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Working Paper

Determinants of the Transition from Work into Retirement

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Determinants of the Transition from Work into Retirement

by

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Working Paper No. 1310

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DETERMINANTS OF THE TRANSITION FROM WORK INTO RETIREMENT

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WITH CONTRIBUTIONS FROM BIRGIT WOEGERBAUER

NEUJOBS WORKING PAPER NO. 17.1

APRIL 2013

Abstract

This NEUJOBS research report is concerned with determinants for planned retirement from work in European countries, using data from the 2006 ad hoc module of the European Labour Force Survey. The research uses multivariate analysis, taking into account factors that affect retirement planning including personal as well as work-related characteristics, and some characteristics of national pension systems.

In the context of the NEUJOBS project, the key conclusions of the report is that the interaction between planned retirement age and personal and work-related variables is not identical across Europe. Sex as well as country type need to be taken into consideration.

Our results hint at EU states being in different phases of the transition from physically demanding to intellectually demanding work environments, which relates to earlier planned retirement where working is physically more demanding. This interpretation, however, is very tentative due to the crude identification of job characteristics via broad ISCO and NACE codes.

NEUJOBS Working Documents are intended to give an indication of work being conducted within the NEUJOBS research project and to stimulate reactions from other experts in the field. Texts published in this series are ultimately destined for academic publishing. The views expressed in this paper are those of the authors and do not necessarily represent any institution with which they are affiliated. See the back page for more information about the NEUJOBS project.

Available for free downloading from the NEUJOBS website (http://www.neujobs.eu)

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DETERMINANTS OF THE TRANSITION FROM WORK INTO RETIREMENT

MONIKA RIEDEL AND HELMUT HOFER*

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1. Introduction

Increasing longevity is threatening the sustainability of pension systems in many industrialized countries (e.g., Gruber and Wise 1998). In many European countries, the old-age dependency ratio as well as the average duration while persons receive pension benefits have been increasing dramatically over the last years (European Commission 2011). This process is forecast to continue during the coming decades, thus adding further to the fiscal strain on national pension systems. Across the European Union (EU), the population aged 65 and above will almost double until the year 2060, while the population aged 15-64 is estimated to drop by 14% during the same period. According to projections on behalf of the European Commission, public expenditure on pension will increase to 12.8% of the gross domestic product in the 27 member states of the EU by 2060 (European Commission 2012). Retaining long-run financial sustainability will force several countries to reduce the generosity of their pension systems and to increase the general awareness of pension risks and individual responsibility. Many European countries have already increased the statutory retirement age or are in the process of doing so, by changing regulations affecting the effective retirement age in more or less direct ways. To establish which policy reforms are apt to reduce the financial pressure on pension systems, it is highly important to understand better what determines the transition from work to retirement for older workers.

In order to contribute to this body of evidence, we use the ad hoc module 2006 of the European Labour Force Survey to analyse the relation between individual characteristics and the effective age at retirement, but control also for some characteristics of the pension system. The ad hoc module is one of the few datasets which satisfy two conditions: First, include all member states of the EU, and second, contain individual-level information relevant for the transition from work to retirement. A special feature of this dataset is that it allows us to investigate the planned timing of retirement of still active workers, a question which is increasingly taken into consideration in the literature (see e.g. de Grip, Fouarge, Montizaan 2013, Voòková, van Soest 2009). Furthermore, the dataset allows to identify spouses and their retirement plans (if not yet retired), thus enabling us to analyse whether spouses' retirement plans are correlated. As social and economic differences in national backgrounds can be assumed to influence individual retirement decisions, we estimate separate models for three groups of European countries.

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* Monika Riedel and Helmut Hofer are Senior Researches in the Applied Economics Department at the Institute for Advanced Studies (IHS), Vienna. Excellent research assistance was provided by Birgit Wögerbauer. Helpful comments from Anna Ruzik, Anna Thum and an anonymous reviewer on an earlier draft of this report are gratefully acknowledged.

This report has been prepared as deliverable 17.1 of Work Package 17 of the NEUJOBS Study by the Institute for Advanced Studies, Vienna (IHS). It starts with a short summary of the literature on determinants for (early) retirement from work. Chapter three describes the ad hoc module 2006 of the European Labour Force Survey (LFS), the main data source for the empirical investigations. Chapter four consists of two parts. The first presents some descriptive statistics on the transition into retirement across EU countries, the second presents micro-econometric models for the planned age at retirement and for the (actual) age at which a person started to receive an individual retirement pension. Finally, the last part discusses the results and looks at the implications of the report for further work in this and other Work Packages of the NEUJOBS project.

2. Literature review

This section starts with a brief summary on some relevant characteristics of national pension systems. As there is a rich literature on pension systems, we restrict ourselves to the characteristics that we use in the empirical section.

The perhaps most visible characteristics of pension systems are the age at which they allow to retire, and the level of income they grant to retirees. Only very few countries apply different rules to male and female retirees, see Table 1. Among the few countries with lower statutory retirement for women, some have already introduced legislation to reduce or eliminate this difference. Over the last years, there has been a tendency to raise the statutory retirement age, last but not least in order to better align the long-term financial sustainability of pension systems with increases in life-expectancy and ultimately in the time-span that individuals receive pensions. Policies often have been addressing supply side incentives for postponing effective retirement, like tighter qualifying conditions for early retirement, higher benefit penalties for persons retiring early or larger pension increments for persons retiring after the statutory pension age (OECD 2011).

Table 1. Selected characteristics of pension systems

	Pensionable age		**Gross pension replacement rates by earnings**	**Average pension wealth (1,000 USD)**	
	Male	**Female**	**Median earner**		
	2010	**2010**	**Male (female if different)**	**Men**	**Women**
Austria	65	60	76.6	557	608
Belgium	60	60	42.6	407	476
Czech Rep.	61	58.7	57.3	145	175
Denmark	65	65	84.7	937	1.106
Estonia			50.9	114	146
Finland	65	65	57.8	529	632
France	60.5	60.5	49.1	444	501
Germany	65	65	42.0	466	563
Greece	57	57	95.7	528	609

Hungary	60	59	75.8		144	180
Ireland	65	65	34.9		448	544
Italy	59	59	64.5	(50.6)	408	427
Luxembourg	60	60	90.3		1.542	1.789
Netherlands	65	65	89.1		1.145	1.311
Poland	65	60	59.0	(43.2)	119	133
Portugal	65	65	54.4		205	235
Slovak Rep.	62	57	57.5		82	101
Slovenia			62.4		293	392
Spain	65	65	81.2		455	513
Sweden	65	65	58.4		556	625
UK	65	60	37.0		332	394

Source: OECD (2011).

Many studies on financial incentives to work use a simple indicator, the replacement rate, to measure the relationship between incomes in and out of work. Replacement rates can vary considerable between countries: Rather high rates for the median male wage earner are observed for countries as diverse as Luxembourg, Netherlands or Denmark on the one hand, and Greece and Spain on the other, see Table 1.

This indicator, however, has been criticized as being too static because it fails to capture the effect of work decisions made at one point in time on future pension entitlements. Dynamic measures like pension wealth, the present value of the lifetime flow of pension benefits, should therefore be preferred. Table 1**Error! Reference source not found.** shows that in all of our sample countries, average pension wealth of women exceeds that of their male peers, which needs to be seen in the context of higher life expectancy for women. Variation in this indicator is even larger than variation in replacement rates: life expectancy is typically higher in more wealthy countries, and both characteristics drive pension wealth upwards.

The factors influencing people's effective retirement decisions have attracted much attention among the scientific community and policy makers. The following literature review attempts to give a broad overview of what has been identified to influence individual's retirement behaviour.

Given the multitude of possible determinants, we apply the following classification: individual and household characteristics, job-related determinants, the role of pension systems and macroeconomic characteristics. Due to the fact that these categories are interactive, some determinants can be attached to more than just one domain.

Our selection of literature favours papers on Europe or European countries over those from other parts of the world. For some characteristics, separate results relating to actual as opposed to planned retirement are available. In these cases, we concentrate on actual retirement first, and discuss planned retirement in the end of the respective section.

2.1 Individual and Household Characteristics

Health

In the literature, one of the most discussed determinants of an individual's retirement decision is health. According to economic theory, a poorer health status decreases the probability of continued work due to several reasons: increased disutility from work, reduced return from work via lower wages and entitlement to benefits contingent on not working. (Jones et al., 2010) Several empirical studies show that health status is one of the key factors of labour supply of the elderly:

Alavinia and Burdorf (2008), for example, investigated 11,462 participants of the Survey on Health, Ageing and Retirement in Europe (SHARE) between the age of 50-64. They found that perceived poor health status is strongly associated with being out of the labour force. Especially individuals with long-term sicknesses such as stroke, diabetes, chronic lung disease and musculoskeletal disease are significantly less likely to participate in the labour force. Alavinia and Burdorf (2008) also stress the importance of psychological problems. According to their study, depression is the most important health problem leading to exit from paid work. These results are consistent with findings from Karpansalo et al. (2004), who observed for middle-aged Finnish males that depressed people retire on average 1.5 years earlier than those without mental disorders. The World Health Organization (WHO) warns that depression will become one of the 21st century's greatest diseases. Further research on the relationship between depression and early retirement is therefore needed.

Using 12 waves of the British Household Panel Survey, Jones et al. (2010) investigate the influence of health on early retirement. One major advantage of their study is that they use longitudinal data, which allows them to track the same individuals from work into retirement. Their findings confirm results of studies mentioned above, namely, that health is an important determinant of retirement. Moreover, they found that in their models, the health effect is larger than that of pension entitlements and income variables.

Some empirical studies concentrate on analysing planned rather than actual retirement age. Using baseline data from SHARE, Siegrist et al. (2007), for example, investigate the impact of different measures of well-being (self-reported health, depressive symptoms, number of reported bodily symptoms and quality of life) on intended early retirement for 10 European countries. Their results suggest that more individuals with poor well-being plan to retire as early as possible compared to individuals with higher levels of well-being.

To conclude, poor health and disability are among the most important and most discussed determinants of early exit from the labour market. But health is closely related to other factors which also contribute to early retirement. This is especially true for jobs where working conditions cannot be adjusted to a reduced work capacity of older employees (Siegrist et al., 2007). Possibilities for health-related exits from the labour market are also contingent on the design of national social security systems. According to Blöndal and Scarpetta (1999), the increase in disability benefits as an income support for persons leaving work also contributed to rising early retirement rates in OECD countries.

Education

A considerable number of studies on determinants of retirement control for education. Siegrist et al. (2007), for example, who analysed the effect of quality of work and well-being on retirement for 10 European countries, controlled for education and found that individuals with low education (pre-primary, primary, or lower secondary education) have a higher early exit probability. There are, however, very few studies that focus on the relationship between retirement and education. The findings on the effect of education on retirement timing are twofold: A descriptive analysis using Canadian household data by Kieran (2001) suggests that better educated individuals have a higher probability of withdrawing early from the labour market. The probability of an early exit from the labour market is 23 % for individuals without high school degree and 52 % for graduates from tertiary education. One possible explanation for these findings is that higher educated people usually have higher wages. Consequently, higher incomes allow individuals to build up savings for pension. Hence, individuals with higher earnings can afford early retirement more easily since they are less dependent on pension allowances.

Blekesaune and Solem (2005) came to a different conclusion. According to their findings for Norway, educated individuals tend to work longer. This can be largely explained by the fact that better educated individuals have a smaller probability of retiring due to ill-health. For one thing, higher educated people have healthier working conditions and for another thing, ill-health is more relevant as a factor of early retirement for people with physically demanding jobs.

The discussed studies show that education is closely related to other determinants of retirement, such as wage, working conditions or health, and therefore it is not clear whether the effect of education can be seen as an entirely separate effect. In line with this discussion also the social security system has to be taken into account. For example, private pensions are much more important in Canada than in Europe where public retirement systems are often more generous. Therefore, education and income play more important roles in countries with moderate public pensions than in countries with a more comprehensive old age retirement system.

Marital status

A growing literature on the effects of family related issues on retirement suggests that retirement timing should be treated as a joint rather than an individual decision. As a rapidly growing proportion of married and working women reach retirement age, it is important to understand couple's transitions into retirement.

Blöndal and Scarpetta (1999) analysed data from the United States, Germany, Italy, the United Kingdom and the Netherlands and found that the retirement decision is, among other factors, also influenced by household characteristics. For their analysis, they use household size, status as head of the household (yes/no), and the spouse's labour market status. The results for the US and Italy indicate that retirement is a joint decision of husbands and wives: the probability of one spouse to retire is higher if the other spouse is already in retirement. Moreover, the spouse's wage rate seems to play a role: the US study suggests that the higher the spouse's wage, the more likely the individual is to retire. Furthermore, their results suggest that in the US, the UK and

Italy, heads of large households tend to retire later. This can be explained by the fact that the fall in living standards due to reduced income may not be as strong in small households as in larger ones.

Hurd (1990) analysed whether there is a tendency that husbands and wives are retiring together. For his study, Hurd used data from the US. When examining the distribution of the difference in retirement dates, he finds evidence for coordination of retirement dates. These results imply that there is indeed joint determination of retirement dates suggesting that husbands and wives both tend to retire within a short period. There are several possible explanations why couples would retire together. According to Hurd (1990), (cross)-economic variables such as own wage and spousal wage do not have a strong impact on retirement ages. Possible causes could be neglected economic variables, assortative mating or true complementarity in the utility function.

Using data from the US Health and Retirement Survey, Coile (2004) adds to this discussion and focuses on spillover-effects by financial incentives from social security and private pension which could result in joint retirement. In particular, Coile estimates the effect of each spouse's retirement incentives on their own and their spouse's retirement decision. The results show different effects for husbands and wives: Women's retirement incentives have spillover effects on the husband's retirement decision which are approximately as strong as both the direct effect of her incentives on her own retirement and the direct effect of his incentives on his retirement. In contrast, the spillover effects of the husband's incentives on the wife's retirement decision are found to be small and statistically insignificant. To conclude, these results imply that women are strongly influenced by their own economic variables in making retirement decisions and are largely independent of their husband's economic variables. The husband's retirement decision, on the other hand, is dependent on the wife's retirement status. Consequently, Coile (2004) suggests that joint modelling of couple's retirement decisions is reasonable.

Another study conducted by Gustman and Steinmeier (1994) with data from the United States also found evidence for couple's aligned retirement decisions. In particular, their results suggest that the probability of couples retiring at the same time is 11 per cent. Their data support two possible explanations, a correlation in preferences and increased valuation of jointly spent leisure time. These findings are also in line with a study by Blau (1997) on the labour supply of older married couples in the US. He finds evidence that one spouse's non-employment has a positive effect on the other spouse's labour force exit rate, which cannot be explained by financial incentives. These results suggest that there is a strong preference for sharing leisure.

Not only the labour market status, but also other factors can contribute to the other partner's retirement decision. Using the British Household Panel Survey, Jones et al. (2010), for example, found that for women, the health status of their partner has an impact on their retirement decisions. This effect is not evident for men, but men's probability of retirement is reduced if they have a working spouse.

To conclude, there is evidence in the literature that retirement decisions of husbands and wives are joint rather than individual decisions. The results in the literature are manifold. Due to the increasing importance of this topic, further research is needed in order to understand couple's retirement transition.

2.2 Job-related determinants

Working conditions

Unfavourable working conditions can repel older workers from work and can push them into early retirement. Especially workers with jobs characterized by little autonomy, little skill variety, and poor social relationships have a higher probability of withdrawing early from the labour force compared to workers with intrinsically interesting and motivating jobs. (Beehr et al., 2000) When dealing with the effects of unfavourable working conditions on the retirement decision, different mechanisms may be predominant for different classes of jobs. That is to say, white-collar workers may focus on criteria such as autonomy and psychological stress; while blue-collar workers may focus more on physical demands of the job and potential negative effects on health. (Wang, Shultz, 2010)

Research on the relationship between psychosocial conditions at work and employee health has frequently employed the demand-control model by Karasek (1979). The demand-control model suggests that two independent inputs influence poor working conditions: job demands and control of the work situation. The expression "job demands" refers to psychological stresses, such as time pressure and having too much work. Job control implies the organization of work in terms of workers' authority to make self-contained decisions concerning their own activities and skill usage. According to the demand-control model, job strain and related health problems occur in situations where high demands coincide with low control. (Elovainio et al., 2005)

Of course it must be taken into account that poor working conditions can have diverse effects on the type of retirement. One study which differentiates between disability and non-disability retirement was conducted by Blekesaune und Solem (2005). They analysed the impact of working conditions on individual retirement for 19,114 Norwegian employees between the ages of 60 and 67. In order to find out whether poor working conditions affect the probability of retiring early, Blekesaune und Solem (2005) estimate logistic regression models. The results indicate a relationship between physical job strains and disability retirement. Moreover, low autonomy jobs are correlated with both, disability and non-disability early retirement among men. Additionally, they found that psychological job stress reduces the probability of early retirement. This can be explained by the fact that stressful jobs need not necessarily be low quality jobs.

A study by Mein et al. (2000) on the predictors of early retirement came to a different conclusion. They used data from a longitudinal study on 2523 British civil servants and found that individual work characteristics such as work demands, control and work support did not have much effect on early retirement. Job dissatisfaction, to the contrary, has been identified as a strong predictor of early retirement for both men and women. It must however be noted that the sample is restricted to a very homogenous group of employees, namely British civil servants. Filer and Petri (1988) also argue that job characteristics such as intense physical demands, stress and repetitive working conditions are significantly correlated with early retirement. Unlike other studies, they explain their results by the fact that poor working conditions are strongly related with easy access to early retirement pensions. Their findings therefore suggest that

individuals with poor working conditions tend to have better access to early retirement schemes. Their study, however, is restricted to the US.

Similar to empirical studies on health, working conditions not only affect the actual date of retirement, but also intended retirement. Alongside with well-being, Siegrist et al. (2007) investigate the effect of working conditions on planned early retirement for several European countries. For their study, they used data from the SHARE project. Quality of work was assessed by the following criteria: high demand in combination with low job control on the one hand and low rewards for high efforts on the other hand. The results of the estimated logistic regression models show that poor working conditions are significantly related with a higher probability of an intended early exit from the labour market. These findings do not change once indicators for well-being are included into the model. This implies that poor quality of work and reduced well-being represent two conditions that are independently associated with intended early retirement.

An empirical study by Elovainio et al. (2005) employs the demand-control model in order to investigate the relationship between poor working conditions and early retirement intentions among employees in social and health care in Finland. They found that the likelihood of early retirement thoughts are strongly associated with poor job control and high job demands. Particularly, situations with high demands in combination with low control provoked predictions for early retirement age. This study faces however two important shortcomings: the study is restricted to one sector only, Finnish social and health care, and there are no longitudinal data available.

Training and education during the working life

According to human capital theory, investments in training to update skills can help to improve the labour market position of workers. Hence, investment in human capital of older workers through occupational training has often been recommended in order to improve their labour market opportunities and to delay early retirement. In the literature, there are several studies which try to assess whether participation in training affects the retirement decision.

A study by de Luna et al. (2010) investigates whether adult education is a suitable policy measure for prolonging working life and increasing labour force participation of the elderly. For their analysis, they use panel data from Swedish middle-aged individuals. Their empirical findings suggest that adult education has no significant effect on the survival rate in the labour force. According to them, one possible explanation for their counterintuitive findings could be that the timing of adult education enrolment in their data coincides with a strong economic expansion period characterized by low levels of unemployment. Another possible reason could be that the sample captured a lot of individuals who merely "consumed" education, but did not have any intention to increase their productivity. Since the findings are based on Swedish data only, the authors suggest that in order to draw general conclusions, further studies from different economic and institutional backgrounds are needed.

Another study by Fouarge and Schils (2009) using data from the European Community Household Panel found that older workers participate less in on-the-job training in comparison to younger workers. One major finding of their investigation suggests that

participation rates for on-the-job training are at least to some extent dependent on the flexibility of the early retirement system. In countries with a more flexible early retirement system and more freedom of choice, older workers invest more often in on-the-job training than in countries with inflexible retirement systems. Hence, in such systems, older workers are more willing to participate in on-the-job training because they expect larger returns. Furthermore, their results suggest that on-the-job training among older workers is less common in countries with a more generous retirement system such as Germany or Netherlands. Fouarge and Schils (2009) conclude that participation in training is dependent on exit expectations. Consequently, workers who plan to retire late are more willing to participate in on-the-job training than workers who plan to retire early. According to Fouarge and Schils (2009), participation in training should therefore be treated as an endogenous variable.

Alongside with on-the-job training, other forms of skill-update can affect the retirement decision. Using the Labour Force Survey ad-hoc module (2006) on the transition from work to retirement, Garrouste and Paccagnella (2012) investigate the impact of late graduation on the decision of workers aged 40 and above to stay longer on the labour market. Their results for EU countries suggest that graduating after the age of 40 has a positive and statistically significant effect on the planned age to retire. Furthermore, Garrouste and Paccagnella (2012) found that late graduation decreases the probability of retiring before the normal pensionable age and increases the probability of retiring after the normal pensionable age. Garrouste and Paccagnella (2012) also accounted for different institutional settings caused by pension systems: their results suggest that late graduation affects retirement age more significantly in countries with highly flexible but less generous early retirement schemes.

Firm characteristics

Bellmann and Janik (2007) as well as Dorn and Sousa-Poza (2005) found that early retirement occurs more frequently in large firms. Bellmann and Janik analysed data for Germany, Dorn and Sousa-Poza used data for Switzerland. Dorn and Sousa-Poza (2005) explain their findings by the fact that larger companies often have their own pension funds. By setting financial incentives through occupational pension plans, large firms can encourage workers to go into early retirement. (See also section *Demand side factors*) Also, in firms that have collective agreements and firms with a works council, early retirement is more common. (Bellmann, Janik, 2007) Moreover, Dorn and Sousa-Poza (2005) found that frequency of early retirement differs between economic sectors. Their findings suggest that early retirement is more common in the public sector, which is also in line with results from Hallberg (2008) who investigated older workers in Sweden. Additionally, Dorn and Sousa-Poza (2005) found that there is a slightly negative relationship between the sectors manufacturing and construction and early retirement. The authors conclude that blue-collar workers with low education do not often exit early from the labour market. They are usually employed in sectors such as agriculture, construction, or manufacturing. Due to their low income, they lack financial resources to bridge the gap between early retirement and the beginning of the entitlement to old-age pensions.

Demand-Side-Factors

A lot of studies on the determinants of early retirement focus on supply-side-factors. That is to say, the transition into early retirement is often discussed from an employee perspective. Very few studies have however assessed the retirement question from an employer side. Hutchens (1999), for example, developed a model for the US where employers take an active part in the retirement decision. By making favourable early retirement offers, which cannot be refused by rational workers, employers encourage workers to go into early retirement. This is especially valid in times of technological shocks or a fall in demand. The pension system therefore acts as unemployment insurance, which reduces dismissal costs for profit maximizing firms. Moreover, in Hutchens' model, favourable institutional early retirement provisions lead to a rise in early retirement. A study by Bellmann and Janik (2007) uses the approach suggested by Hutchens (1999) and analyses the relationship between indicators of demand and technological shocks and the incidence and amount of early retirement for Germany. The retirement decision is therefore analysed as a consequence of firms' profit-maximising behaviour rather than a consequence of workers' utility maximising behaviour. The empirical findings suggest that both demand shocks and technological changes have a positive effect on the incidence of early retirement. To conclude, the authors suggest that not only workers but also firms have to be viewed as actors in the early retirement discussion.

Hallberg (2008) investigates the influence of employers on early retirement decisions of Swedish workers. The findings are in line with Bellmann and Janik (2007) and Hutchens (1999) and indicate that many employers offer relatively favourable early retirement options to induce retirement.

Wealth and Wage Rates

The possibility of retiring early is also a matter of affordability, especially in countries with not so generous pension systems. Hence, economic variables such as wealth and labour income affect the retirement decision.

Due to a shortage of adequate variables for wealth, wage rates are often used as proxies in the literature. Dorn and Sousa-Poza (2005), for example, investigate the determinants of retirement for Switzerland. Their findings indicate that the wage rate is an important determinant. They found that early retirement is less prevalent among people with lower wages. This result supports the hypothesis that early retirement is barely affordable to poorer persons. People with medium income, on the other hand, usually have the possibility to accumulate enough assets in private or occupational retirement plans.

These results are also in line with a study by Bütler et al. (2004) for the Swiss labour market. Their findings also suggest that affordability is a key determinant in the retirement decision, especially for male individuals. Men with higher lifetime labour income tend to retire earlier than men with lower income. For females, the effect of income is also positive, but not as strong as for male individuals.

Börsch-Supan (2000) did not include the wage rate in his retirement-incentives models for Germany. He argues that an inclusion of the wage rate would not change the

coefficients of the other explanatory variables (in particular option value and health). These controversial results might be due to differences in the German and the Swiss retirement system, like the lower generosity in the Swiss pension system.

Working hours

Using data from the 2006 Portuguese Labour Force Survey, Machado and Portela (2012) investigate the impact of a voluntary reduction in working hours before retirement on labour force exit. It is often assumed, that reducing working hours before retirement can improve the attractiveness of work for older workers. Applying a hazard ratio approach, Machado and Portela (2012) however found that a reduction in working hours leads to retirement at earlier ages. These results suggest that workers who reduce their working hours seem to be preparing their exit from the labour force rather than delaying it.

In Portugal, there is no partial retirement mechanism, that is to say, workers do not have the possibility to combine part-time wage with part-time retirement. Since there is no information on income sources in the data, Machado and Portela (2012) could not control for potential income losses due to reduced working hours. Furthermore, Machado and Portela (2012) admit that they were facing serious data limitation problems due to the static, cross-sectional nature of the data and a lack of variables on financial incentives. The authors therefore conclude that in order to identify the mechanisms behind the positive relationship between reduction of worked hours and the retirement hazard, future research with more comprehensive data is needed.

2.3 Pension Systems

According to the labour supply theory, individuals maximise their utility from leisure and work by choosing the optimal time for retirement. The optimal date of retirement is determined by future payments from pension systems and by foregone earnings from withdrawing from the work force. Hence, the exact design of an old age pension system plays a crucial part in the retirement decision. Blöndal und Scarpetta (1999), for example, found that old-age pension systems discourage work at older ages in almost all OECD countries. In the literature, international comparisons of pension systems mainly focus on three factors: the generosity of pension systems, the actuarial neutrality of pension systems and early exit possibilities.

Generosity

Replacement rates are the most frequently used measure in order to assess the degree of a pension system's generosity. The old age pension replacement rate is a measure of how effectively a pension system provides income during retirement to replace earnings which were the main source of income prior to retirement. (OECD Glossary, 2007) It is presumed, that more generous retirement systems facilitate premature exits from the labour market: The future stream of pension benefits to which older workers are entitled can be regarded as pension wealth, which is a share of their total wealth. Therefore, an unexpected rise in the level of pension benefits of older workers not compensated by an increase in their tax payroll creates unexpected gains. As a

consequence, the resulting increase in their demand for both consumption goods and leisure pushes workers to retire earlier than expected. (Duval, 2003)

Euwals et al. (2006) used a reform in the Dutch pension system as an opportunity to analyse changes in retirement age. In course of the policy reform, the Dutch pension system was transformed into a less generous and actuarially fairer one. The two major consequences of the changes were "fairer" prices for leisure due to actuarial adjustments and lower early retirement wealth. According to their estimates, the policy reform was effective in increasing the labour supply of the elderly, implying that there is a positive relationship between early retirement and generosity.

To sum up, recent results in the literature provide evidence for this hypothesis. For example, Blöndal and Scarpetta (1999) confirmed that more generous pension systems encourage early retirement in OECD countries. Between 1985 and 1995, Blöndal and Scarpetta (1999) found that relatively high replacement rates have contributed to lower than average participation rates amongst the elderly in Portugal, Finland, Spain and in the Netherlands. Less generous pension systems, on the contrary, can potentially lead to higher participation rates. This was for example found for the US, Canada, the UK, Japan and Norway. According to Fischer and Sousa-Poza (2006), who analysed the institutional determinants of retirement for 10 different European countries, however, actuarial fairness is more important for explaining early exit from the labour market than replacement rates.

Actuarial Fairness, implicit tax rates and pension wealth accruals

Actuarial fairness of a pension system requires that the present value of expected lifetime contributions is equal to the present value of expected lifetime benefits. Hence, a neutral or fair pension system presupposes that the present value of accrued pension benefits for working one additional year is the same as in the year before, meaning that benefits grow only by the additional entitlement earned in that year. This also implies that retiring a year earlier should reduce the pension benefit in two ways: by an amount reflecting the longer duration for which the pension must be paid and by the entitlement that would have been earned during the year. (Queisser, Whitehouse, 2006) In the literature, actuarial neutrality is often analysed by the use of implicit tax rates on continued work and option value approaches. Gruber and Wise (1998) compare social security systems of 11 industrialized countries including France, Germany, the US and Japan. They argue that the extent to which people continue to work after the early-retirement age is closely related to the pattern of benefit accrual. According to them, the key concern for retirement decisions is how acquired entitlement to future benefits upon retirement (social security wealth) will evolve with continued work. If the accrual is positive, it adds to total compensation from working one additional year; if the accrual is negative, it reduces total compensation. Therefore, the ratio of the accrual to net wage earnings can be seen as an implicit tax on earnings if the accrual is negative, and an implicit subsidy to earnings if the accrual is positive. Hence, a negative accrual should discourage continued work and a positive accrual should encourage continued work. Gruber and Wise (1998) showed that the pension accrual is typically negative at older ages in Europe, which implies that there is an implicit tax on continued participation in the labour force. Furthermore, they come to the conclusion that there is a strong relationship between the implicit tax rate on work and labour-force

participation of older persons. This is in line with results from Blöndal and Scarpetta (1999) for OECD countries. They found that implicit tax rates and a decrease in pension wealth accruals contribute to early exits from the labour market. According to them, an increase in pension entitlements due to an additional year spent working is not enough to cover the extra pension contributions. In particular, disincentives seem to be strongest after the earliest age at which pensions become available. They conclude that removing financial incentives for early retirement could increase labour market participation rates of older workers by up to 8 to 9 percentage points. Therefore, the removal of disincentives to work would be an important step to combat high early retirement rates.

Blundell et al. (2002) investigate individuals from the UK Retirement Survey and also find strong retirement incentive effects from the pension system. Their findings suggest that total pension wealth has a positive effect on early exits from the labour market. Moreover, low opportunity costs for early withdrawals from the labour force expressed as forgone future pension wealth accruals seem to support early retirement.

Stock and Wise (1988) develop an option value approach in order to quantify early retirement incentives by the public pension system for American workers. The option value refers to the trade-off between retiring now and keeping all options open for some later retirement date. Hence, an individual would continue to work if the option of choosing a better age for retirement in the future is worth more than the value of retiring now. This approach is used to simulate the effect of changes in pension plan provisions on retirement. According to the authors, simulation results using the option value approach yield very realistic results. Thus, they conclude that the option value of work is indeed a key determinant of the retirement decision.

In the context of actuarial neutrality, also life expectancy plays a role. Breyer and Hupfeld (2008) point out that the value of one contributed Euro in generating future retirement benefits depends on the individual's life expectancy. Life expectancy is positively correlated with income. For this reason, the current German pension system redistributes from low income groups to high income groups. In order to overcome this problem, Breyer and Hupfeld (2008) proposed a new benefit formula for the German pension system that takes income-group-specific differences in life expectancy into account (and thereby differences in the expected length of the retirement period). The derived formula attempts to avoid income redistribution on a lifetime basis. Calculations show that the new formula would reduce the number of very low pensions as well as the number of very high pensions. Moreover, the formula fulfils "distributional neutrality", a concept denoted by Breyer and Hupfeld (2008) meaning that the ratio between total benefits and total contributions does not vary with average annual earnings. Next to distributional effects, the study suggests that an implementation of the formula would also have indirect incentive effects on labour supply. Breyer and Hupfeld (2008) assume that increasing pension benefits for low income groups and decreasing benefits for high income groups would raise labour supply on the whole.

Early Exit Possibilities

The third major institutional determinant of pension systems refers to access to retirement benefits. Gruber and Wise (1998) argue that there is a strong correspondence between exit from the labour market and the age at which pension benefits become available. In France, for example, the age specific exit rate from the labour market jumps to 60 per cent at the early retirement age. Thus, the early retirement age is more important for explaining the retirement decision than the statutory retirement age.

According to several studies (e.g. Gruber, Wise 1998, Blöndal, Scarpetta 1999), incentives from old age security systems have contributed significantly to the decline in older individuals' labour force participation rates. According to Duval (2003), however, relatively easy access to various social transfer programmes such as unemployment-related or disability benefits also has an effect on early exit from work. These schemes usually lead to high implicit tax rates on continued work. For the age group 55 – 59, social transfer programmes contribute to a larger part to the high early retirement rates in OECD countries than old-age pension systems themselves, because social transfer programmes are often misused as early retirement schemes. (Duval 2003)

To sum up, existing literature provides a broad body of evidence suggesting that the design of old-age pension systems makes a substantial contribution to the low labour force participation rates among older workers. Alongside with implicit tax rates on continued work and high replacement rates, especially easy access to early retirement schemes seems to drive early retirement (or at least used to do so as long as such options were more easily accessible). Euwals et al. (2006) demonstrate for the Netherlands that policy reforms towards less generous and actuarial fairer pension systems can help to combat early retirement.

Occupational Pensions

Next to state pension systems and individual savings, occupational pension schemes contribute to pension wealth. As public pension systems face the challenge of demographic change, occupational pensions are becoming increasingly important. At the moment, occupational pensions are however more relevant in countries with less generous public retirement systems.

For the British labour market, Blundell et al. (2002) found that incentives created by occupational pension schemes encourage early retirement. In the British pension system, occupational pensions play a relatively more important role as compared to corporatist and social-democratic welfare systems. Blundell et al. (2002) admit however that the used data is suffering from important limitations due to high attrition between the waves and missing information on pension rules and accumulated pension wealth.

Blöndal and Scarpetta (1999) found that in the United Kingdom, workers with an occupational pension retire earlier than those without. This is explained by the fact that occupational pension benefits are already available at the age of 55 years. Furthermore, they estimated the impact of adapting eligibility ages to 65 for men and 60 for women,

respectively. The results suggest a change in the average retirement age of more than one year for men (from 62.6 years to 63.9 years).

These findings are also in line with Bütler et al. (2004). Using data for Switzerland, they argue that an expansion of occupational pension schemes had led to higher effective replacement rates, which in turn resulted in higher early retirement rates.

2.4 Macroeconomic framework

In the course of the Early Retirement Discussion, also macroeconomic conditions and employment protection institutions have to be taken into account. Recent literature suggests that unemployment rates, economic wealth and employment protection legislations are significant for explaining early retirement.

Macroeconomic Performance and Unemployment

Facing high unemployment rates in times of economic hardship, several countries have introduced soft landing plans (for example early retirement, disability or long term unemployment benefits) in order to reduce labour supply. Usually, these landing plans are restricted to a number of industries or firms within a struggling industry. In Europe, soft landing plans have been used extensively in Austria, Finland, Italy, Sweden, West Germany and the Netherlands. The intention of soft landing plans was to create incentives for older workers to exit early from the labour market in order to replace ageing high-wage workers by young low-wage unemployed. (Brugiavini, 2001) Hence, it is argued that high unemployment rates can contribute to early retirement rates. High unemployment rates and economic recessions not only affect voluntary, but also involuntary early retirement. A study by Dorn and Sousa-Poza (2010) employing data from 19 industrialized countries differentiates between voluntary and involuntary early retirement. Involuntary retirement, as opposed to voluntary retirement, results from employment constraints rather than from a preference for leisure relative to work. According to Dorn and Sousa-Poza (2010), the distinction between voluntary and involuntary is especially important when assessing the effects of macroeconomic conditions on the labour supply of older workers. Dorn and Sousa-Poza (2010) found that in times of economic recessions, firms tend to force staff into early retirement. They found that this was especially evident for continental Europe. Due to the fact that older workers usually face difficulties in finding a new job, dismissed older workers often see no other choice than retiring early. Fischer and Sousa-Poza (2006) also found evidence that higher unemployment rates are related to higher early retirement rates in Europe; they however did not differentiate between voluntary and involuntary retirement.

Duval (2003) analyses the labour force participation of older males in OECD countries and also accounts for unemployment rates. In order to avoid endogeneity problems, he uses the unemployment rate of prime-age workers instead of the old age unemployment rate. In line with Fischer and Sousa-Poza (2006), his empirical results also suggest that there is a negative relationship between the unemployment rate of prime-age-workers and labour force participation of older workers. The unemployment variable is however barely significant at the 5% level and does not reduce the implicit tax rate coefficient in a cross-country regression, implying that the

importance of the unemployment rate as a determinant of early retirement in comparison to other factors can be doubted.

Moreover, Dorn and Sousa-Poza (2010) found that the probability of voluntary early retirement depends also on the level of a country's wealth. Their findings suggest that higher GDP per capita is positively related with voluntary early retirement. They argue that higher levels of GDP make early retirement more affordable on a macro level.

Employment Protection Legislation

According to the results of Dorn and Sousa-Poza (2010) for OECD countries, strict employment protection legislation leads to higher levels of involuntary retirement. This can be explained by the fact that employment protection legislation encourages companies to send older workers into early retirement rather than laying them off. Fischer and Sousa-Poza (2006), on the other hand, found no significant relationship between early retirement and Employment Protection Legislation in their sample of European countries. In the literature, this issue is rarely dealt with; hence, more research on employment protection legislation is needed in order to draw a general conclusion.

3. Data

3.1 Description of the data base

The ad hoc module 2006 (AHM2006) of the European Labour Force Survey (LFS) was used as the main data source for this report. This data source was selected for two reasons. First, it covers all EU-27 member states as well as Norway, which constitutes a considerable advantage over other possible data sources like the SHARE data, which is limited to a smaller number of countries. In the delivered file, however, the dataset of Malta was missing, and we did not use the dataset for Norway due to the focus on EU member states. Second, the AHM2006 is specifically focussed on the question posed in task 1 of WP 17, and thus in this research report. AHM2006 is concerned with the transition from work into retirement. It includes working as well retired respondents, with some items of the questionnaire specifically adjusted to the respective labour market status. Working persons are asked about planned transitions, while retired persons are asked about their actual transition into retirement in the past.

The target group of the AHM2006 consisted of all persons aged between 50 and 69, whether they worked or did not work but worked at least up to the age of 50. Every LFS respondent of this age group in the respective survey period was included into the sample in most of the countries. Seven countries, however, used sub-samples of the core LFS. Participation in the module was voluntary in most participating countries and compulsory in eight countries.

An obvious disadvantage of the AHM2006 is its relatively high age. A repetition of the module has been carried out in 2012 and corresponding data will become available soon after, but too late to be included into the NEUJOBS project (or at least into this Work Package).

3.2 Variables

Retirement

The LFS AHM 2006 contains several possibilities to define retirement, depending on the concept of retirement used and on the group of persons.

One possibility to define retirement is to use the variable PLAGESTP (planned age for stopping all work for pay or profit). This question was asked to all respondents aged 50-69 who fulfil one of two definitions: The first is that they report to have worked for pay or own or family business during the reference week or did not work even though still having a job or business. The second is that they were on layoff or without job or business during the reference week, but had worked until the age of 50. PLAGESTP offers several possibilities to state plans for the timing of retirement, but offers also the possibility to answer: "has already stopped all work for pay or profit". Note that this definition requires to have stopped all work, as opposed to having stopped the main job. Unless stated otherwise, we use this variable to define retirement.

An alternative to define retirement would be to use information on the main labour market status after the last job or business (STATAFT=2, see below).

A third possibility to define "retired" would be to refer to receipt of retirement benefits. In variable AGEPENS, the AHM2006 provides information at which age persons started to receive an individual retirement pension. This variable allows also identification of (1) persons who do not receive an individual retirement pension even though being entitled, and (2) persons who are not/not yet entitled to an individual retirement pension.

Information on other benefits than individual retirement pension is provided in variable OTHBENF (Person receives an individual pension or individual benefits, other than a retirement pension and unemployment benefits, such as disability pension, a sick pension or an early retirement scheme allowance).

In section 4.1 we present some statistics describing the dataset with regard to the labour market status.

Working

To define the labour market status working, we use the variable WSTATOR of the Labour Force Survey which refers to the labour market status during the reference week. We allocate the labour market status "working" to persons who ticked one of the following two possibilities:

1. Did any work for pay or profit during the reference week – one hour or more (including family workers but excluding conscripts on compulsory military or community service)
2. Was not working but had a job or business from which he/she was absent during the reference week (including family workers but excluding conscripts on compulsory military or community service)

This definition fits well with the definition of retirement using PLAGESTP. Both variables draw the line between "work" and "retirement" according to the same logic:

paid work for a very low number of hours is defined as work, not retirement. Or put differently, for being defined as "working" it is not necessary that "work" provides the main income, it is sufficient that one is still economically active.

To analyse **transitions** into retirement, we make use of the variable STATAFT, which declares the "main labour market status just after leaving the last job or business". Four valid responses were possible: (1) unemployed, (2) in retirement or early retirement, (3) long-term sick or disabled, (4) other. As this question was asked to persons who either were "not working because on lay-off" or "neither worked nor had a job or business during the reference week" (WSTATOR = 3, 5), we use this variable in combination with information on retirement to learn about routes into retirement.

Age and age at (planned) transition into retirement

A disadvantage of the LFS including the AHM2006 is that no exact information on a person's **age** (at the time of the survey) is available. Information on age at the time of the survey is provided in terms of 5-year age bands only: 50-54, 55-59, 60-64, and 65-69.

Planned age for stopping all work, however, is available as an exact number, ranging from 50 to 93. Persons unwilling or unable to state an exact age were offered broad age groups (before 60, between 60 and 64, 65 or older or planning to work as long as possible). For our evaluations, we recoded these items as "57" (for: before 60), "62" (for: between 60 and 64) and "67" (for: 65 or older) in order not to lose these observations for the econometric analysis.

A drawback of this data structure is that we cannot calculate the planned period until a person will retire, because the actual age is not contained in the data set. Similarly, even though we know the age at which persons started receiving a retirement pension, we can neither calculate for how long persons have been receiving a pension already, nor in which calendar year they started receiving a pension.

Job-related characteristics

The combination of the AHM2006 with variables included in the core LFS allows to include a number of job-related characteristics, at least for persons still active in the labour market.

We define four industries: agriculture (NACE A, B), manufacturing (NACE C, D, E, F), personal services (NACE M, N, P). Remaining NACE categories form the base category. We define three occupational classes: blue collar (ISCO 6, 7, 8, 9), intellectual workers (ISCO 1, 2), and a base category of other workers including ISCO 3 through 5. Both kinds of information, industry and occupation, are in theory available for still active as well as for already retired persons. For retired persons, the dataset contains specific variables for NACE and ISCO in the last job before retirement. In practice, however, these data are missing in a considerable percentage of this sub-sample. For instance, information on NACE in the last job is missing for 76% of retirees receiving an individual retirement pension.

The intention of this classification of industries and occupational groups is to reflect at least to some degree the transition of the quality of work as discussed in Fischer-Kowalski et al. (2012). The storyline there is that empathic and intellectual capacities

will gain importance during the next (or possibly already happening) transition, while purely physical work will lose importance.

4. Results

4.1 Descriptive Analysis of the Data Set

The submitted data set includes 264,579 observations from 26 EU member states (Malta is not included) which are described in this section of chapter 4.

4.1.1 Labour market status in the sample

More than half of the persons included in the sample are still working. Averaged across countries, 6% are receiving an individual retirement pension while working, while 51% work without having this additional income. The majority of persons not working receive an individual retirement income. Some new EU member states (EE, LV, RO), but also UK deviate from this pattern in so far as more than 10% of the sample combine receipt of a retirement pension with still having a job. In Denmark, and even more so in the Netherlands[1], there are more non-working persons without than with an individual retirement pension. In Finland, Ireland and Sweden both groups are of similar size. Sweden is the country with the highest percentage of persons still working (77% without individual retirement pension, 5% with individual retirement pension). Apart from Sweden, only in Ireland, Netherlands and Denmark more than 60% of the individuals in our sample report to be still working. For further results by country see Table A1 in the Annex.

As expected, we see a receding share of workers and an increasing share of persons receiving pension with increasing age. Only in the oldest age group there are more persons combining income from work and pension than receiving income from work alone.

Also the general pattern with regard to occupational groups is in line with expectations: Among intellectual workers (academics and leading positions), the share of active persons is highest and the share of workers without current job or pension income lowest. Among blue collar workers, the situation is reverse. Separated by industries, we see the highest share of active workers in personal services and the lowest in agriculture, at least as long as workers with retirement income are excluded. If included, the picture changes because a rather high share of workers in agriculture combines retirement income and work.

[1] In the Dutch case, this might be seen in the context of extended use of disability pensions.

Table 2. Labour market status at time of interview (2006), row percentages

	Work, no receipt of individual ret. pension	Work, receipt of ind. ret. pension	Receipt of ind. ret. pension, no work	No or unknown receipt of ind. pension, no work
	%	%	%	
Sex				
Men	53.98%	5.76%	28.48%	11.78%
Women	48.55%	5.42%	33.65%	12.39%
Age				
Age 50-54	90.45%	1.23%	1.37%	6.95%
Age 55-59	66.45%	4.04%	14.17%	15.34%
Age 60-64	27.49%	9.72%	45.71%	17.08%
Age 65-69	3.96%	9.16%	77.84%	9.04%
Occupational groups				
Intellectual workers	72.69%	7.31%	15.23%	4.78%
Other white collar	65.21%	5.98%	20.23%	8.58%
Blue collar	58.44%	7.53%	21.90%	12.13%
Industries				
Agriculture	52.77%	16.40%	20.69%	10.13%
Manufacturing	59.67%	3.96%	24.17%	12.21%
Pers. services	70.39%	6.17%	16.94%	6.50%
Other services	64.92%	6.66%	19.12%	9.29%
Total - %	51.51%	5.60%	30.83%	12.06%

Note: Percentages refer to unweighted percentage in study group. For retired persons, work-related characteristics refer to last job before retirement.

Source: LFS AHM 2006.

4.1.2 Routes into retirement

Which routes with respect to **labour market status** lead into retirement, and how pronounced are differences regarding age and sex? Table 3 provides an answer for the study population using the variable STATAFT. The majority of retirees moved immediately from work into (early) retirement, with a slightly higher percentage in the female subsample. Among the four source states considered, unemployment is the least frequent one, with 5%. Immediate transitions from work into retirement were more frequent among the older retirees; the respective share increases from 67% (Age 50-54) to 82% (Age 65-69). Note, though that this table does not distinguish between differences in length of retirement. Changes in retirement policies are therefore not immediately visible.

Table 3. Transitions into (early) retirement, percentages by main labour status before retirement (N=78,624)

	Work	Unemployed	Long-term sick or disabled	Other
	%	%	%	%
Sex				
Men	78.76%	5.37%	8.76%	7.11%
Women	81.31%	4.81%	7.64%	6.24%
Age				
Age 50-54	66.67%	4.72%	9.82%	18.79%
Age 55-59	78.51%	4.51%	7.26%	9.72%
Age 60-64	78.25%	6.00%	8.80%	6.95%
Age 65-69	81.98%	4.64%	8.00%	5.38%
Total - N	62,924	4,004	6,447	5,249

Note: Percentages refer to unweighted percentage in sample without NL, LV and restricted to persons receiving individual or early retirement pension.

Source: AHM 2006.

We estimated a probit model to analyse which factors correlate to direct transitions from work into retirement (model not reported here). We found that being female, married, educated on medium or higher level, and working in an intellectual occupation or personal services all are associated to a higher probability for a direct transition. Blue collar work and work in agriculture or manufacturing are associated to a lower probability.

In several countries more flexible transitions into retirement have been offered by public retirement schemes. Even though exact definition of schemes depends on national regulations, **reduction of working hours** per week is often an element of such schemes. According to the AHM2006, less than 2% of working persons aged 50-79 participated in such schemes. 6% worked reduced hours in course of their planned retirement, but did so without a specific progressive retirement or part-time pension scheme. Less than 10% of workers planned to reduce working hours in the coming 5 years, but the large majority of workers did not plan to reduce working hours before retirement (59% do not plan to reduce working hours during the next 5 years, and 24% have no relevant plans yet). Variations along occupational, age or sex groups are not large, but tend to point in the expected directions, with slightly higher shares of female and older persons willing to reduce hours.

The evaluation of the corresponding questions for persons already retired confirms this picture, see Table 5. In this group, the share of persons without reduced working hours before retirement is even larger than the group of workers without plans to reduce working hours. There are several possible explanations for this difference: Plans of workers to reduce hours may not always work out, and possibilities to reduce hours may have increased, be it via changed pension regulations or via increased flexibility of employers.

Table 4. Reductions in working hours before planned retirement (persons with job or business only, N=144,564)

	Yes, in progressive retirement scheme / part-time pension	Yes, but not in progressive retirement scheme / part-time pension	No, but plans to do so within next 5 years	No, and plans not to do so within next 5 years	No, and no relevant plans yet
	%	%	%	%	%
Sex					
Men	1.39%	5.38%	8.96%	60.11%	24.17%
Women	2.28%	7.03%	9.28%	56.85%	24.55%
Age					
Age 50-54	0.81%	2.90%	6.37%	63.52%	26.41%
Age 55-59	2.25%	5.43%	10.89%	58.02%	23.41%
Age 60-64	3.49%	11.85%	12.84%	51.82%	20.01%
Age 65-69	2.10%	23.49%	10.63%	39.01%	24.77%
Occupational group					
Intellectual workers	1.98%	6.51%	11.51%	59.79%	20.20%
Other white collar	2.21%	5.92%	9.13%	61.03%	21.70%
Blue collar	1.26%	5.94%	7.48%	56.06%	29.26%
Industry					
Agriculture	1.06%	9.70%	7.50%	48.43%	33.31%
Manufacturing	1.29%	3.89%	8.31%	59.70%	26.81%
Personal Services	2.45%	6.67%	10.24%	60.14%	20.50%
Other services	1.76%	6.12%	9.38%	60.07%	22.68%
Total - %	1.77%	6.09%	9.10%	58.71%	24.33%
Total - N	2,560	8,799	13,154	84,876	35,175

Note: Row percentages, unweighted.

Source: AHM 2006.

Table 5. Reductions in working hours before retirement (Retirees with individual retirement pension, N=72,066)

	Yes, in progressive retirement scheme / part-time pension	Yes, but not in progressive retirement scheme / part-time pension	No, but plans to do so within next 5 years	No, and plans not to do so within next 5 years	No, and no relevant plans yet
	%	%	%	%	%
Sex					
Men	1.37%	4.66%	1.50%	82.90%	9.57%
Women	1.21%	6.52%	0.87%	83.67%	7.72%

Age					
Age 50-54	0.66%	6.16%	4.29%	79.87%	9.02%
Age 55-59	0.67%	5.00%	2.00%	83.86%	8.47%
Age 60-64	1.73%	5.22%	1.46%	81.19%	10.40%
Age 65-69	1.18%	5.95%	0.73%	84.62%	7.53%
Total - %	1.29%	5.58%	1.19%	83.28%	8.66%
Total - N	931	4,018	859	60,017	6,241

Note: Row percentages, unweighted.

Source: AHM 2006.

4.1.3 Reasons for retirement

Even though reaching the compulsory retirement age constitutes the largest individual reason given for the transition into retirement, it is noteworthy that it was the main reason for less than half of all retirees, see Table 6. Own health or disability is the main reason in less than 10% of transitions in the sample, as expected with a higher frequency for younger retirees. Financial incentives are reported to have been the main reason for retirement in 7% of transitions, and are more important for women and younger persons. It is to some degree astonishing that the offered reasons cover the main reason for retirement only for about 70%, leaving a rather high share of over 30% of transitions triggered by unspecific "other" reasons.

Table 6. Main reason for (early) retirement (Retirees with individual retirement pension, N=71,200)

	Job lost	Reached compulsary ret. age	Own health or disability	Care respon-sibilities	Job problems	Financial incentive	Other
	%	%	%	%	%	%	%
Sex							
Men	4.75%	44.11%	9.05%	0.66%	2.25%	9.44%	29.73%
Women	5.36%	44.35%	7.73%	2.37%	2.28%	5.36%	32.56%
Age							
Age 50-54	7.30%	28.47%	16.37%	1.88%	3.75%	10.22%	32.01%
Age 55-59	6.44%	34.20%	9.48%	1.76%	3.13%	10.03%	34.96%
Age 60-64	5.27%	39.07%	8.29%	1.58%	2.60%	9.21%	33.99%
Age 65-69	4.46%	50.92%	7.97%	1.38%	1.77%	5.42%	28.10%
Total - %	5.05%	44.23%	8.40%	1.51%	2.27%	7.43%	31.13%
Total - N	3,594	31,490	5,980	1,072	1,614	5,288	22,162

Note: Row percentages, unweighted.

Source: AHM 2006.

4.1.4 Options to postpone retirement

The AHM2006 contained questions on possible factors contributing to a longer working life. Three factors were included, more flexible working time arrangements, more opportunities to update skills and better health / safety at the workplace. The

questions were asked to both groups of persons with slightly adjusted wording, those still working and those not working any more.

Table 7 and Table 8 show responses differentiated by labour market status. In general, working persons assume about twice as often that the three mentioned factors would contribute to a longer working life, compared to already retired workers. In both groups, more flexible working times are more often assumed to potentially prolongue the working life than either more training opportunities or better health or safety at the workplace.

In both groups, we find hardly any sex-specific differences. Also in both groups, we find that among younger persons a higher percentage assumes that better conditions (of all three kinds) could postpone retirement. The latter finding corresponds to expectations: 1) for younger persons, the possible period to benefit from investments in skills or health is longer; 2) among older groups we find a larger share of workers above compulsory retirement age, who possibly are no longer interested in better working conditions at all. Table 7 shows, among others, percentages broken down by main reason for retirement. A comparison between two groups of retirees is noteworthy, namely between those who put their retirement mainly down to job problems, and those who put it mainly down to own health or disability. A higher percentage of retirees due to job problems assume to have benefitted from better health and safety at the workplace, compared to retirees mainly due to health reasons.

Table 7. Factors that would have contributed to staying longer at work (persons not working and with individual retirement pension)

	More flexible working time	**More opportunities to update skills**	**Better health / safety at workplace**
	%	%	%
Sex			
Men	10.45%	5.61%	10.87%
Women	10.31%	5.54%	9.58%
Age			
Age 50-54	20.25%	13.80%	20.26%
Age 55-59	13.86%	7.89%	13.79%
Age 60-64	10.23%	5.06%	9.62%
Age 65-69	7.65%	3.86%	7.84%
Main reason for retirement or early retirement			
Job lost	14.38%	7.16%	13.42%
Reached comp. ret. age	7.12%	3.15%	6.57%
Own health or disability	7.02%	3.42%	13.37%
Care responsibilities	12.76%	3.96%	6.51%
Job problems	18.51%	9.32%	21.28%
Financial incentive	12.26%	5.32%	6.25%
Other	8.06%	3.74%	6.64%
Total - %	10.38%	5.58%	10.24%
Total - N	11,119	6,035	10,979

Note: Percentages of persons in the study group who answered "yes", i.e. they assume that the respective factor would have contributed to the person staying longer at work.
Source: AHM 2006.

Among (still active) workers, a lower fraction of blue collar workers expects later retirement from more flexible working time or from better training opportunities, compared to other groups of workers, see Table 8. Blue collar workers do, however, more often expect to benefit from better health/safety at the workplace.

Broken down by industries, we find expectations to benefit from flexible working time arrangements and from skill upgrades to be highest in personal services. Expectations for health and safety at the workplace are less divergent between industries than the other two factors.

It is a bit surprising that persons working shift, night or weekend work hardly deviate with respect to their expectations from workers typically working "normal" hours. Among workers wishing to change their usual hours worked, the percentage of workers assumedly benefitting from more flexible working time arrangements is a bit higher than average, but the difference is perhaps smaller than one might have expected. On the other hand, this assumedly low impact is in line with findings for Portugal, where it was concluded that reduced working hours are perhaps rather seen as a preparatory measure for retirement than as a route to a longer active career (Machado, Portela 2012).

Table 8. Factors that would contribute to staying longer at work (working persons only)

	More flexible working time	**More opportunities to update skills**	**Better health / safety at workplace**
	%	%	%
Sex			
Men	20.55%	10.11%	14.79%
Women	20.92%	10.95%	14.42%
Age			
Age 50-54	22.17%	12.08%	16.18%
Age 55-59	20.45%	9.70%	13.89%
Age 60-64	18.48%	8.41%	11.84%
Age 65-69	15.53%	7.15%	13.88%
Occupational group			
Intellectual workers	23.64%	12.06%	12.35%
Other white collar	21.50%	11.53%	13.17%
Blue collar	18.12%	8.56%	17.36%
Industry			
Agriculture	13.99%	6.93%	15.90%
Manufacturing	20.39%	9.32%	16.73%
Personal services	23.43%	13.21%	14.68%
Other services	21.15%	10.67%	13.13%

Wish to change working hours			
no	20.14%	9.98%	13.82%
yes	25.74%	13.99%	18.43%
Working conditions			
No shift, night or weekend work	20.42%	10.46%	14.07%
Shift, night or weekend work	21.84%	10.52%	16.81%
Average hours worked	38.26	37.62	38.79
Total - %	20.71%	10.48%	14.63%
Total - N	30,375	15,451	21,597

Note: Percentages of persons in the study group who answered "yes", i.e. they assume that the respective factor would contribute to person staying longer at work.

Source: AHM 2006.

In the AHM2006, persons who still work and are not (yet) entitled for a retirement pension were asked for their reason to stay at work. Almost half of all respondents stated provision of sufficient household income as the main reason to continue working. 35% of all respondents did not have financial reasons, consisting of a considerably smaller share of younger and higher share of older workers. Among workers above 60 years of age, roughly 40% claimed to work for other than financial reasons. In the oldest age group (65-70) 11% of all responding workers stated that increasing their pension entitlement was the main reason for working, in contrast to 17% among respondents of all ages. Among blue collar and agricultural workers, there are more workers who stay at work in order to provide sufficient household income, and a lower percentage of workers who work for non-financial reasons than in other occupational groups.

Table 9. Main financial incentive to stay at work, row percentages (Working persons only, N=35,081)

	Increase retirement pension entitlement	Provide sufficient household income	No financial incentive
	%	%	%
Sex			
Men	17.02%	46.18%	36.80%
Women	17.45%	48.96%	33.59%
Age			
Age 50-54	20.92%	51.67%	27.41%
Age 55-59	19.66%	46.67%	33.67%
Age 60-64	15.78%	44.86%	39.37%
Age 65-69	10.97%	48.93%	40.09%
Occupational groups			
Intellectual workers	17.32%	39.23%	43.45%
Other white collar	17.54%	43.32%	39.14%
Blue collar	16.85%	56.36%	26.79%
Industry			
Agriculture	12.63%	63.60%	23.76%

Manufacturing	18.87%	45.95%	35.18%
Personal Services	18.54%	43.87%	37.59%
Other services	17.49%	43.79%	38.72%
Total - %	17.20%	47.37%	35.43%
Total - N	6,035	16,617	12,429

Note: Percentages refer to unweighted percentage in study group.

Source: AHM 2006.

4.2 Determinants for the planned age at exit from labour market

4.2.1 Method

We estimate linear regression models for the planned age at exit from the labour market. Using the full sample would result in biased estimates as plans of persons in higher ages depend on earlier choices or events. With increasing age, still working persons constitute a biased and increasingly diminishing fraction of their peer group, due to prior retirement of the other fraction. In order to avoid selection bias we chose to estimate the planned age at exit from labour market using a sample restricted to the age group 50-54. In this age group, more than 90% are still working, while only 27% are working in the age group 60-64, see Table 2.

We are using the planned age at exit from the labour market as our dependent variable, which is continuous and observable for every person in the sample. The analysis of a duration process typically requires special econometric techniques to care for censoring in the data, i.e. the process may still be on-going. In our case, this is not a problem, because all individuals state a planned retirement date. Moreover, also normality of the residuals should not be a problem. For simplicity reasons, we therefore use OLS regression with robust standard errors. We also estimated Cox proportional hazard models to analyse the robustness of our results (for space reasons not included into the report).

We are interested in country effects as well as in factors related to the **pension system**. Factors related to the pension system are, however, not available in or constructable from the AHM2006; we therefore cannot include pension-specific information on an individual level. In order to include at least some information describing national pension systems, we take macro-level information from OECD (2011), i.e. standard retirement age and either replacement rate or pension wealth for the median worker. All variables are available separately for men and women, but not for all EU27 countries.

Country effects are considered in two ways: First, we estimate one set of regressions with country-fixed effects, using Germany as base. This approach, however, prohibits us from including other macro-level dummy variables into the estimation, most notably those describing national pension systems. As a second approach, we therefore chose to segregate the sample into more homogeneous groups of countries, and to run separate estimations using pension dummies in each group of countries. We defined three groups of countries: new members in the EU (BG, CY, EE, HU, LT, LV, PL, RO, SI, SK), richer members of the EU15 (AT, BE, DK, FI, NL, IE, LU, SE, DE, with GDP per

capita above EU15 average), and poorer members of the EU15 (ES, GR, FR, IT, PT, UK, with GDP per capita below EU15 average). This approach allows us to compare size and significance of coefficients across country groups.

Results are presented in Table 10 (for variables including replacement rate) and Table 11 (variables including pension wealth) and discussed by group of variable in the following sections. Both variants of models are labelled with corresponding numbers and are distinguished by "a" (if including replacement rate) and "b" (including pension wealth), which facilitates references to corresponding models (i.e. a reference to model M1 is to be understood as M1a and M1b).

Table 10. Linear regression model estimations for planned retirement age, pension variables: standard retirement age SRA and replacement rate

	M1a: total sample	**M2a: male**	**M3a: female**	**M4a: EU15, rich**	**M5a: EU15, poor**	**M6a: new EU members**
Female	-0.490***			-0.493***	0.459***	-1.523***
	(0.0431)			(0.0620)	(0.0802)	(0.0977)
Married	-0.460***	-0.117*	-0.726***	-0.612***	-0.391***	-0.351***
	(0.0399)	(0.0571)	(0.0562)	(0.0540)	(0.0764)	(0.0851)
Medium education	-0.0369	0.0596	-0.213**	0.0808	-0.110	0.412***
	(0.0416)	(0.0544)	(0.0653)	(0.0618)	(0.0740)	(0.0990)
High education	0.224***	0.0792	0.276**	0.376***	0.0924	1.188***
	(0.0575)	(0.0773)	(0.0881)	(0.0782)	(0.104)	(0.168)
Large firm	-0.407***	-0.466***	-0.318***	-0.285***	-0.542***	-0.242**
	(0.0371)	(0.0508)	(0.0542)	(0.0504)	(0.0734)	(0.0761)
No firmsize	0.154*	0.149	0.182	0.563***	-0.187	0.00472
	(0.0758)	(0.0892)	(0.140)	(0.127)	(0.106)	(0.175)
Employee	-1.074***	-1.032***	-1.059***	-0.450***	-1.753***	-0.123
	(0.0680)	(0.0808)	(0.125)	(0.110)	(0.104)	(0.146)
Part-time job	-0.395***	-0.0858	-0.427***	-0.268***	-0.206	-0.152
	(0.0524)	(0.111)	(0.0610)	(0.0645)	(0.115)	(0.185)
Working conditions	-0.00822	-0.0667	0.0791	0.128*	-0.0690	-0.0628
	(0.0395)	(0.0519)	(0.0609)	(0.0558)	(0.0719)	(0.0825)
Large city	0.00212	-0.00802	-0.00281	0.103	-0.0200	-0.156
	(0.0410)	(0.0552)	(0.0612)	(0.0595)	(0.0780)	(0.0849)
Medium city	-0.242***	-0.353***	-0.0895	-0.309***	-0.137	-0.354***
	(0.0432)	(0.0573)	(0.0657)	(0.0646)	(0.0806)	(0.0834)
Agriculture	0.334***	0.349***	0.293*	0.309*	0.982***	-0.603***
	(0.0826)	(0.0987)	(0.149)	(0.142)	(0.132)	(0.150)
Manufact-uring	-0.0385	0.0223	-0.215**	0.0252	-0.198*	-0.0939
	(0.0446)	(0.0531)	(0.0830)	(0.0642)	(0.0816)	(0.0854)
Personal services	0.0907*	0.146	0.0142	0.353***	-0.120	-0.372***
	(0.0456)	(0.0756)	(0.0584)	(0.0610)	(0.0846)	(0.108)

Blue collar worker	0.187*** (0.0459)	0.333*** (0.0607)	0.0442 (0.0740)	-0.00734 (0.0656)	0.247** (0.0840)	0.0263 (0.0914)
Intellectual worker	0.264*** (0.0501)	0.481*** (0.0676)	0.0214 (0.0761)	0.0912 (0.0653)	0.393*** (0.0940)	0.248 (0.129)
yearspnt	-0.0777*** (0.00291)	-0.109*** (0.00448)	-0.0603*** (0.00383)	-0.0330*** (0.00394)	-0.122*** (0.00477)	-0.0446*** (0.00988)
sra	0.396*** (0.00856)	0.428*** (0.0150)	0.378*** (0.0106)	0.520*** (0.0218)	0.538*** (0.0164)	0.437*** (0.0247)
rr	-2.033*** (0.0970)	-2.346*** (0.129)	-1.738*** (0.148)	-2.231*** (0.124)	-3.147*** (0.211)	-1.339*** (0.366)
_cons	2.497*** (0.558)	1.241 (0.976)	2.759*** (0.673)	-7.667*** (1.419)	-4.109*** (1.039)	-1.860 (1.519)
N	44,558	24,493	20,065	18,905	16,719	8,934
adj. R^2	0.114	0.103	0.099	0.088	0.156	0.179

Notes: Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Due to missing variables, observations for RO, SI, SK, UK were excluded. Variable labels see notes for table 10.

Table 11. Linear regression model estimations for planned retirement age, pension variables: standard retirement age SRA and pension wealth

	M1b: total sample	**M2b: male**	**M3b: female**	**M4b: EU15, rich**	**M5b: EU15, poor**	**M6b: new EU members**
Female	-0.323*** (0.0434)			-0.307*** (0.0616)	0.382*** (0.0797)	-1.296*** (0.118)
Married	-0.501*** (0.0400)	-0.209*** (0.0572)	-0.737*** (0.0564)	-0.614*** (0.0541)	-0.452*** (0.0758)	-0.357*** (0.0851)
Medium education	-0.0292 (0.0415)	0.0759 (0.0543)	-0.210** (0.0654)	0.0443 (0.0622)	-0.0112 (0.0737)	0.410*** (0.0990)
High education	0.235*** (0.0575)	0.149 (0.0775)	0.264** (0.0880)	0.331*** (0.0787)	0.168 (0.104)	1.172*** (0.167)
Large firm	-0.305*** (0.0373)	-0.337*** (0.0512)	-0.259*** (0.0546)	-0.276*** (0.0505)	-0.396*** (0.0727)	-0.239** (0.0759)
No firmsize	0.164* (0.0757)	0.168 (0.0892)	0.186 (0.139)	0.597*** (0.128)	-0.149 (0.106)	0.0278 (0.175)
Employee	-1.032*** (0.0678)	-0.964*** (0.0809)	-1.041*** (0.125)	-0.443*** (0.111)	-1.791*** (0.104)	-0.121 (0.146)
Part-time job	-0.166** (0.0535)	0.109 (0.111)	-0.292*** (0.0638)	-0.278*** (0.0647)	-0.116 (0.113)	-0.169 (0.186)
Working condit.	-0.0306 (0.0394)	-0.102* (0.0517)	0.0638 (0.0610)	0.0932 (0.0561)	-0.0517 (0.0710)	-0.0581 (0.0823)
Large city	0.00440 (0.0410)	-0.00452 (0.0551)	-0.0166 (0.0615)	0.0518 (0.0600)	0.0183 (0.0774)	-0.157 (0.0848)
Medium city	-0.198*** (0.0435)	-0.309*** (0.0574)	-0.0697 (0.0665)	-0.371*** (0.0650)	-0.111 (0.0798)	-0.338*** (0.0834)

Agri-culture	0.281*** (0.0824)	0.277** (0.0988)	0.243 (0.148)	0.300* (0.144)	0.960*** (0.130)	-0.626*** (0.151)
Manu-facturing	-0.0710 (0.0445)	-0.0218 (0.0530)	-0.244** (0.0832)	0.0156 (0.0645)	-0.185* (0.0808)	-0.0818 (0.0854)
Personal services	0.0882 (0.0456)	0.112 (0.0756)	0.0215 (0.0586)	0.340*** (0.0610)	-0.135 (0.0839)	-0.370*** (0.108)
Blue collar	0.109* (0.0460)	0.265*** (0.0607)	-0.0300 (0.0746)	-0.0113 (0.0659)	0.257** (0.0830)	0.0142 (0.0915)
Intellect. worker	0.294*** (0.0500)	0.548*** (0.0675)	0.0297 (0.0761)	0.111 (0.0654)	0.387*** (0.0938)	0.242 (0.129)
yearspnt	-0.0724*** (0.00289)	-0.0922*** (0.00451)	-0.0591*** (0.00382)	-0.0337*** (0.00396)	-0.132*** (0.00477)	-0.0461*** (0.00983)
sra	0.447*** (0.00948)	0.476*** (0.0159)	0.411*** (0.0123)	0.635*** (0.0225)	0.350*** (0.0154)	0.386*** (0.0234)
Pension wealth	-0.00122*** (0.0000551)	-0.00146*** (0.0000733)	-0.000809*** (0.0000859)	-0.00115*** (0.0000754)	-0.00801*** (0.000359)	-0.0105*** (0.00267)
_cons	-1.709** (0.617)	-3.253** (1.048)	-0.0180 (0.761)	-15.62*** (1.449)	9.511*** (1.091)	1.927 (1.617)
N	44,558	24,493	20,065	18,905	16,719	8,934
adj. R^2	0.115	0.105	0.097	0.083	0.169	0.179

Notes: Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Due to missing variables, observations for RO, SI, SK, UK were excluded. Variable labels see below.

List of abbreviations (Source of variable)

Medium education	Medium level of education (LFS)
High education	Higher level of education (LFS)
Large firm	Firm size: 50 persons or more (LFS)
No firmsize	Firm size missing (LFS)
Part-time job	Part-time job (LFS)
Working conditions	Working conditions: shift , night or weekend work (LFS)
Large city	Densely populated area (LFS)
Medium city	Intermediate area (LFS)
Agriculture	Agriculture. NACE classification A, B (LFS)
Manufacturing	Manufacturing. NACE classification C, D, E, F (LFS)
Personal services	Personal service. NACE classification M, N, P (LFS)
Blue collar worker	Blue collar. ISCO > 599 & ISCO < 999 (LFS)
Intellectual worker	Intellectual worker. ISCO > 99 & ISCO < 300 (LFS)
yearspnt	Number of years spent working for pay or profit during working life (AHM2006)
sra	Standard retirement age (OECD 2011)
rr	Replacement rate (OECD 2011)
Pension wealth	Pension wealth (OECD 2011)
_cons	Constant

4.2.2 Results: Effects related to the pension system

As stated above, we use two variables to grasp characteristics of national pensions systems, standard retirement age (SRA) and either replacement rate (RR) or pension wealth (PW). In the most general model M1 comprising all individuals and country groups, variables are significant and with the expected sign: higher RR and PW are associated with plans for earlier retirement, while a higher SRA is associated with plans for later retirement. Segregation of the sample by sex (M2, M3) shows that the relations between pension variables and planned age for retirement are slightly more pronounced in the male sample.

Segregation of the sample by country type reveals differences in the size of the effects: In M3 (EU 15, rich) the estimated coefficient for SRA is larger than in estimations for both other country groups. The effect of PW, in contrast, is largest in the new EU member states and smallest in rich EU15 countries.

4.2.3 Results: Country fixed effects

Estimated coefficients for models including country fixed effects are summarized in Table 12.

Table 12. Linear regression model estimations for planned retirement age, country fixed effects

	M7: total sample	M8: male	M9: female
AT	-3.449***	-2.506***	-4.495***
	(0.0970)	(0.133)	(0.135)
BE	-2.443***	-2.507***	-2.358***
	(0.129)	(0.178)	(0.184)
BG	-1.195***	-0.642***	-1.848***
	(0.122)	(0.161)	(0.182)
CY	0.258	0.232	0.232
	(0.166)	(0.202)	(0.282)
CZ	-2.763***	-1.805***	-3.821***
	(0.0802)	(0.108)	(0.116)
DK	-0.929***	-0.935***	-0.974***
	(0.119)	(0.181)	(0.155)
EE	1.880***	1.711***	1.887***
	(0.114)	(0.146)	(0.174)
ES	-1.188***	-1.475***	-0.776***
	(0.0971)	(0.128)	(0.149)
FI	-1.466***	-1.852***	-1.209***
	(0.0994)	(0.146)	(0.135)
GR	-1.910***	-2.104***	-1.786***
	(0.0979)	(0.126)	(0.164)
NL	-1.467***	-1.369***	-1.457***
	(0.0768)	(0.103)	(0.117)
FR	-3.589***	-4.109***	-3.091***
	(0.0908)	(0.124)	(0.131)

HU	-1.846*** (0.0855)	-1.619*** (0.115)	-2.169*** (0.127)
IE	-0.630*** (0.101)	-0.350** (0.132)	-1.005*** (0.158)
IT	-0.956*** (0.0828)	-1.021*** (0.112)	-0.982*** (0.125)
LT	-1.858*** (0.172)	-1.529*** (0.240)	-2.281*** (0.244)
LU	-2.972*** (0.126)	-3.608*** (0.159)	-1.825*** (0.189)
LV	-1.763*** (0.238)	-1.693*** (0.369)	-1.978*** (0.314)
PL	-2.824*** (0.121)	-0.979*** (0.166)	-4.732*** (0.149)
PT	0.746*** (0.117)	0.683*** (0.154)	0.710*** (0.177)
SE	0.0946 (0.0869)	-0.527*** (0.124)	0.606*** (0.120)
N	46,674	25,548	21,126
adj. R^2	0.168	0.155	0.196

Notes: Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Germany is base category. Due to missing variables, observations for RO, SI, SK, UK were excluded. Coefficients for additional variables see Annex.

4.2.4 Results: Job related characteristics

Being an **employee** is associated to plans for an earlier retirement than observed for persons working in their own business. This result is rather robust across model specifications and samples and corroborates earlier findings. Also working in a **larger firm** (which the LFS defines as 50 or more workers) is associated to plans for an earlier retirement, again robust across model specifications and samples and in line with results in the literature.

Results for part-time work and strainful working conditions are mixed. The estimated coefficient for **part-time work** as a rule carries a negative sign. The significance of this effect seems to be driven by women and more wealthy countries, as estimations with more selected samples show (M2-M6). Some consideration was given to the fact that the sample includes also some persons working only a very small number of hours per week. We therefore ran the models also with a sample restricted to persons working usually at least 10 hours per week. Estimated results (not reported here) did not deviate considerably from results reported above.

Working conditions turn out to be significant in very few models only. If significant, the coefficient is negative and the effect seems to be driven by male workers.

Estimations use dummy variables for two **occupational groups**: blue collar workers and intellectual workers (ISCO 1, 2; other white collar workers are the base category).

For both variables we estimate a significantly positive sign in both M1 models. The size of the effect is larger for intellectual workers. Segregation by sex leads to significant effects in the male sample only. Segregation by countries shows that the effect originates almost entirely from the less wealthy part of the EU15, for both other country groups we fail to estimate significant effects.

In models not distinguishing by country type, we find planned retirement age in agriculture being significantly higher than in other services, which was defined as base category with regard to **industries**. Significance of this effect is lower for women than for men. But estimations for groups of countries show large deviations across Europe: The estimated coefficient for richer EU15 countries is about as high as for the whole sample, far larger and also positive in the poorer EU15 countries, but large and negative in new EU member states. Our hypothesis is that earlier planned retirement in new member states might be related to different (physically harder) working conditions, compared to richer countries.

In manufacturing, female workers and workers in poorer EU15 countries plan to retire earlier than workers in other services. In personal services, workers in rich EU15 countries plan to retire later, and workers in new EU member states plan to retire earlier than persons working in the base category in their country group.

4.2.5 Results: Personal characteristics

Our estimations corroborate several well-known earlier findings: **Women** plan earlier retirement than men, which is in accordance with still sex-specific legislation in several EU countries. **Married** persons also plan earlier retirement than single or widowed persons, an effect which is far stronger for women. Having achieved higher **educational levels** seems to be related to longer active work-lives, but this effect does not seem to be significant for all Europeans. Women and workers in the more wealthy parts of EU15, but also in new member countries seem to experience the association between longer working lives and higher education, but male workers and workers in the less wealthy parts of the EU15 not. In our models, education coefficients are typically significant for higher but not for medium levels of education.

Model estimations also include the variable yearspnt (**years spent working** for pay or profit during working life). As pension systems in several countries include contribution years into calculations for pension entitlements, this variable could also be seen as related to pension systems. In all models, the estimated coefficient is highly significant and positive. The size of the effect is larger for men than for women and larger for poorer EU15 states than for richer or new EU states.

4.3 Partners and planned retirement

There is considerable literature discussing that plans for retirement are decisions governed not only by personal factors, but also by factors relating to the partner's labour market status, see references in section 2.1. The LFS allows identification of partners and their retirement plans (if not yet retired). This invites to investigate whether one can detect correlated plans of partners.

In order to identify correlations between partner's retirement plans, we re-estimate models M1-M3, but with the additional variable "partner's planned age for retirement" and with a restricted sample, i.e. restricted to individuals that are married (or living in the same household with an adult of opposite sex) and whose partner's data set is sufficiently complete as well.

We find a consistently positive and significant coefficient, which is somewhat higher in estimations with the female sample, see Table 13 (and annex for country fixed effects). Thus, if partners plan to retire at higher age, this is significantly connected to own plans for late retirement. Our results thus are in line with the literature suggesting joint household decisions rather than individual decisions on retirement. The effects of being married are no longer significant in these models, which is a result that needs to be seen in the context that the sample consists of (married or unmarried) couples only.

The effect of the partner's retirement plan is rather strong as it raises adj. R^2 of estimations considerably over the level achieved in models M7-M9. Note, though, that the sample here is far more homogenous because only couples with both partners working are included.

Table 13. Linear regression models for planned retirement age including the partner's planned age for retirement

	M10: total sample	M11: male	M12: female
Female	-1.915*** (0.0648)		
Married	-0.198 (0.131)	-0.0711 (0.203)	-0.167 (0.168)
Medium education	0.0889 (0.0732)	0.0935 (0.116)	0.00632 (0.0918)
High education	0.286** (0.0980)	0.148 (0.157)	0.223 (0.125)
Large firm	-0.133* (0.0608)	-0.263** (0.0949)	-0.0690 (0.0760)
No firmsize	0.183 (0.110)	0.164 (0.160)	0.173 (0.146)
Employee	-0.982*** (0.0996)	-1.042*** (0.142)	-0.773*** (0.134)
Part-time job	0.125 (0.0835)	-0.257 (0.219)	-0.128 (0.0980)
Working conditions	0.0382 (0.0646)	-0.0899 (0.0972)	0.130 (0.0832)
Large city	0.0333 (0.0710)	0.156 (0.109)	-0.0579 (0.0895)
Medium city	-0.170* (0.0755)	-0.203 (0.115)	-0.133 (0.0953)
Agriculture	0.224 (0.127)	0.315 (0.180)	0.0304 (0.167)

Manufacturing	-0.0323 (0.0748)	0.0995 (0.0992)	-0.213* (0.107)
Personal services	-0.0656 (0.0710)	-0.0320 (0.135)	-0.196* (0.0830)
Blue collar worker	0.175* (0.0759)	0.130 (0.115)	0.200* (0.101)
Intellectual worker	0.274*** (0.0805)	0.473*** (0.123)	0.139 (0.105)
yearspnt	-0.0612*** (0.00454)	-0.0857*** (0.00989)	-0.0466*** (0.00515)
Partner's planned ret. age	0.331*** (0.00943)	0.329*** (0.0138)	0.387*** (0.0129)
_cons	19.59*** (0.350)	19.94*** (0.588)	16.21*** (0.453)
N adj. R2	14,564 0.258	5,405 0.276	9,159 0.276

Notes: Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Due to missing variables, observations for DK, FI, RO, SI, SK, UK were excluded. Country fixed effects see annex. Variable labels: see Table 11.

We have to admit that the lack of the exact age of observed individuals, however, limits the accuracy of our analysis as we are not able to identify for which calendar year a person's and the partner's retirement are planned. Furthermore, we need to stress that we do not investigate causal relationships. That is, we cannot distinguish if a partner's plan to retire at older age contributes to postponing the other partner's retirement age, or if the estimation results simply reflect a matching effect of partners with similar preferences regarding leisure and work.

4.4 Reasons for retirement

The reason for retirement may be connected to the timing of the transition out of the labour market. Job loss, health problems, and hard working conditions can all be related to early retirement, see section 2.1.

The AHM 2006 specifically asked for the main reason for retirement, see Table 6. Naturally, this question was asked only to persons already in retirement. In order to identify correlations between reasons for retirement and the timing of actual retirement, we estimate linear regression models for the age at which a person started to receive an individual retirement pension (variable AGEPENS), using the main reason for (early) retirement (variable REASRET) as explanatory variable, see highlighted area in Table 14. Note, though, that in contrast to Table 6 we collapsed two rather infrequent main reasons for retirement into one category ("job loss" and "job problems").

Table 14 shows the effects of the reason for retirement (compulsory retirement age, own health or disability, favourable financial arrangements, job problems and care obligations) relative to other reasons. Having reached the compulsory retirement age is associated with late retirement. This variable carries the largest (absolute) effect size.

From the size of the coefficient we infer that workers retiring at the compulsory retirement age work significantly longer than all other workers. The slightly larger coefficient (again in absolute terms) in the male sample may be related to countries where compulsory retirement age is still sex-specific. Own health or disability and favourable financial arrangements to leave are both significantly related to earlier retirement relative to other reasons, in total as well as in the female sample. In the male sample, however, the effect of health and disability is not significantly different from other reasons. Job problems[2] and care obligations both fail to differ significantly from other reasons, in the male as well as in the female sub-sample.

Table 14. Linear regression model estimations for age at which person started to receive an individual retirement pension

	M13: total sample	M14: male	M15: female
Married	0.0924**	-0.164**	0.0894*
	(0.0337)	(0.0544)	(0.0425)
Medium education	-0.0110	-0.00943	-0.106*
	(0.0368)	(0.0502)	(0.0521)
High education	-0.00445	0.118	-0.227**
	(0.0587)	(0.0798)	(0.0868)
Large city	-0.0530	0.0426	-0.128*
	(0.0369)	(0.0505)	(0.0509)
Medium city	-0.0599	-0.0608	-0.0224
	(0.0390)	(0.0531)	(0.0543)
Blue collar worker	0.230***	0.199***	0.106
	(0.0380)	(0.0527)	(0.0547)
Intellectual worker	0.348***	0.569***	0.0962
	(0.0486)	(0.0682)	(0.0683)
Agriculture	0.577***	0.505***	0.574***
	(0.0506)	(0.0686)	(0.0748)
Manufacturing	-0.0344	0.0480	-0.313***
	(0.0360)	(0.0452)	(0.0557)
Personal services	0.0462	0.0702	0.0271
	(0.0439)	(0.0849)	(0.0522)
yearspnt	0.0570***	0.107***	0.0255***
	(0.00256)	(0.00522)	(0.00309)
Age 55-59	3.423***	3.095***	3.626***
	(0.0839)	(0.115)	(0.133)
Age 60-64	6.591***	6.868***	5.816***
	(0.0831)	(0.113)	(0.132)
Age 65-69	9.559***	9.640***	8.502***
	(0.0868)	(0.118)	(0.142)

[2] In the female sub-sample, however, job-problems are significantly negative on the 10% level.

Job loss or problems	-0.0534 (0.0651)	0.0798 (0.0894)	-0.169 (0.0876)
Having reached comp.ret.age	0.610*** (0.0397)	0.657*** (0.0543)	0.623*** (0.0566)
Own health or disability	-0.174** (0.0649)	-0.116 (0.0896)	-0.306*** (0.0913)
Care obligations	-0.121 (0.135)	-0.332 (0.276)	-0.0524 (0.149)
Financial incentives	-0.296*** (0.0665)	-0.274** (0.0883)	-0.273** (0.0956)
_cons	11.54*** (0.148)	9.200*** (0.253)	13.91*** (0.213)
N adj. R^2	32,768 0.612	17,668 0.616	15,100 0.626

Notes: Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Due to missing variables, observations for FR, IE, and due to problems with pension variables observations for NL were excluded. Germany is base. Country fixed effects see Annex. Variable labels: see table 11.

5. Discussion

Pension system

In line with the literature, our analyses confirm that replacement rate and pension wealth both are negatively correlated to retirement age. In contrast to most of the literature, we provide this evidence for *planned* rather than actual and observed retirement age. If pension systems of the future are to be designed in a way that workers *intend* to work longer rather than are simply forced to do so by regulations (which then are checked in order to exploit loopholes), this approach of using planned retirement may provide useful insights.

Estimating the model in more homogenous subsamples shows different effects for different parts of Europe. In richer countries of the EU15, standard retirement age seems to have a larger effect on planned retirement age than in poorer EU15 states or in new EU member states. The effect of pension wealth, in contrast, is largest in the new EU member states and smallest in rich EU15 countries.

Choice of variable (pension wealth or replacement rate) hardly affects results. This is somewhat unexpected as pension wealth typically is seen as the stronger variable, but may be explained by the regrettable fact that we can include these variables only in form of country averages – albeit differentiated by sex - rather than as individually calculated information.

Job and work characteristics

Our analyses take, inter alia, information on two **occupational groups** into consideration: blue collar workers and intellectual workers. We find for both groups that they plan to retire later than other workers, with the effect for intellectual workers

being stronger than that for blue collar workers. We would assume that reasons for late retirement are different in both groups of workers: Intellectual workers may earn higher wages and feel less physical strain during their life, which both may contribute to retirement needs occurring at older ages, compared to other workers. Furthermore, in some countries (with stronger insurance and contribution elements in the pension system), intellectual workers' typically later entry into full-time employment may contribute to later entitlements for pension. Blue collar workers, on the other hand, may work longer due to lower wages during their active time, which makes accumulation of savings for retirement harder. This explanation could be more relevant in poorer EU15 states compared to richer EU15 states. In richer states, pension systems assumedly enable more retirees to live from pension alone, or with wage levels that facilitate to accumulate sufficient savings to retire earlier.

Segregation by countries shows that the effect originates almost entirely from the less wealthy part of the EU15, for both other country groups we fail to estimate significant effects. Furthermore, effects seem to be more relevant for men than for women, perhaps because their careers more often depend on a larger number of other and not necessarily work-related factors.

We find also different **industry** effects in different types of countries. Workers in agriculture plan to retire earlier than workers in services when living in new EU states, but later when living in the EU15. This may be related to different working conditions in this sector in different parts of Europe. Our hypothesis is that earlier planned retirement in new member states might be triggered by different (physically harder) working conditions, compared to richer countries. Similarly, also workers in social or personal services plan to retire relatively late in rich EU15 states, but earlier in new EU states.

Seen in the context of the NEUJOBS project, these results hint at EU states being in different phases of the transition from physically demanding to intellectually demanding work environments, which relates to earlier planned retirement where working is physically more demanding. This interpretation, however, is very tentative due to the crude identification of job characteristics via broad ISCO and NACE codes.

Partner's retirement

In line with the existing literature, we find a significant relation between two partners' planned retirement age. While other authors mostly concentrated on actual retirements, which may be blurred by pension entitlements or job requirements, our results indicate some degree of matching between partners already at the stage of retirement plans.

Reasons for retirement

In contrast to the previously discussed estimations, which relate to *planned* age for retirement, we can look into reasons for retirement only for persons that have already retired. As expected, we find that workers retiring due to reaching the compulsory retirement age work significantly longer than all other workers. For own health or disability (self-rated) and favourable financial incentives we find the strongest negative effects. However, the effect of health and disability does not significantly differ from

other reasons in the male sub-sample. Other reasons for retirement, job problems and care obligations are not statistically different with regard to their relation to retirement age.

Further research

It should be kept in mind that the analysis uses the AHM 2006. Persons included as workers then may be retired by now. A follow-up survey of this survey was conducted in 2012, and repetition of the analysis with newer data would provide a more up-do-date picture of determinants of retirement decisions. This would be especially worthwhile because recent reform efforts in several countries aimed at increasing the time of being active on the labour market. Implemented measures focussed on elimination of possibilities for early retirement and on providing financial incentives to work longer. (OECD 2011) Furthermore, a comparison between both LFS AHMs might contribute to the understanding of transitions in the labour market like briefly mentioned above.

References

Alavinia, Seyed Mohammed, Burdorf, Alex (2008): Unemployment and retirement and ill-health: A cross sectional Analysis across European Countries. International Archives of occupational and environmental health Vol. 82 (1), pp. 39 – 45.

Beehr, Terry A., Glazer, Sharon, Nielson, Norma L., Farmer, Suzanne J. (2000): Work and Nonwork Predictors of Employees' Retirement Ages. Journal of Vocational Behavior Vol. 57, pp. 206–225.

Bellmann, Lutz, Janik, Florian (2007): Firms and Early Retirement: Offers that one does not refuse. IZA Discussion Paper No. 2931.

Blau, David M. (1997): Social security and the labor supply of older married couples. Labour Economics Vol. 4(4), pp. 373–418.

Blekesaune, Morten, Solem, Per Erik (2005): Working Conditions and Early Retirement: A Prospective Study of Retirement Behavior. Research on Aging Vol. 27(1), pp. 3-30.

Blöndal, Sveinbjörn, Scarpetta, Stefano (1999): The Retirement Decision in OECD Countries. Economics Department Working Papers No. 202. OECD Publishing.

Blundell, Richard, Meghir, Costas, Smith, Sarah (2002): Pension Incentives and the Pattern of Early Retirement. The Economic Journal Vol. 112, pp. 153 – 170.

Börsch-Supan, Axel (2000): Incentive effects of social security on labor force participation: evidence in Germany and across Europe. Journal of Public Economics Vol. 78, pp. 25 – 49.

Breyer, Friedrich, Hupfeld, Stefan (2008): Fairness of Public Pensions and Old-Age Poverty. German Institute for Economic Research Discussion Paper No. 817.

Brugiavini, Agar (2001): Early retirement in Europe. European Review Vol. 9(4), pp. 501-515.

Bütler, Monika, Huguenin, Olivia, Teppa, Federica (2004): What triggers early retirement? Results from Swiss Pension Funds. Centre for Economic Policy Research. Discussion Paper No. 4394.

Coile, Courtney C. (2004): Retirement Incentives and Couples' Retirement Decisions. Topics in Economic Analysis & Policy Vol. 4(1).

De Grip, Andries, Fourage, Didier, Montizaan, Raymond (2013): How sensitive are individual retirement expectations to raising the retirement age? IZA Discussion Papers, No. 7269.

de Luna, Xavier, Stenberg, Anders, Westerlund, Olle (2010): Can adult education delay retirement from the labour market? IFAU – Institute for Labour Market Policy Evaluation Working Paper 2010:2.

Dorn, David, Sousa-Poza, Alfonso (2005): The Determinants of Early Retirement in Switzerland. Swiss Journal of Economics and Statistics (SJES) Vol. 141(2), pp. 247-283.

Dorn, David, Sousa-Poza, Alfonso (2010): Voluntary and involuntary early retirement: an international analysis. Applied Economics Vol. 42(4), pp. 427-438.

Duval, Romain (2003): The retirement effects of old-age pension and early retirement schemes in OECD countries. OECD Publishing.

Elovainio, Marko, Forma, P., Kivimäki, M., Sinervo, T., Sutinen, R., Laine, M. (2005): Job demands and job control as correlates of early retirement thoughts in Finnish social and health care employees. Work & Stress: An International Journal of Work, Health & Organisations Vol. 19(1), pp. 84-92.

European Commission (2011): Demography Report 2010. Older, More Numerous and Diverse Europeans. Brussels: Commission Staff Working Document.

European Commission (2012): The 2012 Ageing Report. Economic and budgetary projections for the 27 EU Member States (2010-2060). European Economy 2|2012.

EUROSTAT (2008): Transitions from work into retirement. Methodologies and Working Papers. ISSN 1977-0375.

Euwals, Rob, van Vuuren, Daniel, Wolthoff, Ronald (2006): Early Retirement Behaviour in the Nederlands – Evidence from a Policy Reform. Centre for Economic Policy Research Discussion Paper No. 5596.

Filer, Randall K., Petri, Peter A. (1988): A Job-Characteristics Theory of Retirement. The Review of Economics and Statistics Vol. 70(1), pp.123-129.

Fischer, Justina A. V. and Sousa-Poza, Alfonso (2006): The Institutional Determinants of Early Retirement in Europe. University of St. Gallen Economics Discussion Paper No. 2006-08.

Fischer-Kowalski, Marina, Haas, Willi, Wiedenhofer, Dominik, Weisz, Ulli, Pallua, Irene, Possanner, Nikolaus, Behrens, Arno, Serio, Giulia, Alessi, Monica, Weis, Ekke (2012): Socio-ecological transitions: Definition, Dynamics and related global scenarios. Key assumptions SET. State of the Art Report No. 6/D1.1.

Fouarge, Didier, Schils, Trudie (2009): The Effect of Early Retirement Incentives on the Training Participation of Older Workers. LABOUR Vol. 23(s1), pp 85 – 109.

Garrouste, Christelle, Paccagnella, Omar (2012): Shall I stay or shall I go? Late graduation and retirement decision. Centre for Research on Lifelong Learning Research Papers.

Gruber, Jonathan, Wise, David (1998): Social Security and Retirement. An International Comparison. The American Economic Review Vol. 88(2), pp. 158 – 163.

Gustman, Alan, Steinmeier, Thomas (1994): Retirement in a Family Context: A Structural Model for Husbands and Wives. NBER Working Paper No. 4629.

Hallberg, Daniel (2008): Economic fluctuations and retirement of older employees. Institute for Labour Market Policy Evaluation (IFAU) Working Paper 2008:2.

Hurd, Michael J. (1990): The Joint Retirement Decision of Husbands and Wives. In: David A. Wise: Issues in the Economics on Aging (pp. 231 – 258). Chicago: University of Chicago Press.

Hutchens, R. (1999): Social security benefits and employer behavior: evaluating social security early retirement benefits as a form of unemployment insurance. International Economic Review Vol. 40(3), pp. 659–678.

Jones, Andrew M., Rice, Nigel, Roberts, Jennifer (2010): Sick of work or too sick to work? Evidence on self-reported health shocks and early retirement from the BHPS. Economic Modelling Vol. 27(4), pp. 866 – 880.

Karasek, Robert A. Jr. (1979): Job demands, job decision latitude, and mental strain: Implications for job redesign. Administrative Science Quarterly Vol. 24. pp. 285-307.

Karpansalo, M., Manninen, P., Kauhanen, J., Lakka, T.A., Salonen, J.T. (2004): Perceived Health as a Predictor of Early Retirement. Scandinavian Journal of Work, Environment and Health Vol. 30(4), pp. 287 – 292.

Kieran, Patrick (2001): Early Retirement Trends. Perspectives on Labour and Income, Vol. 2(9), pp. 5 – 11.

Koster, Ferry, Fleischmann, Maria (2012): Labour market transitions in Europe. A multilevel analysis of age cohorts and institutions across 13 countries. NEUJOBS Working Paper No. D 6.5.

Machado, C. Sofia, Portela, Miguel (2012): Hours of Work and Retirement Behavior. IZA Discussion Paper No. 6270.

Mein, Gill, Martikainen Pekka, Stansfeld Stephen A., Brunner, Eric J., Fuhrer, Rebecca, Marmot, Michael G. (2000): Predictors of early retirement in British civil servants. Age and Ageing Vol. 29(6), pp. 529 – 536.

OECD (2007): OECD Glossary of statistical terms.

OECD (2011): Pensions at a glance. Retirement-income systems in OECD and G20 countries. OECD Publishing.

Queisser, Monika, Whitehouse, Edward (2006): Neutral or Fair?: Actuarial Concepts and Pension-System Design. OECD Social, Employment and Migration Working Papers No. 40. OECD Publishing.

Siegrist, Johannes, Wahrendorf, Morten, von dem Knesebeck, Olaf, Jürges, Hendrik, Börsch-Supan, Axel (2007): Quality of work, well-being, and intended early retirement of older employees—baseline results from the SHARE Study. European Journal of Public Health Vol. 17(1), pp. 62 – 68.

Stock, James, Wise, David (1988): Pensions, the Option Value of Work, and Retirement. National Bureau of Economic Research. Working Paper No. 2686.

Voòková, Hana, van Soest, Arthur (2009): How sensitive are retirement decisions to financial incentives: a stated preference analysis. IZA Discussion Papers, No. 4505, forthcoming in Journal of Applied Econometrics.

Wang, Mo, Shultz, Kenneth S. (2010): Employee Retirement: A Review and Recommendations for Future Investigation. Journal of Management Vol. 36(1), pp. 172 – 206.

Annex

Table A1. Labour market status at time of interview (2006) by country, row percentages

Country	Work, no receipt of individual ret. pension	Work, receipt of ind. ret. pension	Receipt of ind. ret. pension, no work	No or unknown receipt of ind. pension, no work	Total
AT	3,097 45.87 %	120 1.78 %	2,704 40.05 %	830 12.29 %	6,751 100.00 %
BE	2,227 50.60 %	83 1.89 %	1,178 26.77 %	913 20.75 %	4,401 100.00 %
BG	3,217 40.10 %	440 5.48 %	3,649 45.49 %	716 8.93 %	8,022 100.00 %
CY	1,023 58.73 %	108 6.20 %	372 21.35 %	239 13.72 %	1,742 100.00 %
CZ	5,977 46.46 %	559 4.34 %	5,053 39.27 %	1,277 9.93 %	12,866 100.00 %
DE	4,176 44.44 %	642 6.83 %	3,596 38.27 %	982 10.45 %	9,396 100.00 %
DK	2,144 63.49 %	91 2.69 %	523 15.49 %	619 18.33 %	3,377 100.00 %
EE	2,107 47.88 %	645 14.66 %	1,366 31.04 %	283 6.43 %	4,401 100.00 %
ES	9,544 57.39 %	149 0.90 %	4,047 24.33 %	2,891 17.38 %	16,631 100.00 %
FI	3,931 54.64 %	353 4.91 %	1,521 21.14 %	1,390 19.32 %	7,195 100.00 %
FR	5,316 50.72 %	163 1.56 %	3,696 35.26 %	1,307 12.47 %	10,482 100.00 %
GR	7,360 53.64 %	321 2.34 %	4,637 33.79 %	1,403 10.23 %	13,721 100.00 %
HU	6,756 40.14 %	624 3.71 %	8,012 47.60 %	1,439 8.55 %	16,831 100.00 %
IE	7,484 69.34 %	383 3.55 %	1,583 14.67 %	1,343 12.44 %	10,793 100.00 %
IT	15,074 46.96 %	1,138 3.55 %	12,873 40.10 %	3,015 9.39 %	32,100 100.00 %
LT	952 46.92 %	173 8.53 %	660 32.53 %	244 12.03 %	2,029 100.00 %
LU	1,808 52.10 %	2 0.06 %	1,158 33.37 %	502 14.47 %	3,470 100.00 %

Table A1. Labour market status at time of interview (2006) by country, row percentages, continued

Country	Work, no receipt of individual ret. pension	Work, receipt of ind. ret. pension	Receipt of ind. ret. pension, no work	No or unknown receipt of ind. pension, no work	Total
LV	453 48.55 %	128 13.72 %	303 32.48 %	49 5.25 %	933 100.00 %
NL	13,502 65.95 %	634 3.10 %	800 3.91 %	5,538 27.05 %	20,474 100.00 %
PL	3,913 41.18 %	560 5.89 %	3,520 37.04 %	1,509 15.88 %	9,502 100.00 %
PT	5,087 53.63 %	795 8.38 %	2,733 28.81 %	870 9.17 %	9,485 100.00 %
RO	5,570 39.83 %	2,149 15.37 %	5,431 38.83 %	836 5.98 %	13,986 100.00 %
SE	10,142 76.75 %	723 5.47 %	1,282 9.70 %	1,068 8.08 %	13,215 100.00 %
SI	1,922 49.17 %	187 4.78 %	1,248 31.93 %	552 14.12 %	3,909 100.00 %
SK	2,546 41.18 %	205 3.32 %	3,040 49.17 %	392 6.34 %	6,183 100.00 %
UK	10,956 48.30 %	3,446 15.19 %	6,589 29.05 %	1,693 7.46 %	22,684 100.00 %
Total – N **Total - %**	136,284 51.51 %	14,821 5.60 %	81,574 30.83 %	31,900 12.06 %	264,579 100.00 %

Table A2. Additional variables for Table 12 (Linear regression model estimations for planned retirement age with country fixed effects)

	M7: total sample	M8: male	M9: female
Female	-1.273*** (0.0379)		
Married	-0.473*** (0.0382)	-0.153** (0.0554)	-0.703*** (0.0521)
Medium education	0.0214 (0.0420)	-0.0756 (0.0551)	-0.0156 (0.0637)
High education	0.232*** (0.0569)	-0.0502 (0.0779)	0.273** (0.0846)
Large firm	-0.211*** (0.0358)	-0.320*** (0.0488)	-0.117* (0.0510)
No firmsize	0.115 (0.0704)	0.120 (0.0851)	0.0342 (0.121)
Employee	-1.153*** (0.0648)	-1.135*** (0.0784)	-1.051*** (0.113)
Part-time job	-0.0640 (0.0523)	-0.148 (0.109)	-0.170** (0.0639)
Working conditions	-0.0394 (0.0378)	-0.0884 (0.0495)	0.00820 (0.0569)
Large city	0.169*** (0.0411)	0.176** (0.0549)	0.137* (0.0600)
Medium city	-0.0661 (0.0442)	-0.101 (0.0583)	-0.0224 (0.0655)
Agriculture	0.308*** (0.0767)	0.299** (0.0935)	0.249 (0.130)
Manufacturing	-0.0781 (0.0424)	-0.0384 (0.0502)	-0.223** (0.0769)
Personal services	0.0866* (0.0434)	0.166* (0.0726)	-0.102 (0.0547)
Blue collar worker	0.159*** (0.0437)	0.223*** (0.0577)	0.114 (0.0682)
Intellectual worker	0.238*** (0.0479)	0.415*** (0.0653)	0.118 (0.0707)
yearspnt	-0.0815*** (0.00288)	-0.109*** (0.00474)	-0.0655*** (0.00371)
_cons	28.03*** (0.148)	28.63*** (0.219)	26.65*** (0.204)
N	46,674	25,548	21,126
adj. R^2	0.168	0.155	0.196

Notes: Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Due to missing variables, observations for RO, SI, SK, UK had to be excluded. Coefficients for country fixed effects see main text.

Table A3. Linear regression model estimations for age at which person started to receive individual retirement pension, country fixed effects

	M13: total sample	M14: male	M15: female
AT	-0.823***	-0.579***	-1.386***
	(0.0874)	(0.113)	(0.132)
BE	-0.234	-0.122	-0.329
	(0.135)	(0.183)	(0.199)
BG	-2.270***	-1.417***	-3.200***
	(0.0974)	(0.134)	(0.136)
CY	-0.400*	-0.508*	-0.0186
	(0.161)	(0.204)	(0.244)
CZ	-0.788***	0.167	-1.842***
	(0.0809)	(0.105)	(0.119)
DK	0.554***	0.501**	0.612**
	(0.144)	(0.190)	(0.219)
EE	-2.095***	-0.709**	-2.945***
	(0.164)	(0.219)	(0.211)
ES	0.815***	0.807***	1.232***
	(0.0809)	(0.105)	(0.129)
FI	-0.102	-0.0196	-0.0367
	(0.111)	(0.164)	(0.151)
GR	0.135	0.528***	0.192
	(0.0785)	(0.107)	(0.128)
HU	-1.175***	-0.660***	-2.057***
	(0.0799)	(0.103)	(0.123)
IT	-1.203***	-0.796***	-1.434***
	(0.0769)	(0.105)	(0.118)
LT	-2.293***	-0.880***	-3.229***
	(0.208)	(0.264)	(0.280)
LU	-0.616***	-0.535***	-0.363*
	(0.0962)	(0.119)	(0.176)
LV	-2.204***	-1.547*	-2.898***
	(0.546)	(0.633)	(0.796)
PL	-1.450***	-0.329*	-2.524***
	(0.0933)	(0.147)	(0.129)
PT	-0.315***	-0.145	-0.342*
	(0.0957)	(0.123)	(0.155)
RO	-2.402***	-1.531***	-3.478***
	(0.0891)	(0.124)	(0.129)
SE	1.151***	0.799***	1.649***
	(0.0905)	(0.119)	(0.134)
SI	1.948***	2.853***	0.667**
	(0.156)	(0.220)	(0.222)
SK	-1.539***	-0.369**	-2.934***
	(0.0927)	(0.123)	(0.133)
UK	-1.244***	-1.336***	-1.378***
	(0.0942)	(0.139)	(0.126)

Notes: Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Due to missing variables, observations for FR, IE, and due to problems with pension variables observations for NL had to be excluded. Germany is base. Other coefficients: see main text.

Table A4. Linear regression models for planned retirement age including the partner's planned age for retirement, country fixed effects

	M10: total sample	M11: male	M12: female
AT	-2.743*** (0.181)	-1.077*** (0.299)	-3.640*** (0.213)
BE	-1.732*** (0.189)	-1.753*** (0.291)	-1.513*** (0.243)
BG	-1.432*** (0.176)	-0.176 (0.263)	-2.252*** (0.223)
CY	0.177 (0.259)	0.741* (0.371)	-0.277 (0.337)
CZ	-2.232*** (0.115)	-0.478** (0.180)	-3.332*** (0.143)
EE	0.786 (0.408)	1.452* (0.568)	0.152 (0.551)
ES	-0.777*** (0.150)	-1.226*** (0.242)	-0.486** (0.186)
GR	-1.200*** (0.165)	-0.782** (0.274)	-1.492*** (0.203)
NL	-1.324*** (0.110)	-1.041*** (0.168)	-1.231*** (0.143)
FR	-2.551*** (0.135)	-2.983*** (0.204)	-2.070*** (0.174)
HU	-1.409*** (0.125)	-1.068*** (0.188)	-1.666*** (0.164)
IE	-1.107*** (0.159)	-0.699** (0.250)	-1.301*** (0.202)
dIT	-0.731*** (0.124)	-0.680*** (0.200)	-0.859*** (0.158)
LT	-1.261*** (0.303)	-0.354 (0.448)	-1.942*** (0.400)
LU	-1.340*** (0.226)	-2.782*** (0.321)	-0.0509 (0.260)
LV	-1.629*** (0.357)	-1.719** (0.628)	-1.589*** (0.441)
PL	-2.639*** (0.200)	0.398 (0.301)	-4.624*** (0.214)
PT	0.629*** (0.173)	0.375 (0.260)	0.646** (0.224)

Notes: Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Due to missing variables, observations for DK, FI, RO, SE, SI, SK, UK were excluded. Coefficients for other variables: see main text.

ABOUT NEUJOBS

"Creating and adapting jobs in Europe in the context of a socio-ecological transition"

NEUJOBS is a research project financed by the European Commission under the 7th Framework Programme. Its objective is to analyse likely future developments in the European labour market(s), in view of four major transitions that will impact employment - particularly certain sectors of the labour force and the economy - and European societies in general. What are these transitions? The first is the **socio-ecological transition:** a comprehensive change in the patterns of social organisation and culture, production and consumption that will drive humanity beyond the current industrial model towards a more sustainable future. The second is the **societal transition,** produced by a combination of population ageing, low fertility rates, changing family structures, urbanisation and growing female employment. The third transition concerns **new territorial dynamics** and the balance between agglomeration and dispersion forces. The fourth is **a skills (upgrading)** transition and and its likely consequences for employment and (in)equality.

Research Areas

NEUJOBS consists of 23 work packages organised in six groups:

- **Group 1** provides a conceptualisation of the **socio-ecological transition** that constitutes the basis for the other work-packages.
- **Group 2** considers in detail the main drivers for change and the resulting relevant policies. Regarding the drivers we analyse the discourse on **job quality**, **education**al needs, changes in the organisation of production and in the employment structure. Regarding relevant policies, research in this group assesses the impact of changes in **family composition**, the effect of **labour relations** and the issue of financing transition in an era of budget constraints. The regional dimension is taken into account, also in relation to **migration** flows.
- **Group 3** models economic and employment development on the basis of the inputs provided in the previous work packages.
- **Group 4** examines possible employment trends in key sectors of the economy in the light of the transition processes: energy, health care and goods/services for the **ageing** population, **care services**, housing and transport.
- **Group 5** focuses on impact groups, namely those vital for employment growth in the EU: **women**, the **elderly**, immigrants and **Roma**.
- **Group 6** is composed of transversal work packages: implications NEUJOBS findings for EU policy-making, dissemination, management and coordination.

For more information, visit: www.neujobs.eu

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