefits.

Out of those who were older than 55 and who lost their jobs sometime in 1996, 11.2 percent were back at work at the end of the same year. Over the following years, the share of the re-employed remained remarkably constant. At the end of the next year (1997), only a slightly higher share of the same group (13.6%) was at work. Thereafter, the worker share in this sample decreased slightly until the end of our data set (13.3% in 1998, 11.5% in 1999, and 11.9% in 2000). The most predominant labor market status for those who lost their job in 1996 continued for several years to be unemployment (87.4% at the end of 1996, 81.1% at the end of 1997, and 80% at the end of 1998). Three years after their loss of employment, the share of the unemployed started to decline (66.9% at the end of 1999 and 52.4% at the end of 2000). Retirement shares, in contrast, produced a mirror image to these

⁸ If we restrict the sample only to those who qualify for the continuing high benefits, the share of those who continue in unemployment is considerably higher in the following years.

unemployment shares, as the retirement shares increased sharply in time (1% at the end of 1996, 3.5% at the end of 1997, 4.9% at the end of 1998, 19.9% at the end of 1999 and 33.5% at the end of 2000). We therefore concluded that more than 85% of those who lost their jobs in 1996 and qualified for the continuing high benefits, never really returned to work, but eventually retired.

4 Empirical strategy

In order to test whether the reforms in the year 2000 changed the employee and the employer behavior, we matched our replacement rate and firm cost share calculations for a median income worker, to our sample from the Employment Statistics. As we observed the firm size in 11 categories and concentrate on 14 age groups, we calculated the replacement rates and the lay-off rates pre- and post-reform for the resulting 154 cells. We then compared the changes in the incentives in these cells to the changes in the lay-off rates pre-and post-reform.

We also used these grouped data in the regression analysis. The unemployment risk in the cells was regressed on the replacement rates and the firm cost share. In these regressions, we controlled for the age and the firm size by including all the age dummies (14) and all the firm size category dummies (11), as well as all of their interactions (154). These dummies controlled completely for any age and firm size effects, and the identification of the incentive coefficients was then based on the difference in the differences, that is, the differential changes in the pension benefit and the experience-rating parameters among these 154 groups.

In this case, we did not really need the individual data to identify the model. Since the identification was based on the changes that affect the same way all workers in the same category of the worker age – firm size, the micro-data added little to the estimates. However, micro data was useful in increasing the precision of the estimates, and served as a robustness check ensuring that the effects that we found in the aggregate data were not caused by changes in the worker composition across the firms. We therefore estimated the corresponding linear probability model using the micro-data.⁹ Thereafter we added other control variables: an indicator for males, dummy variables for the married, divorced and widowed, seven indicator variables for different educational levels, 58 two-digit industry codes, the local community unemployment rate, the dummy variables for a working spouse, retired spouse and unemployed spouse, and the log annual earnings of the individual in the previous year. These variables acted as controls, and the model still included the 14 age dummies, the 11 firm-size dummies, as well as their interactions. The identification was again based on the changes in the replacement rates and the changes in the firm cost share of the benefits between the 154 worker age-firm size cells.

We could, in principle, have calculated the expected benefits for each person, based on their previous income and the employment history. For the UI-benefits, this calculation would have been rather accurate, but for the pension benefits, the inability to observe the employment history prior to 1987 would have created less reliable proxies. We therefore

⁹ With no additional controls, a linear probability model estimated from the micro data yields estimates that are identical to the weighted least squares estimates of the grouped data.

chose not to do this, primarily because the differences in the individual-level replacement rates would then mainly have reflected differences in income, and these could have been correlated with other factors affecting retirement. Instead, we used the calculations for a median income worker with a continuous career since the age of 25. To account for the wage variation, we included previous earnings as an explanatory variable in the micro data models.

The aggregation of the incentive measures, however, introduced some additional econometric issues. First, the aggregation produced some measurement errors both in the firm share of the pension cost and in the replacement rates. For example, the firm liability within the firm size category of 50 to 99 employees varied between 0 and 5.2% after the reform. In our calculations, we allocated the median value to all firms within this category. This corresponded to a value of a firm with 75 employees, that is, a 2.6% liability share. In turn, the variation in the replacement rates between the workers in the same age group would have been much higher, were the employment history and wages to have been taken into account in the calculations. Yet changes in the replacement rates that were due to the reform were rather similar for all workers in a given age group. Nevertheless, it is likely that the measurement errors caused some downward bias in our estimates.

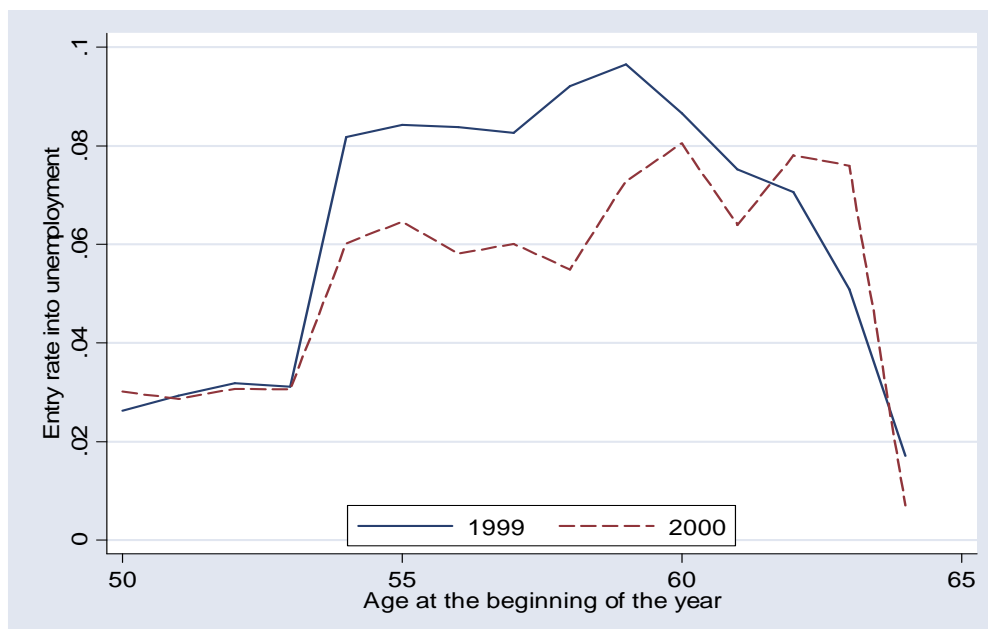
Measuring some variables at a more aggregate level may also have caused bias to the standard errors of the estimates. If the random disturbances are correlated within groups, the standard errors of the variables that only vary across the groups may be biased downwards (Moulton, 1990). In our baseline estimates that only rely on the variation across the groups, we dealt with this problem by aggregating all the data into the group averages. When running the models on the micro data, we calculated the robust standard errors that allowed the observations in the same worker age-firm size group to be correlated.

5 Results

As a first illustration of how the reform affects the unemployment entry, we plot the unemployment entry rate against the age in Figure 2. This figure shows that the unemployment risk increases considerably at the age of 55. The entry rate for workers below the age of 54 in our sample is roughly 3 percent. For workers who are 54 at the beginning of the year (and turn 55 during the year), the entry rate increases to 8 percent in 1999 and 6 percent in 2000. The unemployment risk then remains at roughly this level until the age 62-63. Workers who are 64 at the beginning of the year rarely get dismissed, as they soon reach the old-age retirement age of 65.

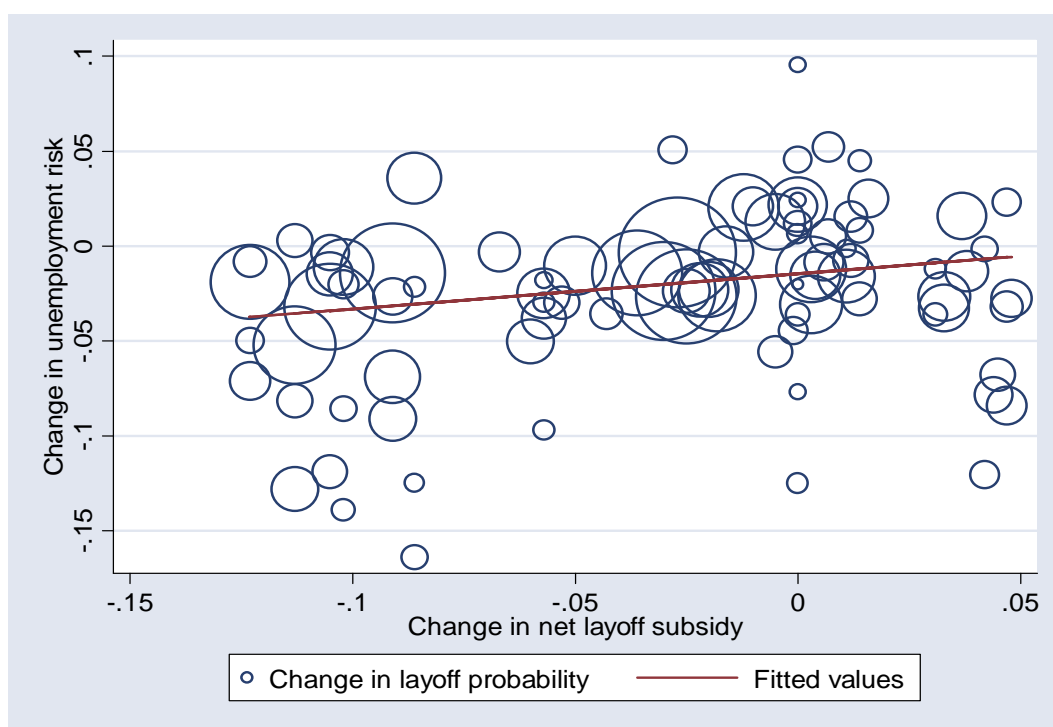
The figure also shows that the relative unemployment risk at the age of 55 increases less after the reform. This suggests that the reform may have been successful in reducing the unemployment risk. The change does not appear to be caused by the business cycle, because the unemployment risk for the younger workers (50-54) remains unchanged. Also, the aggregate unemployment rate in the whole economy, according to the Labor Force Surveys, was roughly constant, decreasing only slightly from 10.2% in 1999 to 9.8% in the year 2000.

Figure 2: Unemployment risk by age



In Figure 3, we plot the changes in the unemployment risk against the changes in the net subsidy (defined as a share of the worker benefits that are not covered by the firm liabilities). Each circle in the figure represents one worker age - firm size cell, and the size of the circle is proportional to the number of workers in that cell. To concentrate on the differences in the firm liabilities (and to avoid plotting several circles on top of each other), we limit our focus to those workers who are over 54 years old. The figure also contains a regression line that is based on the weighted least squares regression of the change in the entry rate on the change in the lay-off subsidy.

Figure 3: *Change in the unemployment risk by the change in the layoff subsidy*



This figure suggests that the incentives matter. The unemployment risk tends to decrease in the groups where the subsidies for early retirement are reduced. The largest reduction in the unemployment entry rates is observed in the largest firms, where the subsidy rates fall most, due to the increase in the degree of experience-rating.

Regression results

As shown, the dismissal rates of the older workers decrease after the 2000 pension reform, and this fall appears to be consistent with the reduction in the lay-off subsidy. The reduction in the lay-off subsidy is in itself a product of two factors: the pension benefits became less generous for employees because of the change in the accrual rates, and the benefits became more costly for some employers because of the experience rating changes. To distinguish the impact of these two changes, we estimate regression models that explain the changes in the unemployment risk with the changes in the pension rules and the changes in the experience-rating.

In Table 2, we present results for four different specifications. The key variables of interest are the replacement rate, which measures the present value of the available future benefits compared to the present value of the future earnings, and the firm cost share of the benefits, which measures the fraction of the benefits that the firm pays. Models 1 and 2 are estimated by using weighted least squares where the weights are the number of observations in each worker age - firm size – year –category. Specification 3 is a linear probability model, and Specification 4 is a probit model. Specifications 1 and 2 use grouped data, whereas Specifications 3 and 4 are estimated with the micro data.

As a first cut, the first specification regresses the entry rate to unemployment on the replacement rate and the firm share of the costs. As we see, a higher replacement rate increases the lay-offs, as does a smaller firm share of the costs. Both coefficients are statistically significant. Since this specification has no controls for the worker age or the firm size, the effects of the replacement rate and the firm cost share of the benefits are identified both from the time-series and the cross-section variation in the incentives. Therefore the estimates are likely to be biased if the unemployment risk depends on the worker age or on the firm size for other reasons than for the differences in the replacement rates and the experience-rating.

Table 2: Regression results for the unemployment risk

	(1) WLS, no fixed effects	(2) WLS, fixed effects	(3) LPM, fixed effects with controls	(4) Probit, fixed effects with controls
Replacement rate	0.189 [0.011]	0.779 [0.139]	0.776 [0.082]	0.410 [0.094]
Firm share of costs	-0.025 [0.011]	-0.057 [0.030]	-0.056 [0.024]	-0.032 [0.019]
Includes fixed effect for firm- size, year and worker age		√	√	√
Includes controls for sex, edu- cation, marital status, industry, local community unemploy- ment rate, the spouse's labor market status and previous earnings			√	√
Observations	308	308	92,189	92,029
R-squared	0.55	0.87	0.04	

Notes: The dependent variable in (1) and (2) is the share of unemployed in the specific firm-age-year category, and in (3) and (4) it is the indicator of whether an individual becomes unemployed. Standard errors are in brackets. The probit model gives the marginal effects at the mean.

The second specification controls for any permanent differences in firm size or worker age by adding to the model fixed effects for each worker-age and firm-size category, as well as their interactions. The effect of the incentives is, therefore, solely identified from the differences in the changes of incentives across the different worker age - firm size categories. As we see from the table, also in this specification, a higher replacement rate increases the unemployment risk, and a greater liability share for a firm decreases the risk. Both of these effects are economically and statistically significant. An increase in the replacement rate from zero to one increases the unemployment risk by 78 percentage points. Similarly, the effect of changing the firm cost share of the benefits from zero to one decreases the unemployment risk by 6 percentage points.

Changes of this magnitude are naturally not observed in the data. A more relevant interpretation of the results uses changes that actually occur in the data. The maximum decrease in the replacement rate in the data is 3.6 percentage points. This happens to 58-year-olds who lose their full future pension accrual from the unemployment pension period. Using the estimates we have in Specification 2, this change would reduce the unemployment entry

rate by 2.8 percentage points. Similarly, the maximum increase in the firm cost share is 19 percentage points, affecting firms with more than 800 employees who fire a 58-year -old. This change would reduce the unemployment entry rate by 1.1 percentage points. Given that the entry rate into unemployment for the 58-year -olds is 7.2 percent, both of these estimates seem quite reasonable.

In Specification 3, we estimate the same model using micro data. Even adding a number of explanatory variables appears to have only a minimal effect on the estimates. The estimated coefficients differ only after the third digit (that is, a tenth of a percent). In Specification 4, we repeat the regression using a probit-model, instead of a linear probability model. These results are of the same sign, but the magnitude of the effects is smaller in the probit model.

Anchoring our firm cost share estimates to the existing literature is difficult, because we try to estimate permanent discharges from stable jobs during old age. Previous estimates on the effects of the experience-rating tend to concentrate more on the seasonal and temporary lay-offs for all age groups (Topel 1983 and 1984, Card and Levine, 1994 and Anderson and Meyer, 1994 and 2000). In these studies, the share of the lay-offs that can be explained by imperfect experience-rating ranges from 10 percent (Anderson and Meyer, 2000) to 50 percent (Card and Levine, 1994). A full experience-rating of both the unemployment insurance and the unemployment pension benefits in our data would decrease the unemployment risk of those over 54 years old from 6.3% to 1.6% in the year 2000. As the unemployment insurance contributions are not experience-rated for any other age group, a more relevant comparison would involve the highest experience-rating of the unemployment pension contributions in all firms, but to leave the unemployment insurance system intact. According to our estimates, this would decrease the unemployment risk by 1.2 percentage points. Removing the experience-rating from the unemployment pensions entirely would increase the unemployment risk in the year 2000 by 1.0 percentage point (about a 16% increase in the predicted unemployment risk).

Finally, we test the sensitivity of our estimates by altering the restrictions of our data sample. First, we change the restriction on the length of the employment contract prior to our data sample. The original restriction on the length of the contract was made in order to weed out the contracts in which the employer incurs no liabilities because of the exceptions to the basic liability rule, and to concentrate on retirement from a “permanent job”. To test the sensitivity of this restriction, we restrict the sample only to those individuals who have been working for the same employer for more than five years (rather than the 3 years we used in the estimates in Table 2). We also try relaxing the restriction on the length of the contract entirely. Second, we use the information on the reason for the lay-off, and delete all observations where the reason is plant closing, or where the worker is dismissed for any other than for economic reasons. Finally, we consider only the unemployment spells that

start before the first of August each year, because the reform was imposed retrospectively to unemployment spells that started after this date.

All except our final sensitivity test (the restriction on the 1st of August) confirm our key result, that is, the higher the firm cost share of the pension benefits, the fewer are the lay-offs. Stricter criterion for the continuous career increases the magnitude of the coefficient (from 4 to 5.7 and 6.7 percentage points as we move from no limit on the contract to 3 and 5 years). This is highly plausible, as laying off someone with a short contract does not necessarily yield liabilities for the firm, and incorporating short contracts into our data merely introduces noise to our estimations. In addition, limiting the estimations to only those who are laid-off for economic reasons produces virtually no change in our estimates. This is because incorporating also voluntary quits and dismissals for other reasons does not necessarily make the firm liable for the costs, and removing these observations from the data set allows us to focus on the observations that are less likely to include exceptions. (Lay-offs for economic reasons are about 70 to 75% of all the lay-offs.)

The final sensitivity test, however, restricting the unemployment spells to those that start before the first of August, produces a somewhat mixed picture. The coefficient on the firm cost share is mostly statistically insignificant, and has, in some specifications, a positive sign. This may partly be explained by the smaller number of observations and by the uncertainty about when the employees turn 55. (We observe only the year of birth, and hence can determine the age exactly only at the end of each year. We therefore cannot deduce whether the employees are eligible for the extended benefits by August.) Neither explanation is, however, fully satisfactory. A more speculative explanation is that the firms anticipate the increase in the pension liabilities, and make all necessary adjustments to their workforce already during the last months of 1999. These dismissals contribute to the pre-reform unemployment risk when calculated over the whole year, but not over the first half of the year. Another possible explanation for the first of August result is a discrepancy between the dismissal date and the first day in unemployment. In the data, we only observe the latter, whereas it might be the former that actually drives the results.¹⁰

¹⁰ It is required in Finland that the notice is given up to six months prior to the dismissal. (The required notice period is a function of the length of the contract.)

6 Conclusion

The low employment rates for older workers are a cause of concern in most industrialized countries. Early retirement before the official retirement age is common, and the most common causes for that are unemployment and disability. While the employer also might have an effect on the disability applications, the employer's role in the unemployment-related retirement is obvious. Workers first need to be laid-off before they can obtain the unemployment-related benefits.

Using a clearly identifiable change in the experience-rating of the unemployment pension benefits, we demonstrated that the experience-rating of the early retirement benefits reduces the unemployment risk. As the unemployment spells at older ages tend to mean permanent withdrawals from the labor market, an increase in the unemployment risk effectively increases early retirement. Imposing a partial experience-rating on medium and big employers in Finland reduces the unemployment risk of the older workers by about 16 percent. This reduction takes place even when the level of the employee incentives matters. Therefore the policy mix that aims to reduce the early retirement of older workers could, in addition to reducing the employee incentives to retire early, include at least some experience-rating of their early retirement costs.

Appendix

Table A1: Descriptive statistics of the sample

VARIABLE	DEFINITION	MEAN	SD	MIN	MAX
lay-off	1 if laid-off; 0 otherwise	0.0492	0.2163	0	1
lay-off risk in the category	share of the laid-off in the specific firm-year-age –category; 168 classes	0.0522	0.0301	0	0.2037
Net subsidy		0.3783	0.1025	0.2530	0.5820
Replacement rate	present value of the benefit stream divided by the present value of the wage	0.4200	0.1275	0.2990	0.5820
Firm cost share of benefits		0.0749	0.1360	0	0.5244
age	age in years	53.81	3.16	50	63
gender	1 if male; 0 otherwise	0.56	0.50	0	1
education	ICSED categories			0	5
marital status	1 if married; 0 otherwise	0.72	0.45		
	1 if divorced; 0 otherwise	0.16	0.37		
	1 if unmarried	0.09	0.28		
	1 if widowed	0.03	0.18		
previous earnings	annual earnings in Finnish marks	179,987	373,424	0	63,357,000
local unemployment rate	in percentages	12.46	6.89	0	96.4

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