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How did European retirees respond to the COVID-19 pandemic?

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Abstract

We investigate the role of retirement on the adoption of preventive behaviours and on mental health during the first wave of the pandemic. We address the endogeneity of the timing of retirement using variation in early retirement and old-age pension eligibility. We find that those who retired earlier responded to the pandemic by limiting their mobility more, and by adopting stricter preventive behaviours in public. These limitations did not hamper their mental health.

Keywords: COVID-19, retirement, SHARE.

JEL codes: I12, J14, J26.

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1. Introduction

We investigate the role of retirement on the adoption of preventive behaviours and on mental health during the first wave of the COVID-19 pandemic.

Compared to workers of similar age, retirees can isolate themselves better because they do not need to leave their home for work-related purposes. Retirees may also become warier of health risks: several papers (see e.g. Celidoni et al., 2017, Heller-Sahlgren, 2017, Mazzona and Peracchi, 2017, and Bertoni et al., 2018) have used country-specific, time-varying public pension eligibility rules to estimate a negative causal effect of early retirement on physical and mental health at later ages.

We use data from the Survey of Health Ageing and Retirement in Europe (SHARE) to assess if subjects who retired earlier were more likely to limit mobility and to adopt preventive behaviours in public for any given age. We find that this is the case. We also assess whether this higher degree of social isolation made them suffer from worse mental health due to the pandemic, but find limited evidence of this.

2. Data

2.1. Data sources and sample selection

We draw our data from SHARE, a longitudinal dataset that collects face-to-face harmonized information about health and socio-economic status of community-dwelling Europeans and Israelis aged 50+. In March 2020, due to the outbreak of COVID-19, the planned data collection for the eighth wave was suspended in all participating countries and in June-July 2020 a new telephone administered survey collected data on the health-related and socio-economic impact of COVID-19 among elderly individuals.

We combine data from the SHARE Corona Survey with the information from previous SHARE waves on socio-demographic characteristics, health status and employment histories, as well as country and time-specific eligibility rules for early retirement and old-age pensions. We focus on individuals residing in 19 countries that took part in the SHARE Corona Survey and for whom we were able to reconstruct information on pension eligibility ages. Our final sample includes 31,882 individuals aged between 55 and 90. We start at 55 because all individuals aged below 55 in our data are not eligible to retire, and stop at 90 to avoid severe survival bias. Our reconstruction of pension eligibility rules concerns the evolution of early retirement as well as old-age pension eligibility ages over the last four decades. Details are in the Appendix.

Appendix Table A.1 reports descriptive statistics for the full sample and separately for individuals below and above age 67. While up to age 66 we observe variation in pension eligibility status conditional on age, from age 67 onwards everyone is eligible to retire, but there is considerable heterogeneity in time since retirement eligibility for any given age. As a result, we focus on the former sub-sample to study the short-term effects of retirement status, and on the latter to estimate the long-term effects of the time spent in retirement given age.

2.2. Measuring preventive behaviours and mental health

The following questions in the SHARE Corona questionnaire investigate preventive behaviours during the pandemic:

1. Have you ever left home during the outbreak?

If respondents answer positively, a series of follow-up questions investigate how often they carried out the following activities:

2. Going shopping;
3. Going out for a walk;
4. Meeting more than 5 people outside the household;
5. Visiting other family member;
6. Wearing a face mask in public;
7. Keeping distance from others in public.

In analysing the data, we recode questions 2-7 in such a way that "never left home" appears as an independent answer option, and discard question 1. Respondents also report whether they:

8. Washed hands more than usual;
9. Used hand sanitizer more than usual;
10. Covered coughs and sneezes more than usual.

We reduce the dimensionality of the data by applying principal component analysis (PCA). Since answers were on discrete or ordinal scales, we use polychoric PCA. PCA is carried out separately in each sub-sample, but results are consistent. Two components have eigenvalues larger than one and explain roughly 70 percent of the total variance. Questions 2-7 load on the first principal component, while questions 8-10 load on the second one.

Mental health is assessed by asking respondents whether they:

1. Felt nervous, anxious, or on edge in the last month;

2. Felt sad or depressed in the last month;
3. Had trouble sleeping recently;
4. Felt lonely.

In case of a positive answer, the respondent reported if the problem was more so, less so, or about the same as before the outbreak of COVID-19. We applied PCA and obtained a single component with eigenvalue above 1 that explains 65 percent of the total variance. For both preventive behaviours and mental health, we standardize the resulting scores to have zero mean and unit standard deviation (SD) in each sub-sample. The signs of the scores are such that a higher value indicates higher adoption of preventive behaviours and worse mental health. Descriptive statistics for each item are reported in Appendix Tables A.2 and A.3.

3. Empirical strategy

We first focus on the sub-sample of individuals aged 55-66, for whom we observe variation in retirement eligibility conditional on age, and estimate the effect of retirement status on the adoption of preventive behaviours and mental health using the following linear model:

$$Y_i = \alpha + \beta\, Retired_i + \gamma Age_i + X_i'\delta + v_i \qquad (1)$$

In Equation (1), Y_i is a vector of outcome variables that includes the two prevention scores and the mental health score as described; $Retired_i$ is a dummy variable equal to 1 if the individual reports being retired from work, and 0 otherwise. Age_i is a linear age trend; vector X_i includes the following set of additional controls: gender, marital status, education level dummies, number of limitations in (instrumental) daily activities and dummies for the wave when these were recorded (they are pre-determined). We also include country dummies, month of interview dummies and country-specific linear trends in the month of interview. Finally, v_i is an error term.

Since retirement status depends on individual health and preference for leisure, we instrument it with two dummies measuring individual eligibility for early retirement and old-age pension. Retirement rules vary both across countries for a given age and within countries across ages and reflect pension reforms that took place over the last four decades across most European countries. Considering that pension eligibility rules vary by country, cohort and gender, we cluster standard errors at this level.

In the second part of our analysis, we focus on the sub-sample of individuals aged 67+, for whom we observe no variation in retirement eligibility (everyone is eligible to retire) but large variability in the number of years since pension eligibility. We exploit this variation to estimate the long-term effects of time since retirement on preventive behaviours and mental health conditional on age using the following linear model

$$Y_i = \alpha + \beta\, YearsInRetirement_i + \gamma Age_i + X_i'\delta + v_i \qquad (2)$$

Equation (2) is analogous to Equation (1), but we condition on years in retirement instead of retirement status, and instrument it using years since eligibility for early retirement and old-age pension.

In both equations (1) and (2) age enters as a linear trend. This helps us to benchmark the effects of (years in) retirement against those of age. However, estimation results are robust to including age dummies and country-specific age trends (see Appendix Table A.4).

3. Results

Table 1 reports the estimated effects of age and retirement on the outcomes.

We report OLS and TSLS estimates in odd and even columns, respectively. For TSLS estimates, we also report the p-values of the Hausman and Hansen tests as well as the Kleibergen-Paap first-stage F-statistic.

OLS results in Column (1) show that – compared to same-aged respondents still in the labour force – retirees more likely refrained from going out and adopted preventive measures when in public spaces (prevention score 1). This result is confirmed by the TSLS estimates in Column (2) and is most likely driven by retirees' not needing to leave home for work-related purposes. The effect is also large in magnitude, and equal to roughly 0.2-0.4 SD of the outcome. Columns (3) and (4) show that, consistent with their higher degree of isolation, retirees were less likely to adopt further preventive behaviours such as washing hands, using sanitizer or covering while coughing (prevention score 2). This effect is however small in magnitude, and insignificant with TSLS. Finally, while OLS reveals a positive association between retirement and mental health issues – see Column (5) – the relationship is negative and insignificant in Column (6) when we address the endogeneity of retirement using TSLS. We conclude that the consequences of retirement on mental health during the first wave of the pandemic were immaterial.In Table 2 we focus on respondents past retirement eligibility and verify whether, conditional on age, those who retired earlier behaved differently during the pandemic. Results are comparable to the ones for individuals below retirement eligibility: early retirees reacted by limiting their mobility and adopting preventive behaviours in public. On average, the adoption of behaviours summarised by the prevention score 1 increases by 0.2 SD every 10 years of age. The effect is 50% larger for retirees, suggesting that early retirement accelerates the take-up of preventive behaviours that comes with age. Mental health was instead not much affected by the pandemic, despite the adoption of these behaviours.

4. Conclusions

The reaction of European retirees to the first wave of the pandemic was to limit mobility and adopt preventive behaviours. Our key finding is that age has a strong, positive effect on such behaviours and an extra year in retirement increases by 50% the effect of age. For senior individuals, we find that age has an important effect on mental health, but years in retirement does not.

References

Bertoni, M., Maggi, S., and Weber G., 2018. "Work, Retirement and Muscle Strength Loss in Old Age", *Health Economics*, 27, 115-128.

Celidoni, M., Dal Bianco, C., and Weber, G., 2017. "Retirement and cognitive decline: A longitudinal analysis using SHARE data", *Journal of Health Economics*, 56, 113-125.

Heller-Sahlgren, G., 2017. "Retirement blues" *Journal of Health Economics*, 54, 66-78.

Mazzona, F., and Peracchi, F., 2017. "Unhealthy Retirement?" *Journal of Human Resources*, 52, 128-151.

Börsch-Supan, A., M. Brandt, C. Hunkler, T. Kneip, J. Korbmacher, F. Malter, B. Schaan, S. Stuck, S. Zuber (2013). Data Resource Profile: The Survey of Health, Ageing and Retirement in Europe (SHARE). International Journal of Epidemiology. DOI: 10.1093/ije/dyt088

Börsch-Supan, A. (2020). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 1. Release version: 7.1.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w1.710

Börsch-Supan, A. (2020). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 2. Release version: 7.1.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w2.710

Börsch-Supan, A. (2020). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 3 – SHARELIFE. Release version: 7.1.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w3.710

Börsch-Supan, A. (2020). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 4. Release version: 7.1.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w4.710

Börsch-Supan, A. (2020). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 5. Release version: 7.1.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w5.710

Börsch-Supan, A. (2020). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 6. Release version: 7.1.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w6.710

Börsch-Supan, A. (2020). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 7. Release version: 7.1.1. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w7.711

Börsch-Supan, A. (2020). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 8. COVID-19 Survey 1. Release version: 0.0.1. beta. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w8cabeta.001

Tables

Table 1. The effects of retirement status on prevention and mental health.

	(1)	(2)	(3)	(4)	(5)	(6)
	Prevention score 1		Prevention score 2		Mental health score	
	OLS	TSLS	OLS	TSLS	OLS	TSLS
Retired	0.193***	0.377***	-0.110***	-0.082	0.053*	-0.027
	(0.025)	(0.098)	(0.027)	(0.099)	(0.028)	(0.104)
Age/10	0.135***	-0.011	-0.063*	-0.085	-0.058	0.006
	(0.037)	(0.085)	(0.036)	(0.085)	(0.041)	(0.089)
Hausman test (p-value)		0.044		0.722		0.473
Hansen test (p-value)		0.969		0.184		0.473
First stage F statistic		60.9		60.9		60.9

Notes: Observations: 9,669. Each model includes the set of additional controls described in the text. For TSLS models, retirement status is instrumented with eligibility for early retirement and old-age pension. Standard errors clustered by country, gender and year of birth are reported in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table 2. The effects of years in retirement on prevention and mental health.

	(1)	(2)	(3)	(4)	(5)	(6)
	Prevention score 1		Prevention score 2		Mental health score	
	OLS	TSLS	OLS	TSLS	OLS	TSLS
Years in retirement/10	0.072***	0.121***	0.016	-0.004	0.038***	-0.012
	(0.012)	(0.027)	(0.012)	(0.030)	(0.013)	(0.029)
Age/10	0.255***	0.207***	-0.193***	-0.172***	0.057***	0.107***
	(0.017)	(0.029)	(0.017)	(0.032)	(0.017)	(0.031)
Hausman test (p-value)		0.02		0.55		0.09
Hansen test (p-value)		0.14		0.17		0.10
First stage F statistic		440.4		440.4		440.4

Notes: Observations: 22,213. Each model includes the set of additional controls described in the text. For TSLS models, years in retirement is instrumented with years since eligibility for early retirement and old-age pension. Standard errors clustered by country, gender and year of birth are reported in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Online Appendix: "How did European retirees respond to the COVID-19 pandemic?"

A. Additional tables

Table A.1. Descriptive statistics

Variable	Age range: 55-90, Observations: 31,882		55-66, 9,669		67-90, 22,213	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Retired	0.796	0.404	0.384	0.486	0.974	0.160
Years in retirement	11.27	9.47	2.57	4.94	15.06	8.41
Eligible for early retirement	0.902	0.297	0.678	0.467	1	0
Eligible for old-age pension	0.796	0.403	0.328	0.470	1	0
Years since early retirement eligibility	12.71	0.10	2.73	3.06	17.06	7.24
Years since old-age pension eligibility	9.33	8.450	0.67	1.52	13.10	7.39
Age	71.40	8.33	61.67	3.13	75.63	6.02
Female	0.542	0.498	0.567	0.496	0.532	0.499
In a couple	0.691	0.833	0.782	0.413	0.652	0.476
ISCED level	3.048	1.460	3.397	1.333	2.896	1.489
# ADL	0.159	0.656	0.076	0.428	0.196	0.730
# IADL	0.307	1.059	0.108	0.538	0.394	1.208

Table A.2. Descriptive statistics. Preventive behaviours.

Question	Description	Mean % (age <67)	Mean % (age>=67)
1	Ever left home	93.31	79.45
2	If left home: Going shopping (*not any more or less often)*	64.42	71.42
3	If left home: Going out for a walk (*not any more or less often)*	38.52	45.92
4	If left home: Meeting more than 5 people (*not any more or less often)*	84.77	90.80
5	If left home: Visiting other family members (*not any more or less often)*	81.76	86.10
6	If left home: Wearing a face mask in public	56.45	58.06
7	If left home: Keeping distance from others in public	75.69	77.98
8	Washed hands more than usual (*always*)	91.06	88.12
9	Used hand sanitizer more than usual (*always*)	89.73	81.37
10	Covered coughs and sneezes more than usual (*always*)	90.05	82.58

Notes: question numbering corresponds to the description provided in section 2.2.

Table A.3. Descriptive statistics. Mental health.

Question	Description	Mean % (age <67)	Mean % (age>=67)
1	Felt nervous, anxious, or on edge in the last month	27.99	29.06
	If yes: More so as before the outbreak of COVID-19	78.94	70.65
2	Felt sad or depressed in the last month	21.69	26.19
	If yes: More so as before the outbreak of COVID-19	70.10	62.38
3	Had trouble sleeping recently	23.61	28.38
	If yes: More so as before the outbreak of COVID-19	33.68	26.08
4	Felt lonely (*often* or *some of the time*)	21.09	29.96
	If often or some of the time: More so as before the outbreak of COVID-19	42.72	42.35

Notes: question numbering corresponds to the description provided in section 2.2.

Table A.4. The effects of retirement status and years in retirement on prevention and mental health controlling for age dummies and country-specific linear age trends.

	(1)	(2)	(3)	(4)	(5)	(6)
	Prevention score 1		Prevention score 2		Mental health score	
	OLS	TSLS	OLS	TSLS	OLS	TSLS
Panel A.						
Retired	0.200***	0.360***	-0.112***	-0.185	0.062**	0.063
	(0.026)	(0.112)	(0.028)	(0.125)	(0.028)	(0.124)
Panel B.						
Years in retirement/10	0.075***	0.095***	0.014	-0.007	0.038***	-0.035
	(0.012)	(0.023)	(0.012)	(0.026)	(0.013)	(0.028)

Notes: see Tables 1 and 2 in the main text. The estimates in Panel A (B) replicate the ones in Table 1 (2) after replacing linear age trends with age dummies and country-specific linear age trends.

B. Early and old-age retirement eligibility criteria

The initial sources of information about early and old-age retirement eligibility criteria are Gruber and Wise (1999 and 2010), Wise (2012), the Mutual Information System on Social Protection (MISSOC) database[1] and Social Security Administration (SSA) data on 'Social Security Programs throughout the World'.[2] Other country-specific auxiliary data sources are reported below. ER = early retirement. OA = old-age retirement.

When an early retirement option is not available, we set early retirement eligibility criteria equal to old-age eligibility criteria.

[1] https://www.missoc.org/missoc-database/comparative-tables/.
[2] https://www.ssa.gov/policy/docs/progdesc/ssptw/.

Belgium – see Jousten et al. (2010)

ER: No early retirement until 1966. For men, 60 afterwards; for women, 55 until 1987 and 60 from 1987. For both men and women, 61 in 2014, 62 in 2016.

OA: 65 for men; for women, 60 until 1997, 61 from 1997 to 1999, 62 from 2000 to 2002, 63 from 2003 to 2005, 64 from 2006 to 2008, and 65 from 2009.

Croatia

ER: No early pension before 2002. From 2002, 57 for men and 52 for women. From 2004, 58 for men and 53 for women. From 2006, 59 for men and 54 for women. From 2008, 60 for men and 55 for women. From 2014 56 for women.

OA: 60 for men and 55 for women until 2001. From 2002, 62 for men and 57 for women. From 2004, 63 for men and 58 for women. From 2006, 64 for men and 59 for women. From 2008, 65 for men and 60 for women. From 2014, 61 for women. From 2018, 62 for women.

Czech Republic

ER: Early retirement is possible up to two years before normal retirement age.

OA: For men 60 from 1961 to 2002, 61 from 2003 to 2008, 62 from 2009 to 2015, 63 from 2016. For women, old-age retirement depends on the number of children:

	0 child	1 child	2 children	3/4 children	5+ children
Up to 1999	55	55	55	55	55
From 2000 to 2002	56	56	56	56	56
From 2003 to 2006	59	58	57	56	55
From 2007 to 2011	60	59	58	57	56
From 2012 to 2014	61	60	59	58	57
From 2015 to 2018	62	61	60	59	58
From 2019 onwards	63	62	61	60	59

Denmark – see Bingley, Datta Gupta and Pedersen (2010)

ER: 60 for both men and women.

OA: 67 until 2004, 65 from 2004, 66 from 2020 – for both men and women.

Estonia – Schmähl and Horstmann (2002)

ER: 60 for men and 55 for women until 2003. From 2004, early retirement age increased gradually for women: 56 from 2004, 57 from 2007, 58 from 2010, 59 from 2013, and 60 from 2016.

OA: 63 for men; for women, 58 before 2004, 59 from 2004 to 2007, 60 in 2008 and 2009, 61 from 2010, 62 from 2013, and 63 from 2016.

France – see Hamblin (2013)
ER: No early retirement until 1963. 60 from 1963 to 1980; 55 from 1981.
OA: 65 until 1983 and 60 from 1983 to 2010; from 2011, 60 for those born up to 1952, 61 for those born between 1953 and 1954, and 62 for those born since 1955.

Germany – see Berkel and Börsch-Supan (2004), Mazzonna and Peracchi (2014) and DRV (2015)
ER: For men, no early retirement until 1973, 60 from 1973 until 2005, and 63 from 2006. For women, no early retirement until 1962, 60 from 1962.
OA: 65 for all until 2012; 67 from 2012.

Greece
ER: 60 for both men and women until 2012, 62 from 2013.
OA: For women, 60 until 2012, 65 in 2013, and 67 from 2014. For men, 65 until 2012 and 67 from 2013 onwards.

Hungary
ER: For men, 60 for those born before 1938 and 61 for those born in 1938 or later; 62 from 2015. For women, 55 until 2003, 57 from 2004, 59 from 2010 and 62 from 2012.
OA: 60 for men and 55 for women until 1990. 62 for men and women from 1991, and 65 from 2016 with a gradual increase for specific cohorts (63 for those born in 1953 and 1954, 64 for those born in 1955 and 1956)

Italy – see Angelini, Brugiavini and Weber (2009) and Mazzonna and Peracchi (2014)
ER: From 1965 to 1995, early retirement was possible at any age with 35 years of contributions3 (25 in the public sector) for both men and women; from 1996, it was stepwise increased up to age 60 for both the private and public sectors (61 for the self-employed). From 2012, it is 62 for both men and women.
OA: The old-age retirement was 60 (65 in the public sector) for men and 55 (60 in the public sector) for women from 1965 to 1993. Several consecutive reforms (1992, 1995 and 1998) increased the old-age retirement to 65 for men and 60 for women, with stepwise increments from 1994. The old-age retirement was 66 from 2012 and 67 from 2019 for men; for women, it was 65 in 2012, 66 from 2013 (there is the possibility to retire at 62 from 2012, 63 from 2013, 65 from 2016 and 66 from 2018 in

[3] We use work experience to define eligibility.

the private sector and at 63 from 2012, 64 from 2013 and 66 from 2018 for the self-employed). The old-age retirement is 67 for both men and women from 2019.

Israel

ER: No early retirement.

OA: 65 for men and 60 for woman up to 2004. From 2005 to 2009, 66 for men and 61 for women. 67 for men and 62 for women from 2009 onwards.

Luxemburg

ER: For both men and women, 65 as OA up to 1992. 57 for men from 1993 onwards. 60 for women from 1993 onwards.

OA: 65 for both men and women.

Netherlands – see Euwals, van Vuuren and Wolthoff (2010)

ER: No early retirement until 1975. 60 from 1975, for both men and women.

OA: 65 for both men and women until 2017 and 66 from 2018.

Poland

ER: 60 for women and 65 for men.

OA: 55 for women and 60 for men.

Portugal – Albuquerque et al (2019)

ER: No early pension before 1999. For both men and women, 55 since 2011, 57 from 2012, 55 from 2015, and 60 from 2017.

OA: 65 for men. For women, 62 until 1993, 63 from 1993 to 1995, 64 from 1996, 65 from 1999. For both men and women, 66 from 2012.

Slovenia – see OECD, 2013; Polanec et al, 2013; Guardiancich, 2010; Ahcan and Polanec, 2008; Majacen and Verbič, 2008; Mrak et al., 2004.

ER: Before 1993, no early retirement. For men: 58 from 1993 to 2014,59 from 2015, and 60 from 2018. For women: 53 from 1993 to 2001, 54 from 2002 to 2004, 55 from 2005 to 2007, 56 from 2008 to 2010, 57 in 2011 and 2013, 58 in 2014 and 2015, 59 from 2016, 60 from 2019.

OA: Before 1993, 55 for men 53 for women (40/38 years of contribution and no age requirements, we assume they start working at age 15). From 1993, 65 for men. For women, 61 from 1993 to 2004; 62 from 2005 to 2007; 63 from 2008 to 2013; 65 from 2014 onwards.

Spain – see Blanco (2000) and Mazzonna and Peracchi (2014)
ER: 64 until 1982, 60 from 1983 to 1993, and 61 from 1994 – for both men and women.
OA: 65 for both men and women.

Sweden – see Mazzonna and Peracchi (2014)
ER: No early retirement until 1963. 60 from 1963 to 1997; 61 from 1998.
OA: 67 for both men and women until 1995; 65 from 1995.

Switzerland – see Dorn and Sousa-Poza (2003) and Mazzonna and Peracchi (2014)
ER: No early retirement until 1997 for men and until 2001 for women. Then, 64 for men from 1997 to 2000 and 63 from 2001; 62 for women from 2001.
OA: 65 for men; for women, 63 until 1964, 62 from 1964 to 2000, 63 from 2001 to 2004, and 64 from 2005.

References for pension reforms

Albuquerque,P., Arcanjo, M. and V. Escária (2009) "Early Retirement in Portugal" ISEG School of Economics and Management WP 39/2009/DE/SOCIUS

Ahčan, A. and Polanec, S. (2008), 'Social security and retirement during transition: microeconometric evidence from Slovenia', European Network of Economic Policy Research Institutes (ENEPRI), Research Report no. 58.

Angelini, V., Brugiavini, A. and Weber, G. (2009), 'Ageing and unused capacity in Europe: is there an early retirement trap?', *Economic Policy*, vol. 24, pp. 463–508.

Berkel, B. and Börsch-Supan, A. (2004), 'Pension reforms in Germany: the impact on retirement decisions', Munich Center for the Economics of Aging (MEA), Discussion Paper no. 62-2004.

Bingley, P., Datta Gupta, N. and Pedersen, P. J. (2010), 'Social security, retirement and employment of the young in Denmark', in J. Gruber and D. Wise (eds), *Social Security Programs and Retirement around the World: The Relationship to Youth Employment*, Chicago, IL: University of Chicago.

Blanco, A. (2000), 'The decision of early retirement in Spain', Fundación de Estudios de Economía Aplicada (FEDEA), Working Paper no. 76.

Dorn, D. and Sousa-Poza, A. (2003), 'Why is the employment rate of older Swiss so high? An analysis of the social security system', *Geneva Papers on Risk and Insurance*, vol. 28, pp. 652–72.

DRV (2015), Die richtige Altersrente für Sie, http://www.deutsche-rentenversicherung.de/Allgemein/de/Inhalt/5_Services/03_broschueren_und_mehr/01_broschueren/01_national/die_richtige_altersrente_fuer_sie.pdf?__blob=publicationFile&v=18; last accessed on 25 January 2015.

Euwals, R., van Vuuren, D. and Wolthoff, R. (2010), 'Early retirement behaviour in the Netherlands: evidence from a policy reform', *De Economist*, vol. 158, pp. 209–36.

Gruber, J. and Wise, D. (1999), *Social Security and Retirement around the World*, Chicago, IL: National Bureau of Economic Research (NBER) / University of Chicago Press.

Gruber, J. and Wise, D. (2010), *Social Security Programs and Retirement around the World: The Relationship to Youth Employment*, Chicago, IL: National Bureau of Economic Research (NBER) / University of Chicago Press.

Guardiancich, I. (2010), 'Slovenia – current pension system: first assessment of reform outcomes and output', European Social Security Observatory,http://www.ose.be/files/publication/2010/country_reports_pension/OSE_2010_CRpension_Slovenia.pdf; last accessed on 29 January 2019.

Hamblin, K. A. (2013), *Active Ageing in the European Union: Policy Convergence and Divergence*, London: Palgrave Macmillan.

Jousten, A., Lefèbvre, M., Perelman, S. and Pestieau, P. (2010), 'The effects of early retirement on youth unemployment: the case of Belgium', in J. Gruber and D. Wise (eds), *Social Security Programs and Retirement around the World: The Relationship to Youth Employment*, Chicago, IL: University of Chicago Press.

Majcen, B. and Verbič, M. (2008), 'The Slovenian pension system in the context of upcoming demographic developments', in R. Hozmann, L. MacKellar and J. Repansek (eds), *Pension Reform in South-Eastern Europe: Linking to Labor and Financial Market Reforms*, Washington DC: World Bank.

Mazzonna, F. and Peracchi, F. (2014), 'Unhealthy retirement?', Einaudi Institute for Economics and Finance (EIEF), Working Paper no. 09/14.

Mrak, M., Rojec, M. and Silva-Jauregui, C. (eds) (2004), *Slovenia: From Yugoslavia to the European Union (English)*, World Bank, http://documents.worldbank.org/curated/en/197621468776951986/Slovenia-from-Yugoslavia-to-the-European-Union; last accessed on 29 January 2019.

OECD (2013), 'Slovenia', in *Pensions at a Glance 2013: OECD and G20 Indicators*, Paris: OECD Publishing.

Polanec, S., Ahčan, A. and Verbič, M. (2013), 'Retirement decisions in transition: microeconometric evidence from Slovenia', *Post-Communist Economies*, vol. 25, pp. 99–118.

Schmähl, W. and Horstmann, S. (2002), *Transformation of Pension Systems in Central and Eastern Europe*, Edward Elgar.

Wise, D. (2012), *Social Security Programs and Retirement around the World: Historical Trends in Mortality and Health, Employment, and Disability Insurance Participation and Reforms*, Chicago, IL: National Bureau of Economic Research (NBER) / University of Chicago Press.