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Justina AV Fischer and Alfonso Sousa-Poza

University of Hohenheim, Thurgau Institute of Economics (TWI)

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# **The Effect of Pension Generosity on Early Retirement: A Microdata Analysis for Europe from 1967 to 2004**

JUSTINA A.V. FISCHER<sup>★</sup>  
University of Hohenheim, Germany

ALFONSO SOUSA-POZA<sup>\*</sup>  
University of Hohenheim and IZA, Germany

## **Abstract**

Using pseudo-panel microdata we show that pension generosity affects early retirement decisions. The changes in the average replacement rate and decreases in wealth accrual between 1967 and 2004 have caused an increase in early retirement probabilities from 16% to 63%.

Keywords: Early Retirement; Pension Systems; Pension Neutrality; Pension Generosity; SHARE

JEL Codes: J26; J21; H55

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<sup>★</sup> justina.fischer@uni-hohenheim.de and javfischer@gmx.de , main affiliation: Chair for Household and Consumer Economics, University of Hohenheim, Fruwirthstrasse 48, Kavaliershhaus 4 112, DE-70599 Stuttgart, Germany.

<sup>\*</sup> alfonso.sousa-poza@uni-hohenheim.de, main affiliation: Chair for Household and Consumer Economics, University of Hohenheim, Fruwirthstrasse 48, Kavaliershhaus 4 112, DE-70599 Stuttgart, Germany.

## 1. Introduction

In many industrialized countries, declining fertility rates have already lead to a reduction of the active population aged 20 to 65, thereby exerting pressure on social security systems and, in particular, pension systems. Because of the importance of this topic, there is a growing body of literature that tries to assess the determinants of early retirement (see Blöndal and Scarpetta 1999, Johnson 2000, 2001, Duval, 2003). In addition to various workers' and job characteristics that may affect the decision to retire early, institutional factors such as the generosity of retirement schemes may equally play an important role. Traditional economic theory cannot unambiguously predict the impact of institutional differences in pension systems. However, relatively few empirical studies exist that take a look at these institutional factors. This research void is primarily due to the lack of international microdata which is necessary in order to control for individual as well as institutional characteristics. Thus, all past cross-national studies have analyzed labor market participation rates of older workers using aggregate country-level data (e.g. Blöndal and Scarpetta, 1999, Duval, 2003, Johnson 2000, 2001). Such studies, however, have a number of drawbacks, including unresolved endogeneity problems, small sample sizes and the inability to disentangle micro-level from aggregate-level effects, e.g., for income. On the other hand, existing micro-level studies, such as those carried out by and for the OECD in the late 1990s or those collected in the 2<sup>nd</sup> volume of Gruber and Wise (1999), focus on single country analyzes only, thus omitting the aspect of international comparisons and thereby generally unable to assess the impact of pension generosity on early retirement behavior.

To remedy such shortcomings, in this study we analyze the institutional determinants of early retirement with a unique microdata set covering several European countries. We use data from the 2005 Survey of Health, Ageing and Retirement in Europe (SHARE) which allows us to construct a pseudo-panel exploiting the variation in the interviewees' retirement dates. It is to our best knowledge the first study that assesses the effects of institutional factors on individuals' early retirement decisions in a cross-national way, using microdata that enable us to control for a variety of workers' characteristics.

## 2. Data and Methodology

In this study, we use the 2005 cross-sectional SHARE data from a random sampling of 22,000 persons over 50 years of age in 10 European countries (Austria, Denmark, France, Germany, Greece, Italy, the Netherlands, Spain, Sweden, and Switzerland). Following the OECD (1995), we define retired persons as those that (1) self-assess their employment status as retired and (2) are factually out of the labor force. About half the respondents (10,600 persons) in the SHARE dataset assessed their current job situation as ‘being retired’.

We restrict the analysis to individuals that are *older* than the legal retirement age in their countries in 2004. About 7,000 retirees remain in the dataset, of which approximately 5,000 retired early and 2,000 retired at the legal retirement age. We define an *early retiree* as a retired person who withdrew from the active labor force before the legal age of pension payment eligibility. The SHARE recall data on year of withdrawal allow the calculation of the respondent’s age at the recorded year of retirement, while panel data on the legal retirement ages in the 10 countries from 1960 on was obtained from Blöndal and Scarpetta (1999) and Duval (2003). However, even though retirement decisions took place in different years between the observation period 1967 and 2004, each person is observed only *once*. Thus, the structure of our data gives rise to a European pseudo-panel; a set of repeated, but unbalanced cross-sections of micro-level information on retirement decisions of (presently) retired persons. Restriction of the sample to those beyond the legal retirement age in 2004 implies that the comparison group of the ‘early retirees’ are the ‘regularly retired’.<sup>1</sup>

To investigate the institutional determinants of early retirement, we view the (conditional) probability of early retirement at time  $t$  as a function of (worker’s) personal and job characteristics at the same time, as well as macroeconomic and institutional factors as they existed at that time. The 2005 SHARE data also includes recall information on the respondents’ social and economic situation at the time of (early) retirement, namely gender, marital status, level of education (6 categories), type of employment (4 categories), hierarchical position (6 categories), tenure, and firm size (7 categories). The macroeconomic factors include levels of and changes in unemployment rate and GDP per capita that account for a country’s general economic condition. As institutional factors that describe the generosity of the pension system at the time of

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<sup>1</sup> Non-restriction of the sample would have included the ‘still active in 2004’ in the comparison group, some of which, however, might have retired early but after the year the survey was conducted. For such a sample, a survival analysis would have to be applied.

retirement we employ the ‘average gross replacement rate’ and the ‘decrease in pension wealth accrual’, also called ‘implicit tax rate’ on continued work, obtained from Blöndal and Scarpetta (1999) and Duval (2003), respectively. Thus, our variables of interest do not only vary between countries but also over time and are matched individually by the retirement date. The first variable approximates pension system generosity, while the second (and third) measure(s) the forgone growth in net pension income when continuing working. As all of these pension system indicators are calculated for an average, representative older worker, they reflect the general generosity in a given year rather than being perfectly individual-specific (see Table 1 for descriptive statistics and Table 2 for exact definitions).

*--Insert Tables 1 and 2 about here--*

We estimate a standard Logit model, in which the dependent variable takes on the value ‘1’ if the retired person withdrew early, and ‘0’ otherwise. In some models, country fixed effects take account of time-invariant institutional features that might equally affect one’s decision to retire early, such as engagement possibilities outside the labor force like civic political participation possibilities reflected by the openness of democratic institutions. We include the pension system variables jointly, except the case in which the generosity measures are both by Duval (2003). The latter being correlated with 0.73 in our sample, we also report regressions using one single institutional feature only.<sup>2</sup> We estimate models with time fixed effects and, alternatively, a trend variable or country-specific time trends that allow for heterogeneity in the macroeconomic and institutional development. Clustering at the country-year level ensures that standard errors are corrected for within-group correlation (Moulton 1990).<sup>3</sup>

### **3. Results**

The estimated impacts of pension generosity on the probability of retiring early are depicted in Table 3. Model 1 shows the results of a model that simply pools the data and does not include

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<sup>2</sup> The quite high correlation is due to the fact that replacement rates play a role in calculating the implicit tax.

<sup>3</sup> With merely 10 countries, clustering at the country level was not deemed feasible. The country-year level comprises all individuals with identical retirement year in the same country, amounting to up to 200 clusters.

any fixed effects. All subsequent models include country fixed effects, while model 2 adds time fixed effects, model 3 a linear time trend, and model 4 country-specific time trends.

In all models with two generosity measures simultaneously employed, the inclusion of country and time fixed effects clearly improves the models' fits and significantly alters the effects of the coefficients compared to model 1: in models 2 to 4 both the average replacement rate as well as the decline in wealth accrual increase the probability of retiring early. The lower part of Table 3 corroborates these findings estimating regressions employing one institutional feature only, including the implicit tax rate measure from Duval (2003). This is in line with previous empirical analyses which report a more generous pension system and a higher implicit tax on continued employment to negatively impact labor force participation rates of older persons (e.g. Johnson, 2001, Duval, 2003). In the upper part of Table 3, the similarity of the sizes of the coefficients across models 2 to 4 suggests that *how* the variation over time is treated is not essential for the results.

*--Insert Table 3 about here--*

In order to assess the institutional effects quantitatively, we report in the middle rows of Table 3 the predicted probabilities of early retirement for two time points: in the years 1967 and 2004. Probabilities were calculated at the sample means and the corresponding values for average replacement rate (0.2 in 1967 and 0.44 in 2004) and decrease in wealth accrual (0.86 in 1967 and 2.06 in 2004). Comparing the effects of the institutional settings of 1967 with 2004 allows us to assess the impact of the European pension system policies over the last 30 years. As can be seen, the predicted effect that increased pension generosity and decreased actuarial neutrality has on this probability is substantial: the early retirement inclination increases from approximately 16% in 1967 to 63% in 2004. We find no gender-specific difference. Exclusion of retirees before 1990, who might bias the results due to 'selection' out of the sample caused by health-related attrition, or use of the implicit tax rate measure by Duval (2003), equally reveal increases in early retirement probabilities between 1967 and 2004 by ca. 35 and 50 percentage points, respectively.

## 6. Conclusion

The question of what determines early retirement has grown in importance as industrialized countries grapple with ageing populations and shrinking labor forces. In the face of such changing demographics, early withdrawal of employees and self-employed persons from the active labor force may affect both economic growth and the sustainability of social security systems. Our study is the first *international microdata* analysis that assesses the impact of pension system generosity and neutrality on individual early retirement decisions in 10 European countries between 1967 and 2004. It reveals that differences in pension benefit schemes have a very significant and large impact on the probability of early retirement. The changes in the average replacement rate and decrease in wealth accrual between 1967 and 2004 have caused an increase in the predicted early retirement propensity from approximately 16% in 1967 to 63% in 2004.

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Table 1: Descriptive statistics

	observations	mean	standard deviation	minimum	maximum
Early retirement	4782	0.70	0.46	0	1
Average replacement rate	4782	51.93	25.22	0	80
Decrease in wealth accrual	4782	2.36	2.35	-0.80	7.9
Implicit tax rate	5121	0.44	0.39	-0.05	1.05

Notes: Descriptive statistics based on regression model 1, Table 3.

Table 2: Definition of pension generosity variables

Average replacement rate	Expected gross replacement rate (over the next 5 years) at age 60 in regular retirement pension system, by which the last gross wage is translated into pension benefits. Values are averaged across six different civil status and wage levels (see Duval, 2003). For most countries, values from 1990–1999 and 2003 are available; for some, even earlier time series starting in the late 1960s. Values for 2004 have been replaced by values for 2003. Where applicable, missing values in all countries were replaced by linear interpolation. Data made available by courtesy of Mr. Duval, OECD (Duval, 2003). For Denmark and Greece, this information was unavailable.
Decrease in wealth accrual	Cumulated decrease in pension wealth accruals in year of retirement through postponing retirement from 55 to 65 years of age. Measured in 1967 and 1995 for singles with an average wage (Table III.6, Blöndal and Scarpetta, 1999, p. 65.) For Greece (both years) and for Spain (1967), this information was unavailable. Missing values were replaced by linear interpolation, while from 1995 on, values for the year 1995 were used.
Implicit tax rate	Average implicit tax on continued work for 5 more years (at retirement age of 60) in the old-age pension system. Measured as cumulated decrease in pension wealth accruals in year of retirement. For most countries, values from 1967–1999 are available. Values for 2000-2004 have been replaced by values for 1999. Data made available by courtesy of Mr. Duval, OECD (Duval, 2003). For Denmark and Greece, this information was unavailable.

Table 3: The effect of pension generosity on the probability of early retirement

	1	2	3	4
	pooled			country-specific trends
Average replacement rate	0,004 (1.07)	0.047*** (3.25)	0.042*** (4.83)	0.045*** (3.57)
Decrease in wealth accrual	-0.137*** (3.86)	0.805*** (3.62)	0.925*** (4.75)	0.960* (1.93)
Observations	4782	4711	4782	4782
Pseudo R <sup>2</sup>	0,1585	0,2351	0,2308	0,2433
Wald test (p-value)	0.000	0.000	0.000	0.000
Clusters	204	188	204	204
Country fixed effects	no	yes	yes	yes
Time fixed effects	no	yes	no	no
Trend	no	no	yes	yes
Predicted early retirement probability				
Full Sample				
- 1967	76%	18%	18%	16%
- 2004	75%	64%	64%	63%
Women Only				
- 1967	79%	25%	15%	14%
- 2004	75%	69%	68%	67%
Retirement after 1990				
Average replacement rate	-.003 (0.92)	.067** (2.78)	.094*** (3.80)	.062+ (1.62)
Decrease in wealth accrual	-.031 (0.93)	1.120 (1.28)	2.054*** (3.51)	1.127+ (1.37)
- 1967 (out of sample)	69%	3%	0%	4%
- 2004	66%	39%	24%	40%
Alternative specifications: single institutions regressions				
Average replacement rate	-0.001 (0.33)	0.016 (1.62)	0.042*** (4.83)	0.045*** (3.57)
Decrease in wealth accrual	-0.110*** (3.72)	0.227 (1.46)	0.535** (2.99)	1.196** (2.39)
Implicit tax rate	-0.221 (1.26)	-0.003 (0.00)	0.780*** (4.01)	3.312*** (3.67)
- 1967 (min = 0)	76%	75.75%	60%	44%
- 2004 (max = 0.98)	72%	75.69%	68%	93%

Note: \*\*\*, \*\*, \* significant at the 1%, 5% and 10%-levels, respectively. + indicates jointly significant at least at the 5 percent level. Z-statistics in parentheses obtain through clustering at the country-year level. All models include changes and levels of GDP, changes and levels of unemployment rates, gender, marital status ('married'), level of education (6 categories), type of employment (4 categories), hierarchical position (6 categories), tenure and firm size (7 categories). Included countries: Austria, Denmark, France, Germany, Greece, Italy, the Netherlands, Spain, Sweden, and Switzerland