

**DETERMINANTS OF RETIREMENT STATUS:
COMPARATIVE EVIDENCE FROM
OLD AND NEW EU MEMBER STATES**

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Abstract

This work analyzes how different factors related with health, demographics, behavior, financial status, and macroeconomics can affect retirement status in European Union countries. Linear probability model is used as an estimation method for data collected from the SHARE Wave 2 dataset and UN sources. The results are interpreted and the impacts of these factors are explained comparing them with the results already provided in the academic literature. Also results for New EU Member States and Old Member States are compared and the differences are explained. We find that males are less likely to be retired compared with females in New Member States, which is the opposite result than we find for Old Member States. The reasons for these results can be the facts that significant gender wage gap exists in New Member States, household sizes are bigger in these countries than in Old Member States and males play important role in household income which make them retire less than females.

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Introduction

Population ageing in European Union countries and consequences of this process have a crucial economic impact on society; therefore many researchers try to analyze what causes population ageing and how to solve the problems resulting from this process. This problem requires researching health status, financial well-being, behavioral activities of the residences as well as demographics, pension systems and other main economic characteristics of these countries. The share of retired people in society increases year by year, which implies less labor force and more compensation which needs investigation of factors related with retirement status of individuals and how they can be improved in order to provide efficient social care system and future economic planning.

There are different factors which vary on individual level (financial assets, household size, health condition, behavioral activities, etc.) and factors which do not vary on individuals within country, but are different in different countries (pension system, health care, etc.) and have the same effect for some group of people within country. Therefore this requires taking into consideration factors changing in both individual level and country level.

Different projects were developed for this purpose such as the **Health and Retirement Study** (HRS)¹ which includes information collected using surveys every two years by The University of Michigan from more than 22 000 US citizens over the age of 50. Launched in 1992, HRS is a longitudinal project which aims to study the labor force participation and health transitions toward retirement and after it. The study includes information about income, health care expenditures, work, housing, assets, pension plans,

¹ The web-site of Health and Retirement Study: <http://hrsonline.isr.umich.edu/>

health insurance, disability, health status of individuals using in-depth interviews and provide opportunity for researchers to analyze the ageing process. Other similar study is The **English Longitudinal Study of Ageing** (ELSA)² which is useful for exploring main aspects, mainly the economic, social, psychological and health elements of the ageing process and analyze relationships between health, functioning, social networks and economic position among elderly people aged beyond 50. This survey includes important questions such as physical and cognitive health, household and family structure, retirement and post-retirement, participation in social networks which are useful for understanding trends in society and making implications for future. Another similar study is The **Mexican Health and Ageing Study** (MHAS)³ which includes health measures, background, family, financial condition, housing environment and anthropometric characteristics of people in 2001 and 2003 and provides data for exploring ageing process and its results within country. Similar project, **The Study on global AGEing and adult Health** (SAGEH) was conducted by the World Health Organization⁴ among respondents aged over 18 with the focus on population elder than 50 years in six countries (China, Ghana, India, Mexico, Russian Federation and South Africa) during years 2002-2011.

The successful launch of these studies, necessity of similar projects on European level lead to the project Survey of Health, Ageing and Retirement in Europe (SHARE) which aims to provide data for EU Member states which gives opportunity for researchers to analyze population ageing, health and retirement in European level (Appendix, Table A.1 shows basic

² The web-site of The English Longitudinal Study of Ageing: <http://www.ifs.org.uk/elsa/>

³ The web-site of The Mexican Health and Ageing Study: <http://www.mhas.pop.upenn.edu/english/home.htm>

⁴ The web-site of WHO Study on global AGEing and adult Health (SAGEH): <http://www.who.int/healthinfo/systems/sage/en/index.html>

characteristics of these five datasets). SHARE dataset⁵ includes information about individual characteristics and implications about institutional systems within countries. Other important feature of this dataset is different waves of data collection and updates on the information (Table 1).

Table 1. Participating EU Member States in SHARE and SHARELIFE

	Country	Wave 1	Wave 2	Wave 3/ Sharelife	Wave 4
1	Austria	2004	2006/07	2008/09	2010/11
2	Belgium	2004/05	2006/07	2008/09	2010/11
3	Denmark	2004	2006/07	2008/09	2010/11
4	France	2004/05	2006/07	2009	2010/11
5	Germany	2004	2006/07	2008/09	2010/11
6	Greece	2004/05	2007	2008/09	2010/11
7	Italy	2004	2006/07	2008/09	2010/11
8	Netherlands	2004	2007	2008/09	2010/11
9	Spain	2004	2006/07	2008/09	2010/11
10	Sweden	2004	2006/07	2008/09	2010/11
11	Switzerland *	2004	2006/07	2008/09	2010/11
12	Israel *	2005/06	---	---	2010/11
13	Czech Republic	---	2006/07	2008/09	2010/11
14	Poland	---	2006/07	2008/09	2010/11
15	Ireland	---	2008	---	2010/11
16	Estonia	---	---	---	2010/11
17	Hungary	---	---	---	2010/11
18	Luxemburg	---	---	---	2010/11
19	Portugal	---	---	---	2010/11

* - Israel and Switzerland also participate in this survey although they are not EU members

Source: Web-site of SHARE, www.share-project.org

⁵ This paper uses data from SHARE release 2.4.0, as of March 17, 2011. The SHARE data collection has been primarily funded by the European Commission through the fifth framework program (project QLK6-CT-2001-00360 in the thematic program Quality of Life), through the sixth framework program (projects SHARE-I3, RII-CT-2006-062193, COMPARE, CIT5-CT-2005-028857, and SHARELIFE, CIT4-CT-2006-028812) and through the seventh framework program (SHARE-PREP, 211909 and SHARE-LEAP, 227822). Additional funding from the U.S. National Institute on Aging (U01 AG09740-13S2, P01 AG005842, P01 AG08291, P30 AG12815, Y1-AG-4553-01 and OGHA 04-064, IAG BSR06-11, R21 AG025169) as well as from various national sources is gratefully acknowledged (see <http://www.share-project.org> for a full list of funding institutions).

We are going to use data from SHARE wave 2 as it is the most appropriate one for our research purpose. The purpose of this thesis is to analyze:

- the characteristics of people aged 50 and find causal relationship between their retirement status and their individual characteristics;
- how per capita GDP as a main macroeconomic indicator is related with retirement;
- whether these characteristics have the same effect in Old (Austria, Belgium, Denmark, France, Germany, Greece, Italy, the Netherlands, Spain, Sweden, Switzerland⁶) and New Member States (Czech Republic and Poland);
- differences in case they exist; and
- how the results can be useful in the future.

We group countries into Old and New Member States as they have similar characteristics, economic history and stage of economic progress within these groups. We are going to check whether chosen factors have significant and expected effects on retirement status and explain the results. We are also going to compare our results with the results achieved before by different researchers worked in this economic area, such as Fischer and Sousa-Poza (2006), Dorn and Sousa-Poza (2005a, 2005b), Johnson (2000), Blöndal and Scarpetta (1999), Mişcişin (2007) who estimated causal effects of individual and country specific factors on retirement status of people. We will discuss why these results are different and suggest possible explanations and improvements.

In the first chapter we will cover information about pension systems and stylized facts in analyzed Old and New Member States, describe differences between groups of countries. In the second chapter we will give an overview to literature review which is related to our

⁶ Switzerland is not EU Member State, but it has similar characteristics with Old Member States, therefore we included it into the list of Old Member States.

research and will help us in our interpretations and comparisons. The next chapter is going to describe dataset used for estimation and the most relevant variables to our model. In the fourth chapter we introduce estimation strategy for our model and give theoretical justification why chosen model is relevant for our research purpose and explain it. The fifth and last chapter will include empirical results of estimation and explanations for the results achieved in research. In the conclusion future suggestions of this study are given.

Chapter 1. Overview of pension systems and stylized facts relevant to our model in analyzed countries

In order to analyze pension systems and stylized facts in the European Union nowadays in this chapter we refer to history and discuss how retirement decision changed from 1960s to 1990s. Then we discuss the main pension systems used in Europe (Bismarckian and the Beveridgean systems), describe their differences, how they affect pension systems existing nowadays, attempts to create single European pension market and relevant literature for these topics. At the end we explore the characteristics of retirement process in analyzed countries using data from EU Labor Survey. and Eurostat (the statistical office of the EU).

1.1. Changes between 1960s and 1990s

Blöndal and Scarpetta (1999) explore the main factors that affect retirement decision in OECD countries, and how the social security systems have caused labor force participation of elderly people to go down in recent decades. This study is useful for our research as our sample includes EU Member States that are also OECD members. Pension systems in these countries started to financially discourage to continue working after the age of 55 in mid-1990s which was caused by increase in implicit tax on continued work since the 1960s. They do pooled cross-country time-series regressions and find that financial disincentives to work at older ages decrease labor force participation of elderly males significantly while life expectancy increased through this period as shown by their previous research (Blöndal and Scarpetta, 1997). They also conclude that the worsening of labor market conditions in most countries has also a significant effect as well. The considerable decrease from age 65 and above (in the 1960s and 1970s) to even 60 in the ages of retirement in some countries happened at the end of previous century and this lower age of retirement still exists nowadays,

especially for women (see Figures 1 and 2). The authors find the most significant decrease in the average age of transition to inactivity among older workers between years 1960-1995 in The Netherlands for males (7.3 years) and in Spain for females (9.1 years). Significant changes in retirement age within 3-4 decades made researchers to analyze why and when the elderly people prefer to quit labor market and how this process can affect the society.

1.2. Pension systems and attempts to create European Single Pension Market

Miřciřin (2007) gives an overview for two types of pension systems in Europe. The Bismarckian system was introduced to provide social care for the aged population in Germany at the end of the 19th century. This system allows the workers to make periodic payments and to be eligible for a specific level of pension during the retirement according to the amount of these payments. Pension systems in Germany, France, Belgium, Italy, Spain, Greece, and Portugal are the successors of the Bismarckian system. This type of pension system makes the worker earn and contribute more during working period in order to get a good standard of living in late years of life. It is funded by payments of both worker and their employers and the wages received during employment period is the main determinant of their pension.

The Beveridgean system was introduced in the United Kingdom in the 1940s. Its basic principle is a state guarantee of certain minimum benefits for every individual who is citizen of the country. Therefore, the funding raised in this pension system is not directly linked to the wages the workers get during employment period and this minimum amount is provided through the individual savings plans which are exempted from taxes. Denmark, Britain, Ireland, and the Netherlands are successors of this pension fund culture.

Hennesy (2008) tries to analyze the evolution of pension systems in Europe and gives explanation for changes, because the formulation of Single Market of the European Union requires investigating pension histories and characteristics of Member States and making corresponding improvements. She points out potential benefits from this market (more integrated capital markets, fewer barriers to labor mobility and substantial costs for multinational businesses) and states that the formulation of a single market is more costly for the Bismarckian countries than the Beveridgean ones. As the Beveridgean pension system aimed at prevention of poverty is subordinated by commercial and monetary interests and represents pension fund culture, this was not enough attractive for the countries using the Bismarckian system representing insurance culture to switch to the Beveridgean one at the beginning of 1990s. At the same time Member States using the Beveridgean system did not want to accept the Bismarckian system as well. Therefore their previous attempt to agree on EU pension fund directive in 1991 failed and they had to make changes in their pension systems and make them more similar to each other. EU Member States started to allow high unification of investment regulations, low unification of funding requirements and no harmonization of biometric risk coverage which led to successful negotiation between countries, compromise and agreement on the European pension fund directive in 2003. As a result the Beveridgean states had to sacrifice more than their Bismarckian ones. The accepted directive is considered one step towards European single pension market, but the author doubts that there will be any cross-border activity in the near future.

1.3. Stylized facts

The EU Labor Survey 2005 gives us the opportunity to check whether the differences in retirement issues exist between various countries after the accepted directive. Before starting to describe the stylized facts of the survey we should know the difference between official age of retirement and effective age of retirement. Official age of retirement is the age

at which women and men are allowed to get a full retirement pension according to legislation, but effective age of retirement is the age at which elderly people actually go into retirement. One of the main features of the survey is that it enables for us to estimate the age at which women and men retire. It shows the employment status of people every year asking whether they are employed, unemployed or economically inactive. This can help us to calculate the mean age at which females and males switch their status from “economically active” to “inactive”. These results are used in the subsequent years for comparison of the answers from previous years. Another feature of this survey is that it focuses on the median rather than the mean as a measure of the average. The advantage of this method is that it is not much affected by outliers (extreme and unrepresentative values) such as the very few people who might retire at a very old age.

Table 2. Average median and mean ages of withdrawal from the labor market in 2005

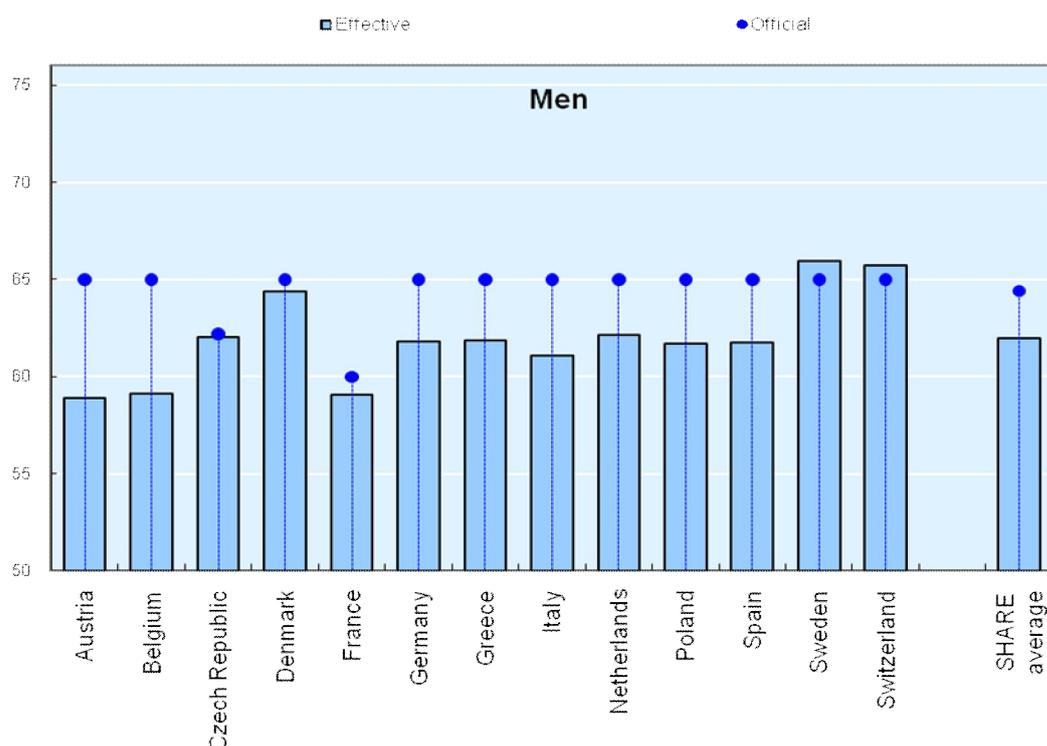
Countries	Median Age		Mean age (structural indicator)	
	Women	Men	women	Men
Austria	56.4	59.6	59.4	60.3
Belgium	56.8	57.9	59.6	61.6
Czech Republic	57.2	61	59.1	62.3
Denmark	60.1	62.2	60.7	61.2
France	58.3	58.8	59.1	58.5
Germany	59.9	61.6	61.1	61.4
Greece	58.4	61.7	61	62.5
Italy	57.2	58.4	58.8	60.7
Netherlands	59.3	60.5	61.4	61.6
Poland	55.2	57	57.4	62
Spain	59.5	62.6	62.8	62
Sweden	63.3	63.9	63	64.3
Switzerland	N/A	N/A	N/A	N/A
Average *	58.5	60.4	60.3	61.5

* - This average is calculated excluding Switzerland from sample as the data is not available for it.

Source: Eurostat, Labor Force Survey and Structural Indicators for Employment

Assumptions for this method are that nobody retires before 50 (normally activity rates are much the same for people who are aged 50 and those in their 30s or 40s) and it takes the age at which the activity rate decreases to 50% of its level for people aged 50 as the median retirement age. This solves the problem of unavailability of longitudinal data for comparative analysis of activity rates of people at different ages in a given year. Table 2 shows that in 2005 the median effective age of retirement in analyzed countries was 60.4 for males and 58.5 for females which implies that females retire around two years earlier than males.

Figure 1. Average effective age of retirement and the official age for men during 2004-2009

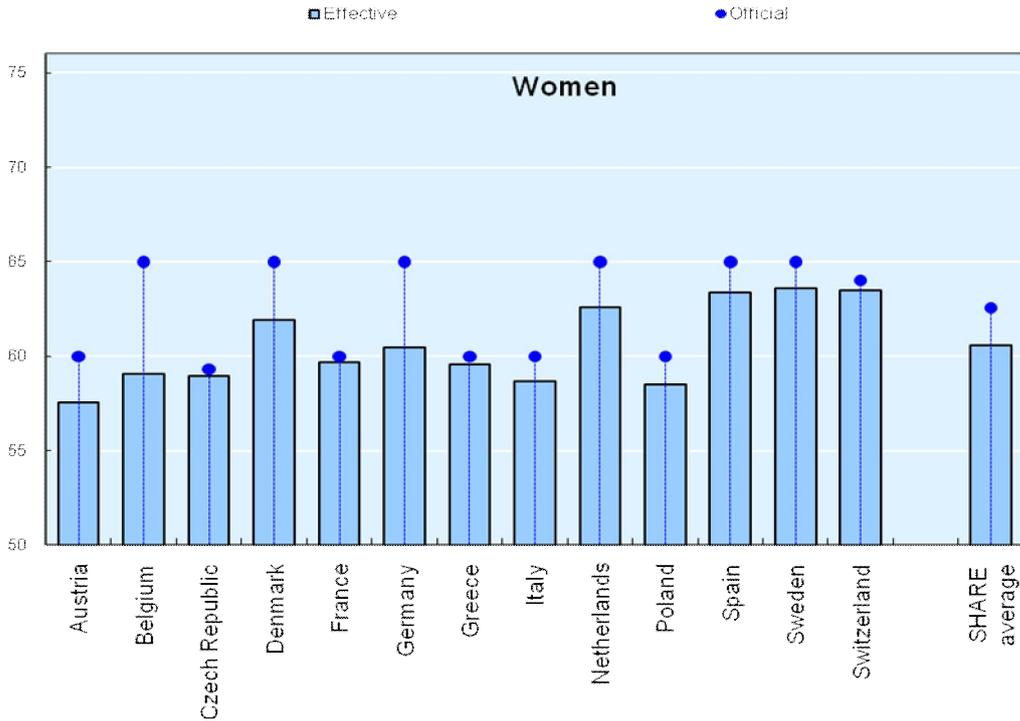


Source: OECD estimates derived from the European and national labor force surveys (for detailed data see Appendix, Table A.2)

The official ages of retirement are similar in most of the analyzed countries, ranging between 59 and 65 for females and between 60 and 65 for males. But effective ages of retirement are different and it is lower than the official retirement age for most people (1.9 for

females, and 2.4 for males on average). Moreover this age also varies across individuals and years which makes difficult to define unique effective age of retirement. That is why the average effective wage of retirement is used for showing actual switches from work to retirement on average (see Figures 1 and 2). If effective age of retirement becomes closer to official age of retirement government can increase official rage of retirement which also make people to retire later and consequently effective age of retirement also increases. But this works to some extend and government cannot simply increase official age of retirement without taking care of health care, education level and pension system.

Figure 2. Average effective age of retirement and the official age for women during 2004-2009



Source: OECD estimates derived from the European and national labor force surveys (for detailed data see Appendix, Table A.2)

Another measurement is effective age range of retirement or the age range when people exit the labor force and retire. We can describe these age ranges for analyzed countries

in the following way: We take as a lower bound the age when the activity rate of those economically active at age 50 decreases to 80 %, as an upper bound the age when the activity rate of the same people decreases to 20 % (this means 80 % of those economically active at age 50 have already retired).

Table 3 shows that on average the effective age range of retirement fluctuates between 56.9 and 64.6 years for males, but it is varying between 55.4 and 62.3 years for females. This implies that the range is larger for males (7.7) on average than for females (6.9). The table also shows us that the largest ranges for females are in Greece and Spain, while the smallest ranges are in Denmark in Sweden. But the largest difference for males is for Poland and the smallest is for Czech Republic. We would like to note that these results are for the whole sample excluding Switzerland, because Eurostat does not provide any data for this country.

Table 3. Effective age range of retirement in 2005

Countries	Males			Females		
	Lower	Upper	Range	Lower	Upper	Range
Austria	56	62	6	54	59	5
Belgium	54	63	9	54	61	7
Czech Republic	59	63	4	56	61	5
Denmark	59	68	9	59	63	4
France	56	61	5	55	61	6
Germany	58	64	6	57	63	6
Greece	57	66	9	54	64	10
Italy	55	65	10	54	62	8
Netherlands	56	64	8	55	63	8
Poland	54	66	12	52	61	9
Spain	58	65	7	54	64	10
Sweden	61	68	7	61	65	4
Switzerland*	N/A	N/A	N/A	N/A	N/A	N/A
Average	56.9	64.6	7.7	55.4	62.3	6.9

* - This average is calculated excluding Switzerland from sample as the data is not available for it.

Source: Eurostat, Labor Force Survey

The analysis of pension systems in Europe, changes in retirement process and stylized facts showed us overall retirement process in Europe which can be useful in the next chapters for discussion of the explanation of findings and estimation results. We are also going to discuss the characteristics of the dataset that we are going to use for the estimation of the model in the third chapter.

Chapter 2. Literature review

Many authors tried to describe and analyze determinants of retirement status as it is one of the important aspects of society. Governments try to adjust pension, health care, retirement policies, as well as economic regulation principles according to share of different age groups in society. As different countries and regions have different population growth, life expectancy, behavioral activities, mentality and other characteristics that affect share of age groups in society, these relationships should be deeply analyzed before taking actions. Therefore different authors tried to analyze how different factors affect retirement status and suggest future implications of their studies. We are going to cover the relevant parts of different researches on this topic, compare them with various other literatures, and describe how they are related to ours.

Alba-Ramirez (1997) uses micro data from the Active Population Survey of Spain and logit model for analyzing determinants of retirement decision and finds that having more members in the household, and as well as children, has a negative effect on the probability of retirement among older males. This is an intuitive result as males in bigger household with children have to earn more and pension benefits will be less than needed for household.

Quinn *et al.* (1998) find significant correlation between health status and retirement status which is not unexpected. They transform answers for question about health status from five levels (“excellent”, “very good”, “good”, “fair” and “poor”) into three levels and report results for three groups of people. 85 % of respondents who answered “excellent” or “very good” to the question about their health in 1992 were still working two years after this interview, compared to 82 % of those who answered “good”, and 70 % of those answered “fair” or “poor”. This fact is also true for year 1996: 73 % of people from the first group were

still on the job market, while this is 66 % and 55 % for other groups of people. However, Dhaval, Rashad and Spasojevic (2006) using data from six waves of HRS show that relationship between retirement and health status can imply the opposite effect in reality: physical and mental health decline after retirement.

Antolin and Scarpetta (1998) using German Socio-Economic Panel and hazard model find that Socio-demographic factors such as health and gender have a strong impact on the retirement decision: women tend to retire earlier than men, and poor health makes people go into retirement, particularly in the case of disability retirement. The relationship between health status and retirement is significant for both self-assessed and objective indicators of health status. This is similar finding to the previous research of Blau and Riphahn (1997); using individual data from the German Socio-Economic Panel as well, but controlling for different variables they found that if individual has chronic health condition, then he tends to retire. Antolin and Scarpetta (1998) use better measure for health status than Blau and Riphahn (1997), because self-assessed and objective indicators of health status are better measures than chronic health condition.

Blöndal and Scarpetta (1999) find significant effect of socio-demographic factors on the retirement decision. Men tend to retire later than women as women try to benefit from special early retirement schemes in Germany and the Netherlands. Another reason is that they get access to pensions earlier than men as standard age of entitlement to pension is lower for women compared with men in Italy and the United Kingdom. The other interesting finding is that retirement depends on household size: heads of large households prefer not to retire. They think that this can be because of the significance of wages in large households compared with smaller ones and insufficiency of pension benefits. Another finding is that health status is significant factor in all early retirements; poor health conditions are especially significant if

respondents join to disability benefit scheme. This result is true for both indicators used to express health status (self assessment and objective indicators). This research is similar to Antolin and Scarpetta (1998) and shows similar results extending sample and implications from Germany to OECD.

Benitez-Silva (2000) analyzes determinants of labor force status and retirement process among elderly US citizens and possibility of decision returning to work using logit and probit models. He uses Health and Retirement Survey (HRS) for this purpose and finds that physical and mental health has significant effect on becoming employed. Male respondents are more likely to change their status from being not-employed to employed, but being insured has a negative effect on switching job status from “not-employed” to “employed” for people aged 60-62 and insignificant effect for 55-59 and aged over 63.

Fischer and Sousa-Poza (2006) explore factors affecting early retirement in European countries using microdataset SHARE wave 1 for probit estimation of the effects of institutional and economic factors such as pension systems, unemployment, and employment protection legislation. They find that in general the likelihood of the retirement of females is less than males for participating countries in this survey. The other finding is that they explain negative correlation between per capita GDP and retirement status in their model arguing that income effect dominates substitution effect in these countries which implies higher per capita GDP means higher participation in labor force.

Mişcişin (2007) uses the first wave of SHARE dataset and tries to explore retirement process in Western Europe using linear probability model comparing results with probit model and finds that females are 8 % less likely to be retired than males with the same characteristics. He also finds significant relationship between health status and retirement

decision similar to previous studies and gives the same intuition as expected. Mişcişin (2007) analyzes the effect of having an individual retirement account and discovers that they are negatively correlated as it discourages old people from quitting work. He cannot find significant relationship between household size and retirement status and gives explanation for that: as his model also includes marital status and most households consist of two people in Western Europe, this effect accounts for the significant effect of household size in the variable showing marital status. Mişcişin (2007) also accounts for institutional (gross pension replacement rate, pension accrual rate, pension wealth accrual rate) and macro variables (GDP, unemployment rate) and gets negative effect on retirement status for all of them. He gives an interesting explanation for the negative effect of GDP on retirement status: population growth is negative in most of the analyzed countries, while these countries have higher production year by year, which implies that older workers are still needed in job market and they also have longer life expectancy and better health status that allow them not to quit job market and continue working.

Dorn and Sousa-Poza (2005a) analyze factors such as gender, marital status, per capita GDP, average pension gross replacement rate that affect involuntary early retirement in 15 countries. They use probit estimation method with different specifications for 19 industrialized countries from the 1997 International Social Survey Program (ISSP). They find that only retirement age and real per capita GDP has significant relationships in all cases, higher age have a positive effect, while real per capita GDP has a negative effect on involuntary retirement. People with higher age have to involuntarily retire, while people from countries with higher per capita GDP go into retirement voluntarily or by their own choice.

These researches are related to our research that tries to analyze the effect of gender, health state, household size, engagement in vigorous physical activities, having individual

retirement account and life insurance as well as per capita GDP on retirement probability of survey participants. There are enough literatures that explore the effect of gender, health condition, household size and per capita GDP as determinants of retirement status, especially many authors group people into different samples according to their health condition, age and investigate particular relationship for these groups of people. However, there is no enough research about the effect of engagement in physical activities, having individual retirement account and life insurance on the likelihood of being retired, particularly for SHARE wave 2 dataset. Therefore we are going to control for the variables that are not discussed enough in previous literature as well as the variables that are covered by many authors in order to explore how they affect retirement status together. Searching on the web search engine of scholarly literature, Google Scholar⁷ for the key words “SHARE dataset” gives 90, “SHARE dataset Poland” gives 18, “SHARE dataset Czech Republic” gives 18, “SHARE Wave 2” gives 55, “SHARE New Member” gives zero results and most of them are irrelevant. This fact shows that our topic has not been analyzed yet or at least there is no any article online using SHARE dataset and exploring participating countries comparing Old and New Member States. Therefore we expect our findings to make a novel contribution to this topic.

⁷ Google Scholar: <http://scholar.google.com/>

Chapter 3. Data description

Before starting to analyze the retirement process and estimate the results we need to know the main characteristics of observations, how the data is formulated, whether the samples are normally distributed. Therefore we will analyze the whole SHARE dataset and cross-country summary statistics, and then we will discuss the share of retired people by age groups, gender and health groups, explain the differences between Old and New Member States. We will finish this chapter with exploring per capita GDP for EU Member States participating in our research.

The Survey of Health, Ageing and Retirement in Europe (SHARE) provides a useful dataset for getting information about individuals and households in participating countries. This is a panel database from 15 countries and more than 45 000 individuals aged 50 and older. Data collection and management are coordinated at the Mannheim Research Institute for the Economics of Aging (MAE). This data is based on interviews which started to be collected in 2004 and released in 2005 (Wave 1). We are using dataset Wave 2 for 13 countries which is based on longitudinal interviews (all people participated in the 2004 SHARE and their spouses or partners) and baseline interviews (only one person per household was interviewed). The reason why we decided to choose analyze SHARE is that it helps to see the full view of the ageing process in participating countries. SHARE includes questions about physical and mental health (self-reported health, health conditions, use of health care facilities, etc.), economic situation (current work activity, opportunities to work past retirement age, composition of current income, wealth and consumption, housing, etc.), financial status (having assets, bank account, amount of earning and etc.), social support (assistance within families, transfers of income and assets, etc.), behavioral activities (personal attitudes, smoking, alcohol consumption, engagement in sport, etc.), demographics

(gender, household size, marital status, number of children, etc.) and other useful questions for analyzing population ageing in Europe⁸. The disadvantage of this survey is that respondents do not answer to some of questions, especially for the ones which ask their financial assets, private life, etc. Therefore researchers cannot analyze the whole data and sometimes exclude the questions which are not answered by most of respondents or exclude respondents which do not answer most of the questions. After carefully analyzing the dataset and previous literatures exploring this dataset we decided to use variables showing retirement status, gender, health condition, household size, marital status, engagement in sport and other vigorous activities, having individual retirement account, life insurance in order to investigate determinants of retirement. We cannot include to our sample all 15 countries and have to exclude two countries: one of them is Israel which is not European country and there is no data from wave 2 questionnaire in this country, the other is Ireland where the survey was conducted around one year later than other countries.

We start grouping SHARE dataset according to relevant samples for our research (see Table 4). Sample size is not similar between country groups: 14773 for Old Member States and 3344 for New Member States. This is because of the availability of dataset only for two New Member States. Sample size is not similar within country group of Old Member States as well (there is almost 19 times difference between sample sizes of Greece and The Netherlands), but it is similar for Poland and Czech Republic.

Share of retired and non-retired people in the sample of Old Member States is not so different (0.52 and 0.48 respectively), but for New Member States the share of retired respondents are bigger (0.66). The explanation can be that both average effective age and official age of retirement are lower for these countries. This implies more people aged 50 and

⁸ The web-site of Survey of Health, Ageing and Retirement in Europe (SHARE): <http://share-project.org>

over are retired in New Member States at the time of interview compared with Old Member States.

The share of males is a bit less than share of females in the sample which is not unusual as it is known fact that female/male ratio is higher than one for old ages.

Table 4. Cross-country summary statistics of the SHARE dataset

Countries	Sample size	Retired	Male	Health*		Household size	Engaged in physical activities	Has individual retirement account	Has life insurance
				Excellent or very good	Fair or poor				
Old Member States									
Austria	923	0.73	0.44	0.28	0.30	1.80	0.59	0.09	0.22
Belgium	1594	0.56	0.49	0.30	0.29	1.94	0.49	0.25	0.22
Denmark	1467	0.50	0.48	0.52	0.25	1.78	0.55	0.37	0.29
France	1710	0.57	0.44	0.20	0.37	1.95	0.49	0.32	0.19
Germany	1445	0.55	0.47	0.21	0.38	1.96	0.64	0.13	0.30
Greece	1900	0.44	0.45	0.34	0.27	2.19	0.75	0.01	0.04
Italy	1706	0.55	0.44	0.19	0.45	2.44	0.44	0.02	0.08
Netherlands	108	0.34	0.45	0.26	0.31	1.85	0.69	0.05	0.23
Spain	1279	0.38	0.41	0.13	0.47	2.57	0.46	0.11	0.09
Sweden	1694	0.56	0.48	0.42	0.29	1.85	0.61	0.48	0.43
Switzerland	947	0.45	0.46	0.46	0.17	1.90	0.71	0.27	0.22
All Old Member States	14773	0.52	0.46	0.30	0.33	2.05	0.57	0.20	0.20
New Member States									
Czech Republic	1744	0.69	0.37	0.18	0.45	1.97	0.52	0.35	0.15
Poland	1600	0.63	0.42	0.08	0.63	2.95	0.42	0.02	0.35
All New Member States	3344	0.66	0.40	0.13	0.54	2.44	0.48	0.19	0.25
All Member States									
All countries	18117	0.55	0.45	0.27	0.37	2.12	0.55	0.20	0.21

* - The share of people who have good health is not stated in this table explicitly, they are the remaining share. Detailed information about questions and answers used in SHARE is in Appendix, Table A.3.

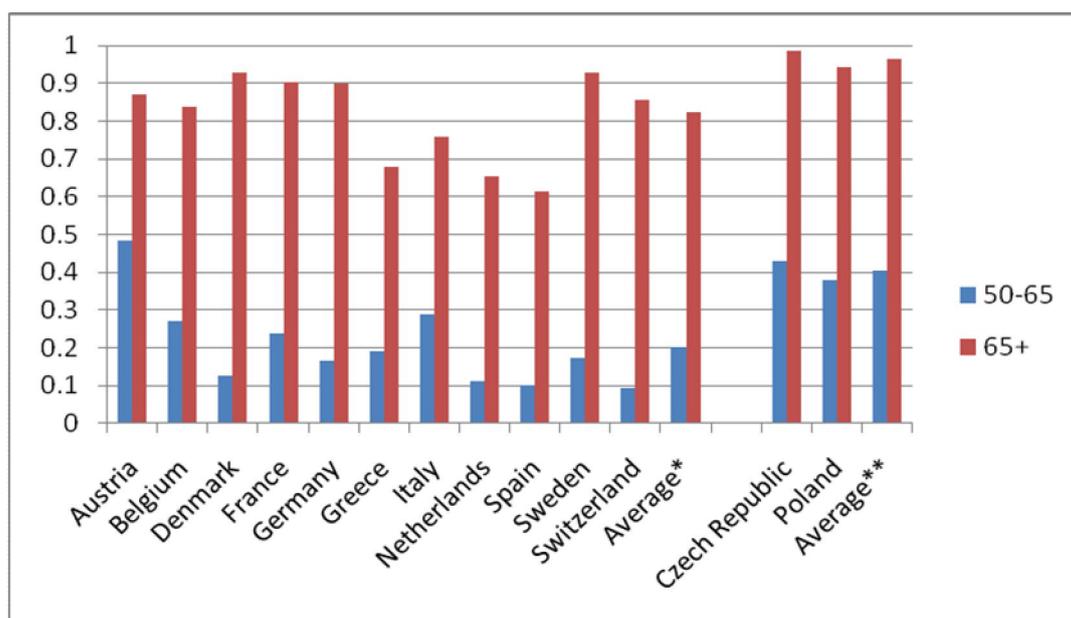
Source: Survey of Health, Ageing and Retirement in Europe (2007)

Another interesting feature of the respondents in Old Member States is that the share of people who have excellent or very good health (0.30), good health (0.37) and fair or poor

health (0.33) are similar. But these shares are not similar for New Member States as the share of people with excellent or very good health on average is higher (consequently the share of people with fair or poor health on average is lower) for Old Member States than New Member States because of higher social and health care, level of education. The other characteristics are not significantly different between country groups.

In order to analyze respondent's retirement status we divide our data into two age groups choosing age 65 as a threshold which is official retirement age (mainly for males) in most countries (Appendix, Table A.2). Our purpose is to see the share of people retired by age across countries and country groups.

Figure 3. Share of retired by age groups across countries and country groups



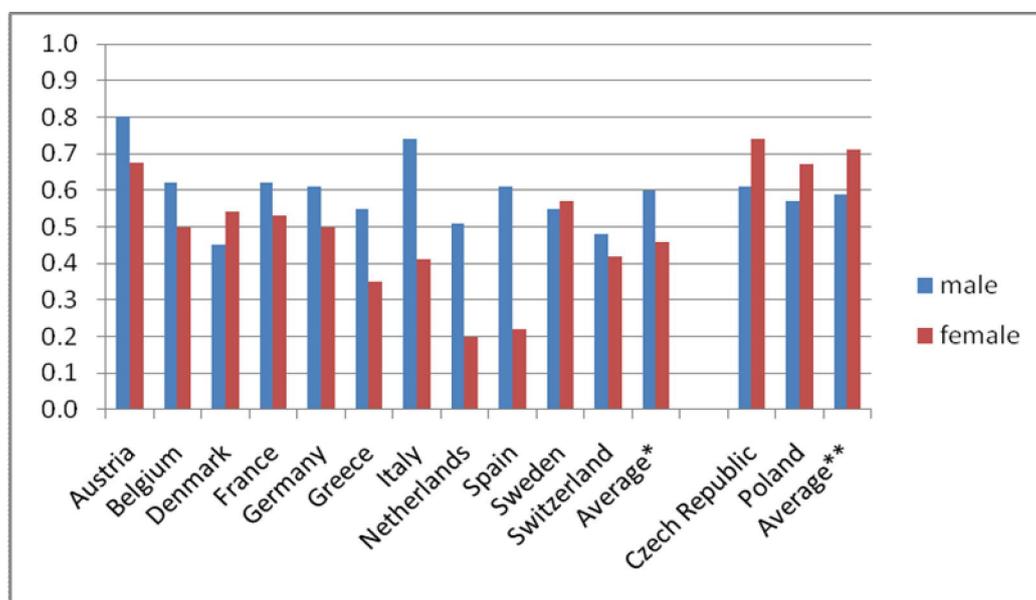
* - Average for Old Member States
 ** - Average for New Member States

Source: Survey of Health, Ageing and Retirement in Europe (2007)

Detailed numbers are in Appendix, Table A.4.

Figure 3 shows that on average share of retired people between ages 50-65 is higher for New Member States than Old Member States. But for Austria share of people retired in this age group is the highest in the dataset. This finding in the data is consistent with average effective ages of retirement (58.9 for males, 57.5 for females) in Appendix, Table A.2. They are the lowest in the sample as well implying that the probability of being retired of the respondent is higher in Austria than other countries. But Austria is the only exception and share of retired people in both age groups are higher in New Member States than in Old Member States on average. The lowest shares of retired people aged 50-65 are observed in Denmark, Germany, The Netherlands, Spain and Switzerland (see Figure 3) which have higher effective age of retirements (see Appendix, Table A.2). The consistency of these findings in SHARE dataset implies that it represents the society and the samples are chosen carefully which is important for the good estimation of results.

Figure 4. Share of retired by gender across countries and country groups



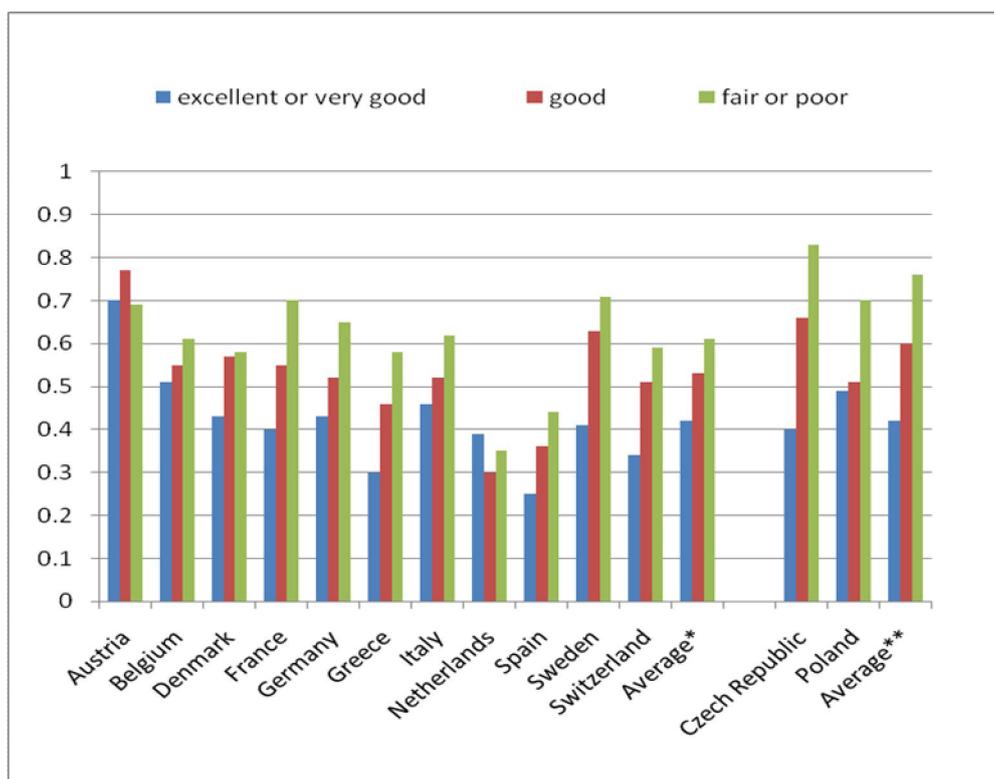
* - Average for Old Member States
 ** - Average for New Member States

Source: Survey of Health, Ageing and Retirement in Europe (2007)

Detailed numbers are in Appendix, Table A.5.

We also try to analyze gender-retirement relationship dividing in data two parts and explore the share of people retired by gender (see Figure 5). The results show that the share of retired women is higher in New Member States, while the share of retired men is a little bit higher for Old Member States (see Appendix, Table A.5 for precise numbers). Another interesting result is that gender differences within retired people are also similar between country groups: share of retired males are higher than females for Old Member States on average, while it is opposite for New Member States.

Figure 5. Share of retired by health groups across countries and country groups



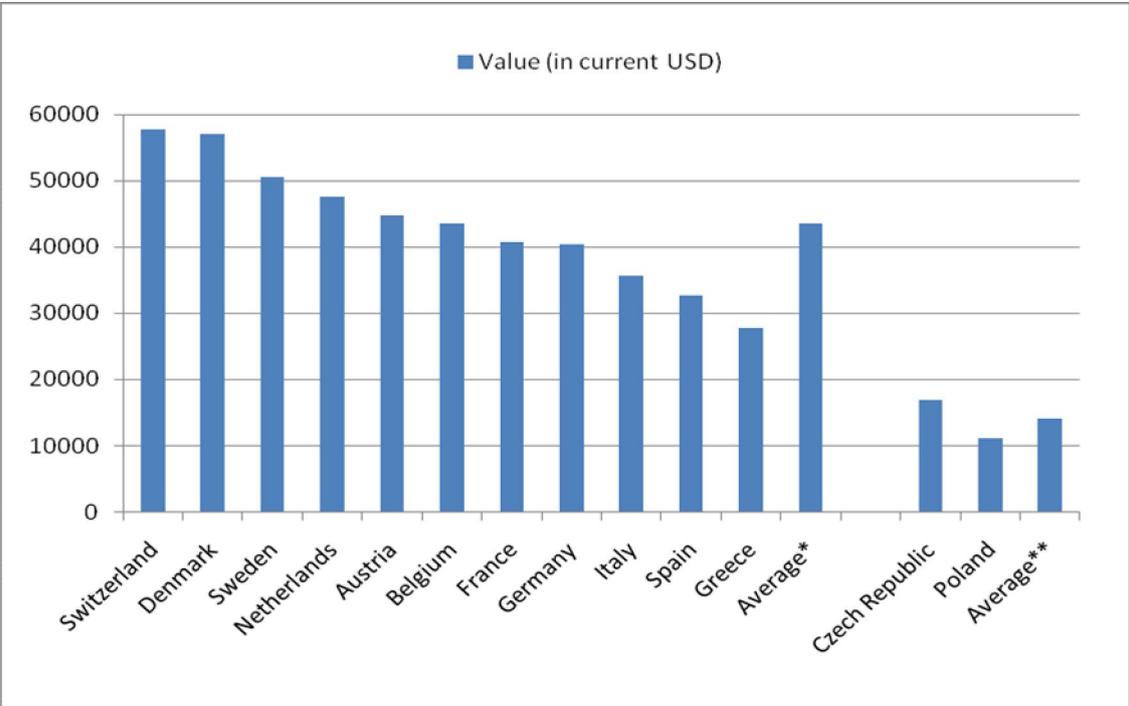
* - Average for Old Member States
 ** - Average for New Member States

Source: Survey of Health, Ageing and Retirement in Europe (2007)

Detailed numbers are in Appendix, Table A.6.

On average shares of retired people by health groups are larger for New Member States than Old Member States, because both effective and official ages are lower for New Member States than Old Member States, because both effective and official ages are lower for New Member States than Old Member States which implies more respondents are in retirement in New Member States than Old Member States at the time of interview. The share of people who have fair or poor health is the highest, but the share of people who have excellent or very good health is the lowest shares in all countries except Austria and The Netherlands. The lowest average effective age of retirement in Austria (see Appendix, Table A.2.) implies that people go into retirement earlier irrespective of health status and that is why the share of people who have good, excellent or very good health status are the highest in all sample. Unusual finding for The Netherlands can be because of very small sample size (108 observations).

Figure 6. Per capita GDP for 13 EU Member States in 2007



* - Average for Old Member States
 ** - Average for New Member States

Source: UNdata

We also use additional country-level determinant from UN Data⁹, internet based data service created by The United Nations Statistics Division (UNSD) of the Department of Economic and Social Affairs (DESA). We are going to use per capita GDP as one of the main macroeconomic characteristics of the countries.

Figure 6 shows significant differences in per capita GDP across country groups on average (around three times higher for Old Member States). The lowest per capita GDP in Old Member States (for Greece) is even more than 10 000 USD higher (precise numbers are in Appendix, Table A.7) than the highest per capita in New Member States (for Czech Republic). Therefore we decided to control for this macroeconomic indicator besides individual characteristics provided by SHARE.

⁹ UNdata: <http://data.un.org/>

Chapter 4. Estimation strategy

As we want to analyze determinants of retirement status which is binary dependent variable, it is logical to use probability model. In this way we can determine which factors change the likelihood of being retired for an individual participating in survey. For simplicity of the estimation and interpreting results we are going to use linear probability model. Linear probability model (LPM) is a special case simple linear regression where dependent variable is either 0 or 1 (Wooldridge, 2003).

We have enough big samples of respondents from different categories which will help us to get more consistent and useful results. We will estimate the effect for two groups of countries (Old Member States and New Member States) separately, then for all countries discussing and comparing achieved results. Old Member States have different economic backgrounds, demographic characteristics and histories from New Member States which implies that the effects of determinants on retirement status of the respondents are expected to be different. Analyzing these two groups separately will give us opportunity to see how different the effects of these factors are and why these differences exist.

We use SHARE dataset for variables about individual's retirement status, gender, health state, household size, sport activity, individual retirement account and life insurance. We generate variables from the dataset according to the questions and answers from SHARE (see Appendix, Table A.3). We should note that the variables *hlthgood* and *hlthbad* are generated using method by Quinn *et al.* (1998): transforming five answer choices to three levels of health status. We also include in our estimation per capita GDP as a main indicator of standard of living in the country for individual citizens from UN dataset. Table 5 shows all

variables used in estimation and their descriptions (see Appendix, Table A.8 for descriptive statistics of variables).

SHARE dataset provides us with information at the time of interview; therefore our model will imply how the probability of being retired depends on these variables in sign and magnitude. This will help us to predict the individuals' retirement status according to individual characteristics and per capita GDP of the country.

Table 5. Variable description

Variables	Description
Individual's demographics and health status	
<i>ret</i>	1 if respondent is retired, 0 otherwise
<i>male</i>	1 if respondent is male, 0 otherwise
<i>hlthgood</i>	1 if respondent's health in general is excellent or very good, 0 otherwise
<i>hlthbad</i>	1 if respondent's health in general is fair or poor, 0 otherwise
<i>hhsiz</i>	respondent's household size
<i>sportact</i>	1 if respondent is engaged in sport and activities that are vigorous at least once a month, 0 otherwise
Individual's financial circumstances	
<i>ira</i>	1 if respondent has individual retirement account, 0 otherwise
<i>lifeins</i>	1 if respondent has life insurance, 0 otherwise
Country-level variable	
<i>lpcgdp</i>	log of per capita GDP

Assuming that probability of being retired is linear in set of determinants we can formulate estimation model for our research question:

$$\text{Prob}(ret_i = 1 | \mathbf{x}) = \beta_0 + \beta_1 x_1 + \dots + \beta_k x_k \quad \text{or} \quad E(ret_i | \mathbf{x}) = \beta_0 + \beta_1 x_1 + \dots + \beta_k x_k$$

where \mathbf{x} – is the vector of right hand side variables and β is the vector of coefficients of these variables. We can see that LPM assumes constant marginal effects for explanatory variables. Wooldridge (2003) shows that heteroskedasticity must exist in linear probability models;

therefore we correct standard errors for heteroskedasticity and use robust standard errors for significance and interpretation of our results.

Chapter 5. Empirical results and discussion

The results of the OLS estimation for three country groups show that all determinants are correlated significantly with retirement status of individuals (see Table 6).

Table 6. OLS estimation results for EU country groups

Variable	Old Member States		New Member States		All countries	
	Coefficient	White standard error	Coefficient	White standard error	Coefficient	White standard error
<i>intercept</i>	-1.765381	0.197886*	-1.232976	0.411487*	1.472293	0.080589*
<i>male</i>	0.197396	0.007506*	-0.075353	0.015652*	0.144029	0.006908*
<i>hlthgood</i>	-0.083516	0.009407*	-0.134110	0.027174*	-0.076603	0.008970*
<i>hlthbad</i>	0.045262	0.009263*	0.106164	0.017288*	0.062049	0.008347*
<i>hhsiz</i>	-0.104580	0.003889*	-0.040079	0.005483*	-0.091974	0.003316*
<i>spportact</i>	-0.053892	0.008071*	-0.161372	0.016823*	-0.086366	0.007391*
<i>ira</i>	-0.234961	0.010420*	-0.171947	0.022025*	-0.178345	0.009144*
<i>lifeins</i>	-0.139097	0.010116*	-0.135251	0.019911*	-0.119938	0.008843*
<i>lpcgdp</i>	0.238257	0.018461*	0.222831	0.042427*	-0.065663	0.007602*
Observations	14773		3344		18117	
R ²	0.169262		0.178343		0.142309	

* - Significant at 1 % level

5.1. Old Member States

The coefficient for *male* shows that males are 20 % more likely to be retired compared to females if other characteristics remain the same. We get similar results to Fischer and Sousa-Poza (2006) and Mişcişin (2007) who found that female workers have lower probability of being retired earlier than males. They also used SHARE dataset, but controlled for different set of variables. Nevertheless our results are similar. This relationship was also shown by Dorn and Sousa-Poza (2005b), Büttler et al. (2004) for Switzerland, Røed and Haugen (2003) for Norway.

Health status has the expected effect on the likelihood of retirement: people who answered “good” or “excellent” (*hlthgood*) for the question about health in general are 8 % less likely to be retired, but people who have “fair” or “poor” health in general (*hlthbad*) are 4.5 % more likely to be retired at the time of interview. These results are quite intuitive and in line with the idea that if people feel good then they prefer working and earning money, but people who feel bad prefer not to take additional risk and go into retirement. There is another fact: if an old individual is involuntarily retired, because he or she cannot meet requirements of job responsibilities and fired, then this individual can answer to the question about health in general “fair” or “poor” even if he or she has better health status. A similar argument is also true for the people who still work and do not have “good” or “excellent” health status, but try to answer to the question in this way showing that their health allows them to work. Blöndal and Scarpetta (1999), Quinn *et. al* (1998), Mişcişin (2007) also found similar relationship between health and retirement status.

The coefficient of household size (*hsize*) implies that having one additional household member decreases the likelihood of retirement by 10 % which is quite large effect. The reason can be that if the household is larger, then household have more costs than smaller one which implies that individuals cannot go into retirement and prefer continue working these costs. Alba-Ramirez (1997), Blöndal and Scarpetta (1999) found similar causal relationship as well. Mişcişin (2007) found household size insignificant determinant of retirement status, because he also controlled for the marital status which already accounted for the household size as most of the households in his sample are not larger than two.

Individual’s involvement in vigorous sport activities at least once a month (*sportact*) decreases probability of being retired by 5.4 % compared to the individuals who hardly ever do sport exercises. This is the expected relationship between sport activities and retirement

status as retired people are less likely to be engaged in sport activities and people who do vigorous sport exercises do not prefer to go into retirement as they feel themselves better.

We get negative sign for the coefficient of the variable *ira* which can be due to the fact that having individual retirement account gives financial benefits to its owners and therefore decrease probability of retirement likelihood (by 23.5 % in our estimation results). Our finding is line with the results of Mişcişin (2007).

The coefficient of the variable showing life insurance (*lifeins*) implies that people who have it tend to retire 14 % less than people who do not have it. This is quite logical if we take into consideration that having life insurance encourages people to take more risk on their life working more compared to the people who do not have insurance. People who do not have life insurance will not put themselves into the risk as they will not be paid upon death. This is especially true if working person has some household or family members that need either money earned during his or her working period or insurance paid upon his or her death.

The coefficient of the macroeconomic indicator in our model (*lpcgdp*) shows that citizens of the countries with higher per capita GDP have higher share of retired people aged 50 and over. The reason can be that countries with higher per capita GDP have higher pensions and social care for elderly people, which discourages them to work. Duval (2003) and Johnson (2000) suggests that higher per capita GDP increases incentives for leisure because of higher living standards and no special need for working. Ahituv and Zeira (2000) give an interesting explanation for this case based on demand side of job market: human capital is technology specific, which implies that technological progress requires acquiring new skills which is not the case for elderly people and this makes them to retire rather than to

acquire new technology specific skills. This is quite reasonable as Old Member States are technologically developed countries.

5.2. New Member States

The coefficient of variable showing gender of the individual (*male*) have negative sign suggesting that males are 7.5 % less likely to be retired compared with females, which is different result than we get for Old Member States. This can be explained by the fact that the gender wage gap is high in these countries (Poland and Czech Republic) which means that males get more wage on average than females. Therefore, it is beneficial working for males rather than females in the household and females retire earlier than males. Another reason why males have to retire less than females is that in New Member States household sizes are bigger than in Old Member States (Appendix, Table A.8) and males play important role in household income. This is consistent with the finding of Blöndal and Scarpetta (1999) that heads of households try not to retire (see Table 8 for comparison of all our results with previous literature).

**Table 7. Comparison of the coefficients for New Member States
with Old Member States (Old Member States as a base)**

Variables	Sign		Effect		
	Same	Opposite	Weaker	Similar	Stronger
<i>male</i>		✓	✓		
<i>hlthgood</i>	✓				✓
<i>hlthbad</i>	✓				✓
<i>hhsiz</i>	✓		✓		
<i>sportact</i>	✓				✓
<i>ira</i>	✓		✓		
<i>lifeins</i>	✓			✓	
<i>lpcgdp</i>	✓			✓	

The sign of coefficients are the same for all other variables: the magnitudes are similar for *lifeins*, *lpcgdp*, and not so different for *ira* compared to the ones for Old Member States. Moreover variables related with health status, sport activities, household size (*hlthgood*, *hlthbad*, *sportact*, *hhsiz*e) have significantly higher magnitude which implies that they have more marginal effect for New Member States compared with Old Member States. Table 7 illustrates the comparison of the results.

Table 8. Comparison of our results with previous literature

Variables	Old Member States	New Member States
<i>male</i>	Fischer and Sousa-Poza (2006), Mişcişin (2007), Dorn and Sousa-Poza (2005b), Bütler et al. (2004), Røed and Haugen (2003)	Similar implication in Blöndal and Scarpetta (1999)
<i>hlthgood</i>	Blöndal and Scarpetta (1999), Quinn <i>et. al</i> (1998), Mişcişin (2007)	
<i>hlthbad</i>		
<i>hhsiz</i> e	Alba-Ramirez (1997), Blöndal and Scarpetta (1999)	
<i>sportact</i>	We did not find similar analysis in the previous literature	
<i>ira</i>	Mişcişin (2007)	
<i>lifeins</i>	We did not find similar analysis in the previous literature	
<i>lpcgdp</i>	Duval (2003), Johnson (2000), Ahituv and Zeira (2000),	

5.3. All Member States

The coefficients of most variables (*male*, *hlthgood*, *hlthbad*, *hhsiz*e, *sportact*,) are similar or closer to the ones for Old Member States than for New Member States which is quite intuitive as most of sample consists of former ones; the coefficients for *ira*, *lifeins* are exceptions, but still have the same sign.

The only puzzling finding is that per capita GDP has a negative effect on retirement probability if we run regression for the whole sample (both Old Member States and New Member States). If we take into consideration that the residents of these countries have better health condition and this fact makes them eligible for working and we can infer that income effect dominates substitution effect in this case. Also these countries have a big share of

elderly people in the society with little and even negative population growth which implies that old people cannot easily quit the job market as high demand for experienced workers still exists. Therefore people living in countries with high per capita GDP go into retirement less than people living in countries with low per capita GDP. This result is similar to found by Mişcişin (2007).

Conclusion

Population ageing has become one of the main problems of the European Union as it affects the size of labor force negatively and increases social care expenditures. Increasing implicit tax rates for retirement postponement decreased effective age of retirement between 1960s and 1990s. Most of pension systems and regulations did not change till the end of previous century significantly, although birth rates went down, participation of women in labor force increased, technological progress changed behavior of people, etc (Pension in the European Union, 2004). Countries started increasing the official rate of retirement and improving health care, education level at the same time which led to the increase of effective age of retirement. They realized that increasing implicit tax rates started to discourage people from working and began to introduce higher pension rates for the people postponing retirement which began to encourage people to stay in labor force. But lower official ages of retirement still exist in some countries (especially for women) which also affect population ageing.

As retirement decisions are made by individuals, they take into consideration their health, pension benefits, potential costs and other factors. Therefore analyzing micro level data, exploring relationships between individuals' retirement status and their socio-demographic characteristics, financial circumstances and macroeconomic indicator of the countries they reside in can help us to understand population ageing and its consequences. Therefore we used micro level data (SHARE wave 2) and macro level data (UNdata) for investigating the effect of health status, gender, household size, engagement in sport and vigorous physical activities, having individual retirement account and life insurance as well as per capita GDP on retirement status of individuals participating in the questionnaire and found

all factors to be strong determinants of retirement status. The main purpose was to find comparative evidence between Old and New Member States and we realized that gender have opposite effects in these country groups (positive effect in Old Member States, negative effect in New Member States). This was explained by the fact that the gender wage gap is higher, household size is bigger and males play more important role in society in New Member States (compared with Old Member States) which make them retire less than females. The effects of other factors are also compared for the country groups. Other factors affect the retirement likelihood of elderly people in similar way, but have different magnitudes.

This study can also be useful for analyzing changes between wave 1 and wave 2 for Old Member States, expanding research for greater number of participating countries in wave 4 (similar data will be available for Estonia, Hungary, Luxemburg and Portugal in this wave). The methodology and approaches we use in the research can also be useful for analyzing SHARE-like datasets. Investigated datasets, found causal relationships, the results of econometric estimation used in the research can also be useful for policy-makers in New Member States for improving their retirement policy and make them competitive with the ones existing in Old Member States.

However, we also have to note the shortcomings of our analysis. Although SHARE dataset is the most appropriate for our research purpose, the character of this dataset cannot provide us with sufficient detailed information about some characteristics (financial stocks, money in bank accounts, accumulated wealth, etc) of individuals that strongly affect their retirement decision. These questions are included into the questionnaire, but people prefer not to answer to these types of questions and this makes difficult to control for these factors. Another problem rises with modeling retirement decision, because the data is available at the time of interview not at the time of retirement decision made. Therefore we cannot say for

sure the reasons why the person decided to retire at the time of interview. It is possible that some characteristics of individuals change between the time of retirement and interview. Therefore using panel data of surveys will be good idea to analyze differences between Old and New Member States from time to time when the data is available.

References

- Ahituv, A. and J. Zeira.** 2000. "Technical Progress and Early Retirement". CEPR Discussion Paper no. 2614. London, Centre for Economic Policy Research. <http://www.cepr.org/pubs/dps/DP2614.asp> (accessed May 29, 2011).
- Alba-Ramirez, A.** 1997, "Labor Force Participation and Transitions of Older Workers in Spain", Universidad Carlos III de Madrid, Working Paper 97-39, Economic series 17, May.
- Antolín, P. and S. Scarpetta.** 1998. "Microeconometric Analysis of the Retirement Decision: Germany", OECD Economics Department Working Papers, No. 204, OECD Publishing,
- Benitez-Silva, H.** 2000. "Micro Determinants of Labor Force Status Among Older Americans", SUNY-Stony Brook Department of Economics Working Papers 00-07.
- Blau, D. and R. Riphahn.** 1997. "Labor Force Transitions of Older Married Couples in Germany". Paper presented at International Health and Retirement Surveys Conference, Amsterdam, August.
- Blöndal, S. and S. Scarpetta.** 1997. Early retirement in OECD countries: The Role of Social Security Systems, OECD Economic Studies, issue 29, pages 7-54.
- Blöndal, S. and S. Scarpetta.** 1999. The Retirement Decision in OECD Countries, OECD Economics Department Working Papers, No. 202, OECD Publishing.
- Comparison between SHARE, ELSA, and HRS,** http://www.share-project.org/t3/share/fileadmin/pdf_documentation/FRB2/Chapter_2.pdf (accessed April 29, 2011).
- Dhaval, D., I. Rashad, and J. Spasojevic.** 2006. "The Effects of Retirement on Physical and Mental Health Outcomes", NBER Working Paper w12123.
- Dorn, D. and A. Sousa-Poza.** 2005a. "Early Retirement: Free Choice or Forced Decision?" CESifo Working Paper No. 1542.

Dorn, D. and A. Sousa-Poza. 2005b.” The Determinants of Early Retirement in Switzerland”. Swiss Journal of Economics and Statistics, 141(2), pp. 247-283.

Duval, R. 2003. “The Retirement Effects of Old-Age Pension and Early Retirement Schemes in OECD countries”. OECD Economics Department Working Paper No. 370. Paris.

The English Longitudinal Study of Ageing (ELSA), <http://www.ifs.org.uk/elsa/> (accessed April 29, 2011).

EU Labor Force Survey. <http://epp.eurostat.ec.europa.eu/portal/page/portal/microdata/lfs>. Eurostat (accessed April 17, 2011).

Fischer, J. and A. Sousa-Soza. 2006. “The Institutional Determinants of Early Retirement in Europe”, University of St. Gallen Economics Discussion Paper No. 2006-08, April.

The Health and Retirement Study (HRS), <http://hrsonline.isr.umich.edu/> (accessed April 1, 2011).

Hennessy A. 2008. “Economic Interests and the Construction of a European Single Pension Market.” Political Studies Association.

Johnson, R. 2000. “The Effect of Old-Age Insurance Male Retirement: Evidence from Historical Cross-Country Data”, Federal Reserve Bank of Kansas City, Research Working Paper No. RWP 00-09.

The Mexican Health and Ageing Study (MHAS), <http://www.mhas.pop.upenn.edu/english/home.htm> (accessed April 29, 2011).

Mişişin I. 2007. “Retirement in Western Europe: Evidence from Ten European Countries.” Master Thesis. Central European University.

Pension in the European Union. 2004. “La Lettre de l’Observatoire des Retraites”, October No. 13.

Quinn, J., R. Burkhauser, K. Cahill and R. Weather. 1998. “Microeconomic Analysis of the Retirement Decision: The United States”, OECD Economics Department Working Paper No. 203.

Røed, K. and F. Haugen. 2003. “Early retirement and economic incentives: evidence from a quasi-natural experiment”, *Labor*, 17 (2), pp. 203-228.

Structural Indicators for Employment. http://epp.eurostat.ec.europa.eu/portal/page/portal/structural_indicators/indicators/employment, Eurostat (accessed April 17, 2011).

The Survey of Health, Ageing and Retirement in Europe (SHARE), <http://www.share-project.org/> (accessed January 1, 2011).

Romans F. 2007. “The transition of women and men from work to retirement”, *Eurostat*, http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-SF-07-097/EN/KS-SF-07-097-EN.PDF (accessed May 1, 2011).

World Health Organization Study on global AGEing and adult Health (SAGEH), <http://www.who.int/healthinfo/systems/sage/en/index.html> (accessed May 29, 2011).

Wooldridge. 2003. *Introductory Econometrics*. 2nd edition. Thompson.

Appendix

Table A.1. Basic characteristics of SHARE-like data sets

Study	Launched	Eligibility age	Sample size		
			Year	Households	Individuals
HRS	1992	51+	2006	12 288	18 469
MHAS	2001	50+	2003	8 614	13 497
ELSA	2002	50+	2006	6 484 ^a	9 718 ^a
SAGEH	2002	50+ / 18-49 ^{b, c}	2007	5 000 / 10 000 ^{b, c}	--
SHARE	2004	50+	2006 ^d	22 255	32 442

^a Excluding the institutionalized (nursing homes) who are not available yet

^b Target

^c Core sample / Comparison sample

^d Wave 2; Israel has wave 1 interviews in 2006 as well, but these are not included in the table.

Sources: The web-sites of HRS, MHAS, ELSA, SAGEH and SHARE

Table A.2. Average effective age of retirement versus the official age, 2004-2009

Men			Women		
Countries	Effective ^a	Official	Countries	Effective	Official
Austria	58.9	65	Austria	57.5	60
Belgium ^b	59.1	65	Belgium ^b	59.1	65
Czech Republic	62.0	62	Czech Republic	59.0	59
Denmark	64.4	65	Denmark	61.9	65
France ^b	59.1	60	France ^b	59.7	60
Germany	61.8	65	Germany	60.5	65
Greece	61.9	65	Greece ^b	59.6	60
Italy ^b	61.1	65	Italy ^b	58.7	60
Netherlands	62.1	65	Netherlands	62.6	65
Poland	61.7	65	Poland	58.5	60
Spain	61.8	65	Spain	63.4	65
Sweden	66.0	65	Sweden	63.6	65
Switzerland	65.7	65	Switzerland	63.5	64
Average ^c	62.0	64.4	Average ^c	60.6	62.5

a) The average effective age of retirement is defined as the average age of exit from the labor force during a 5-year period (2004-2009). Labor force (net) exits are estimated by taking the difference in the participation rate for each 5-year age group (40 and over) at the beginning of the period and the rate for the corresponding age group aged 5-years older at the end of the period. The official age corresponds to the age at which a pension can be received irrespective of whether a worker has a long insurance record of years of contributions.

b) For Belgium and France, workers can retire at age 60 with 40 years of contributions; for Greece, at age 58 with 35 years of contributions; and for Italy, at 57 (56 for manual workers) with 35 years of contributions.

c) Average for all Member States;

Source: OECD estimates derived from the European and national labor force surveys.

**Table A.3. Questions and answers from the SHARE questionnaire
used in the present research**

Codes	Questions	Answers	Generated variables
ep005_	Current job situation: In general, which of the following best describes your current employment situation?	Choices: a) retired; b) employed or self-employed (including working for family business); c) unemployed and looking for work; d) permanently sick or disabled; e) homemaker; f) other (rentier, living off own property, student, doing voluntary work).	<i>ret</i>
dn042_	Gender: Male or female?	Choices: a) male; b) female.	<i>male</i>
ph003_	Health in general: Would you say your health is...	Choices: a) excellent; b) very good; c) good; d) fair; e) poor.	<i>hlthgood</i> <i>hlthbad</i>
hhsize	Household size	Number of household members	<i>hhsize</i>
br015_	Sports or activities that are vigorous: How often do you engage in vigorous physical activity, such as sports, heavy housework, or a job that involves physical labor?	Choices: a) more than once a week; b) once a week; c) one to three times a month; d) hardly ever, or never.	<i>sportact</i>
as065_	Has an individual retirement account: Do you currently have any money in individual retirement accounts?	Choices: a) yes; b) no.	<i>ira</i>
as067_	Has life insurance: Do you currently own any life insurance policy?	Choices: a) yes; b) no.	<i>lifeins</i>

Source: Survey of Health, Ageing and Retirement in Europe (2007)

Table A.4. Share of retired by age groups across countries and country groups

Countries	Aged 50-65	Aged 65+
Old Member States		
Austria	0.48	0.87
Belgium	0.27	0.84
Denmark	0.13	0.93
France	0.24	0.90
Germany	0.17	0.90
Greece	0.19	0.68
Italy	0.29	0.76
Netherlands	0.11	0.65
Spain	0.10	0.61
Sweden	0.17	0.93
Switzerland	0.09	0.86
Average*	0.20	0.82
New Member States		
Czech Republic	0.43	0.99
Poland	0.38	0.94
Average**	0.41	0.96

* - Average for Old Member States

** - Average for New Member States

Source: Survey of Health, Ageing and Retirement in Europe (2007)

Table A.5. Share of retired by gender across countries and country groups

Countries	Male	Female
Old Member States		
Austria	0.80	0.67
Belgium	0.62	0.50
Denmark	0.45	0.54
France	0.62	0.53
Germany	0.61	0.50
Greece	0.55	0.35
Italy	0.74	0.41
Netherlands	0.51	0.20
Spain	0.61	0.22
Sweden	0.55	0.57
Switzerland	0.48	0.42
Average*	0.60	0.46
New Member States		
Czech Republic	0.61	0.74
Poland	0.57	0.67
Average**	0.59	0.71

* - Average for Old Member States

** - Average for New Member States

Source: Survey of Health, Ageing and Retirement in Europe (2007)

Table A.6. Share of retired by health groups across countries and country groups

Countries	Excellent or very good	Good	Fair or poor
Old Member States			
Austria	0.70	0.77	0.69
Belgium	0.51	0.55	0.61
Denmark	0.43	0.57	0.58
France	0.40	0.55	0.70
Germany	0.43	0.52	0.65
Greece	0.30	0.46	0.58
Italy	0.46	0.52	0.62
Netherlands	0.39	0.3	0.35
Spain	0.25	0.36	0.44
Sweden	0.41	0.63	0.71
Switzerland	0.34	0.51	0.59
Average*	0.42	0.53	0.61
New Member States			
Czech Republic	0.40	0.66	0.83
Poland	0.49	0.51	0.70
Average**	0.42	0.60	0.76

* - Average for Old Member States

** - Average for New Member States

Source: Survey of Health, Ageing and Retirement in Europe (2007)

Table A.7. Per capita GDP for 13 EU Member States in 2007

Country	Value (in current USD)
Old Member States:	
Switzerland	57 780
Denmark	57 063
Sweden	50 497
Netherlands	47 544
Austria	44 816
Belgium	43 550
France	40 787
Germany	40 430
Italy	35 683
Spain	32 733
Greece	27 780
Average*	43 515
New Member States:	
Czech Republic	16 966
Poland	11 148
Average**	14 057

* - Average for Old Member States

** - Average for New Member States

Source: UNdata

Table A.8. Descriptive statistics for key variables**a) Old Member States (14733 observations):**

Variables	Mean	Median	Maximum	Minimum	Standard deviation
<i>Ret</i>	0.52	1	1	0	0.50
<i>male</i>	0.46	0	1	0	0.50
<i>hlthgood</i>	0.30	0	1	0	0.46
<i>hlthbad</i>	0.33	0	1	0	0.47
<i>hhsiz</i>	2.05	2	10	1	1.03
<i>sportact</i>	0.57	1	1	0	0.49
<i>Ira</i>	0.20	0	1	0	0.40
<i>lifeins</i>	0.20	0	1	0	0.40
<i>lpcgdp</i>	10.63	10.62	10.96	10.23	0.22

b) New Member States (3344 observations):

Variables	Mean	Median	Maximum	Minimum	Standard deviation
<i>Ret</i>	0.66	1	1	0	0.47
<i>male</i>	0.40	0	1	0	0.49
<i>hlthgood</i>	0.13	0	1	0	0.34
<i>hlthbad</i>	0.54	1	1	0	0.50
<i>hhsiz</i>	2.44	2	14	1	1.51
<i>sportact</i>	0.48	0	1	0	0.50
<i>Ira</i>	0.19	0	1	0	0.40
<i>lifeins</i>	0.25	0	1	0	0.43
<i>lpcgdp</i>	9.54	9.74	9.74	9.32	0.21

c) All Member States (18117 observations):

Variables	Mean	Median	Maximum	Minimum	Standard deviation
<i>Ret</i>	0.55	1	1	0	0.50
<i>Male</i>	0.45	0	1	0	0.50
<i>hlthgood</i>	0.27	0	1	0	0.44
<i>hlthbad</i>	0.37	0	1	0	0.48
<i>hhsiz</i>	2.12	2	14	1	1.14
<i>sportact</i>	0.55	1	1	0	0.50
<i>Ira</i>	0.20	0	1	0	0.40
<i>lifeins</i>	0.21	0	1	0	0.41
<i>lpcgdp</i>	10.42	10.61	10.96	9.32	0.48

Sources: Survey of Health, Ageing and Retirement in Europe (2007), UNdata