

How sensitive are subjective retirement expectations to increases in the statutory retirement age?

The German case

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Abstract. The progressive aging of the population poses an evident threat to the financial sustainability of pension systems based on a “pay-as-you-go” (PAYG) scheme. To cope with this threat, pension systems have undergone in many countries numerous reforms aimed at keeping people longer at work by increasing the statutory retirement age at which workers are legally allowed to retire. In terms of the effectiveness of such type of reforms, many questions still remain unanswered: Will people really work longer? Who is more likely to leave before the new legal retirement age?

In this paper, we focus on subjective retirement expectations, analysing if and to what extent they are affected by such policy changes. We consider the legislative reform introduced in Germany in 2007, which gradually increases the legal retirement age (LRA) from 65 to 67 years. Using the SAVE survey, a representative panel of German households, we first estimate how the probability to retire before, at or after the legal retirement age has changed over time; in a second step we estimate by how much the individuals’ expected retirement age (ERA) has increased as an effect of the reform.

Preliminary results show that less productive workers living in relatively wealthier households are more likely to plan an early retirement. If the introduction of the reform managed to keep better educated workers longer in the labour force, it did not completely succeed in keeping women longer in the labour force: especially among the younger cohorts, whose LRA is now 67 years, women are still more likely than men to plan an early retirement. In terms of the magnitude of the effect, we find that the reform shifted the expectations of the younger cohorts by almost two years: to this respect, therefore, the reform appears to have been quite successful.

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1. Introduction

Population ageing is one of the most relevant demographic phenomena affecting many countries in the world. The combination of low fertility rates and substantial gains in life expectancy – particularly at older ages – implies a substantial increase in the ratio of people aged 65 years and above to those in working age (15 to 64 years) over the next decades. In addition, many countries experienced a so-called baby boom in the 1950s and 1960s, followed by a so-called baby bust thereafter so that untypically large cohorts are followed directly by untypically small cohorts, worsening the ratio even further once the baby-boom cohorts reach age 65+. Such an outlook poses an evident threat to the financial sustainability of pension systems based on a “pay-as-you-go” (PAYG) scheme. To cope with this threat, pension systems have undergone numerous reforms in most industrialized countries over the past two decades. One of the aims of these reforms has been to keep people longer at work by increasing the statutory retirement age at which workers are legally allowed to retire and closing existing early retirement windows.

However, in terms of the effectiveness of such type of reforms, many questions still remain unanswered: Will people really work longer? By how much? Who is going to stay in the labour market and who is more likely to leave before the new legal retirement age? Are individuals saving enough to finance an early departure from the labour force that allows them to substitute smaller public pensions by additional private pension income?

To answer such questions it becomes extremely important to understand how individuals form their retirement plans and which factors affect their decisions. In this paper, we focus on subjective retirement expectations, analysing if and to what extent they are affected by such policy changes. At least two reasons motivate our work: first, if public policies aimed at altering retirement patterns are to be successful, they have to operate in the first instance by altering workers' expectations concerning the tradeoffs associated with retirement. To see if this is the case, we need to better understand the process by which workers formulate and alter their retirement expectations. Second, long term decisions, and in particular saving and investment decisions, are based on expectations about the future: among them, retirement expectations are likely to play a prominent role, so that understanding how public policies affect them is quite important for understanding saving behaviour and wealth accumulation. Furthermore, many studies have found that retirement expectations are pretty accurate in terms of their relations to the outcome (see e.g. Bernheim (1988, 1989); Dwyer and Hu (1999); Disney and Tanner (1999); Haider and Stephens (2007)) and they pass different forms of rationality tests (see e.g. Bernheim (1989), Benítez-Silva and Dwyer (2002, 2005)): an analysis of the effect of public policies on

retirement expectations thus offers a reliable look at the future behaviour of the cohorts affected by the reform.

To identify the effect of an increase in the legal retirement age (LRA) on subjective retirement expectations we consider the legislative reform introduced in Germany in 2007, which will gradually increase the LRA of employees (but not that of other professional groups such as civil servants and self-employed) from 65 to 67 years from 2012 on. Given the slow phasing in of the reform, different cohorts are affected differently by the reform, with some of the cohorts not being affected at all. These features offer therefore a nice quasi-experimental setting to properly single out the effect of the policy on expectations.

Using the SAVE survey, a representative panel of German households with a specific focus on saving and investment choices, we first estimate how the probability to retire before, at or after the legal retirement age has changed over time; in a second step we estimate by how much the individuals' expected retirement age (ERA) has increased as an effect of the reform.

The paper is structured as follows. Section 2 gives a short historical overview of the main reforms to the German pension system, with a special focus on the reform implemented in 2007; section 3 presents the data used for the analysis; section 4 deals with the question of who plans an early retirement and who rather plans to work longer than the LRA, while section 5 assesses the magnitude of the adjustment in the ERAs as an effect of the reform 2007. Section 6, finally, concludes.

2. The German pension system and the reform 2007

The German pension system was the first formal pension system in the world, designed by Bismarck nearly 120 years ago. It has been very successful in providing a high and reliable level of retirement income in the past at reasonable contribution rates, becoming a model for many social security systems worldwide. While the generosity of the German public pension system is considered a great social achievement, negative incentive effects of past reforms in the 1970s and 1980s and population aging are threatening the very core of the pension system. These have led to fundamental pension reforms since 1992.

Although the first reform in 1992 represented a first big step, it became soon clear that it was too little and too late to put the German pension system on a stable and sustainable path. After a failed attempt in 1998 to further reform the system a major set of reforms (commonly known as the "Riester-reform" after the name of the secretary of labor, Walter Riester, who successfully managed to pass the bill) was introduced.

The Riester reform, however, had been based on overly optimistic assumptions, so that in December 2002, the government therefore established a 'Commission on the Financial Sustainability of the Social Security Systems'. In its reform proposal in August 2003, the commission proposed first further cuts in pension levels by introducing a '*sustainability factor*' into the benefit indexation formula and as a second measure, an increase in the normal LRA from 65 to 67. The first proposition was legislated in 2004, while the second with some delay in spring 2007.

The law indicated a gradual implementation of the new LRA, with the increases starting in 2012 and ending in 2030. Between 2012 and 2029, the LRA is adjusted first each year by one month from age 65 to 66, and then each year by two months from age 66 to 67. The phase-in is cohort-oriented, it will affect cohorts younger than 1947; for the 1964 and younger cohorts a statutory retirement age of 67 finally applies. In addition, eligibility ages for disability pensions were raised from age 63 to 65 from 2017 to 2029 for handicapped persons, while early retirement with deductions was raised from age 60 to 62.

Some exceptions to these new rules were also contemplated in the 2007 reform. For long-time insured workers, disability pensions can still be received at age 63 without deductions if workers have at least 35 service years (until 2023) or 40 years (from 2024 on). Furthermore, since there were additional worries about the coverage for workers subject to extreme physical wear and tear due to long years of hard work, a new pension type was introduced making it possible for workers with a service life of at least 45 years to retire two years earlier without any actuarial adjustments.¹ Table 1 gives an overview of the new LRAs for the different birth cohorts.

¹ For a detailed overview of this and of the past reforms to the German pension system, see Wilke (2009).

Birth year	Legal Retirement Age (years/months)	Legal Retirement Age for very long-time insured workers
1945	65	65
1946	65	65
1947	65/1	65
1948	65/2	65
1949	65/3	65
1950	65/4	65
1951	65/5	65
1952	65/6	65
1953	65/7	65
1954	65/8	65
1955	65/9	65
1956	65/10	65
1957	65/11	65
1958	66	65
1959	66/2	65
1960	66/4	65
1961	66,6	65
1962	66/8	65
1963	66/10	65
1964	67	65

Table 1: LRA by birth cohort

3. The data

The analysis in this paper is based on SAVE (Sparen und Altersvorsorge in Deutschland); a longitudinal dataset started in 2001 and focused on households' saving and asset choices. The panel consists of about 3,000 households, which, since 2005, are surveyed every year: the waves from 2005 to 2009 are used in the present work. The interview is conducted with the individual who knows best about the household's financial situation, and the questions focus on the respondent and its spouse.²

This dataset is particularly well-suited for the purposes of the current study: the SAVE survey, in fact, not only collects extensive factual information on all the aspects of the household's balance sheet; it also offers information on actual health conditions and on relevant social and psychological aspects of the households, which are extremely important to understand the saving behaviour in the light of the most recent theoretical models proposed by behavioural economists. In particular, interviewees who are not yet retired have to answer the following question: “*At which age do you expect to go into retirement or respectively to draw retirement benefits?*”. The same question is asked also with respect to the respondent's partner, as long as he or she is not retired: it has to be stressed here, that is the reference person who is reporting the

² See Börsch-Supan et al. (2008b) for a detailed description of the dataset. Essig (2005) and Schunk (2006) provide further technical details.

expected retirement age of the partner, so that we cannot treat this answer as if it was given directly by the partner. For this reason we left our analysis at the household (and not at the individual) level, focusing on the answers by the respondent.

The longitudinal structure of the survey represents a further advantage of the SAVE data over other data sources, as it allows observing how the reported retirement expectations evolve over time with the arrival of new information.

We restricted the sample in several ways. As the implemented reform affects only employees, we discarded the self-employed, civil servants and farmers; furthermore, we discarded respondents who report to be casual workers or who are completely out of the labour force (retirees, students, home keepers). That leaves us with almost 3,000 observations distributed over 5 years. Table 2 offers an overview of the main characteristics of the sample.

Year	2005	2006	2007	2008	2009	Total
Female RP	56.54%	57.02%	57.20%	56.80%	56.52%	56.80%
Age RP						
Under 30	16.67%	17.02%	14.20%	14.60%	11.67%	15.18%
30 – 39	20.86%	21.16%	21.97%	20.08%	19.45%	20.78%
40 – 49	36.54%	35.04%	36.93%	35.29%	36.84%	36.13%
50 – 59	22.22%	22.81%	22.35%	25.36%	27.23%	23.67%
60 and above	3.70%	3.97%	4.55%	4.67%	4.81%	4.25%
<i>Mean</i>	41.79	41.95	42.52	43.21	44.25	42.58
<i>Median</i>	42.5	43	43	44	45	43
Marital Status						
Married	51.23%	50.58%	52.08%	53.75%	58.35%	52.77%
Separated	3.70%	2.64%	2.65%	2.23%	2.29%	2.82%
Single	25.93%	29.09%	27.65%	25.96%	23.57%	26.56%
Divorced	16.54%	15.87%	15.53%	16.63%	14.19%	15.87%
Widowed	2.59%	1.82%	2.08%	1.42%	1.60%	1.98%
Partner HH	60.00%	60.50%	61.55%	64.50%	67.05%	62.23%
Secondary Education						
Basic	34.07%	29.09%	30.68%	28.60%	27.69%	30.49%
Middle	45.56%	46.28%	43.18%	45.84%	45.54%	45.32%
High	20.37%	24.63%	26.14%	25.56%	26.77%	24.19%
Post-secondary and tertiary education						
None	11.85%	11.40%	11.74%	12.78%	10.98%	11.76%
Vocational training	77.78%	75.87%	74.24%	74.85%	76.20%	75.98%
University	10.37%	12.73%	14.02%	12.37%	12.81%	12.25%
Income and Wealth						
Net monthly income	2253.98	1961.65	2024.93	2117.94	2315.41	2136.32
<i>Median</i>	1780	1700	1870	1800	2000	1800
Net financial wealth	20878.91	17063.24	23082.47	20329.85	22500.31	20632.78
<i>Median</i>	4930	3000	3667	3400	5336	4000
Net Worth	128910	102807.7	113454.4	94550.54	97965.98	109970.2
<i>Median</i>	20897.5	16000	21786	16972	22000	19655
Observations	810	605	528	493	437	2873

Table 2: Sample Characteristics

Few aspects are worth to be stressed. First, the average age of the reference person (RP) in the household is 42 years, and almost 40% of them are in their 40s. The predominance of young respondents, who are 20 or more years away from retirement,

is a new feature in comparison with other samples (like the HRS for the USA) used so far in the literature, which focus more on older workers. The age structure of the sample appears to be ideal for the scope of our analysis, as in Germany it is especially the younger birth cohorts who will be fully affected by the recent pension reforms. These young respondents, however, face bigger uncertainty concerning their retirement plans, so that their answers are likely to undergo bigger changes over time and to be less representative for their actual behaviour.

Second, the distribution of the main characteristics does not reveal a specific bias toward specific subgroups. On the contrary, the sample seems to offer a good variation allowing for an accurate description of the distribution and the determinants of subjective retirement expectations.

Finally, the structure of the sample appears to be pretty stable over time. In other words, the sample does not seem to suffer from a selective drop-out: we can therefore rule out that the observed trend are simply due to a change over time in the composition of the data.

An important aspect that needs to be mentioned is the phenomenon of item nonresponse. As in all surveys that deal with sensitive topics such as household finances, item nonresponse to sensitive questions is not ignorable.³ To prevent biased inference based on an analysis of complete cases only, an iterative multiple imputation procedure has been applied to the SAVE data.⁴ Multiple imputation simulates the distribution of missing data and allows for a more realistic assessment of variances in subsequent analyses than single imputation. The procedure uses a Markov-Chain Monte-Carlo method to replace missing data by draws from an estimate of the conditional distribution of the data (see e.g. Hoynes et al. (1998), Kennickell (1998)). All results in this paper use the fully imputed SAVE data: when it comes to the regressions, however, imputed values for the expected retirement age, are reset to missing to avoid a spurious boost in the observed correlation between the expected retirement age and the other covariates.⁵

Figure 1 plots the distribution of the answers for men and women separately. The distribution of the expected ages of retirement appears to be dominated for both men and women by spikes at specific ages such as 60, 65, 67 and, to a lesser extent, 63 and 70.

³ See e.g. Essig and Winter (2003) and Schunk (2006) for a discussion and documentation on this issue.

⁴ See Schunk (2008).

⁵ As missing values are imputed conditional on other observable characteristics, the correlation between the variable of interest and the covariates used for its imputation is (by construction) extremely high.

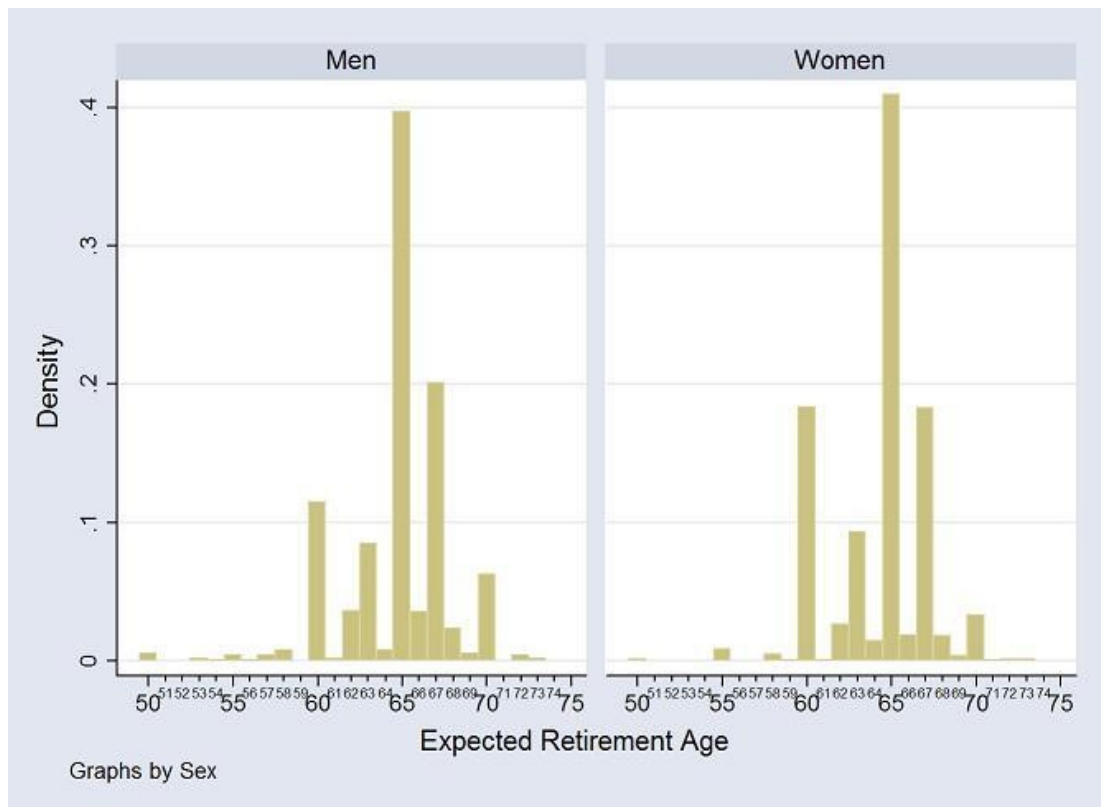


Illustration 1: ERA distribution by sex

These spikes (or focal points -FP) are related to institutional aspects of the German pension system: 60 years, for example, represent the age at which, before the 1992 reform, men were first allowed to claim disability benefits and women were allowed to enter early retirement.

The dominance of the distribution by spikes at “institutional” ages might suggest that little relevant information is provided by these responses. Indeed, looking at the SAVE respondents who, over the whole period 2001 – 2009, entered into retirement, we can see that the actual retirement ages are distributed much more continuously (see Figure 2).

This phenomenon is actually common also to other studies (such as the U.K. Retirement Survey, see Disney and Tanner 1999; or the Australian HILDA, see Cobb-Clark and Stillman, 2009) who elicit expectations as a point estimate. In fact, given that individuals have to report a single summary statistics of their underlying distribution of possible retirement ages, the distribution of the reported expectations is by construction more heavily concentrated than the distribution of actual retirement ages, even if the underlying probability distribution were the same as the distribution of outcomes. To avoid such a problem, other surveys (such as the U.S. Health and retirement survey) ask individuals to indicate the chances of various future events, such as retiring at 62 or 65, on a scale of 1 to 10.⁶

⁶ For attempts to build up probability distributions for expectational variables of this type, see *inter alia* Dominitz and Manski, 1997; Hurd and McGarry (1995), Juster and Smith (1997) and Manski (1990, 2004)

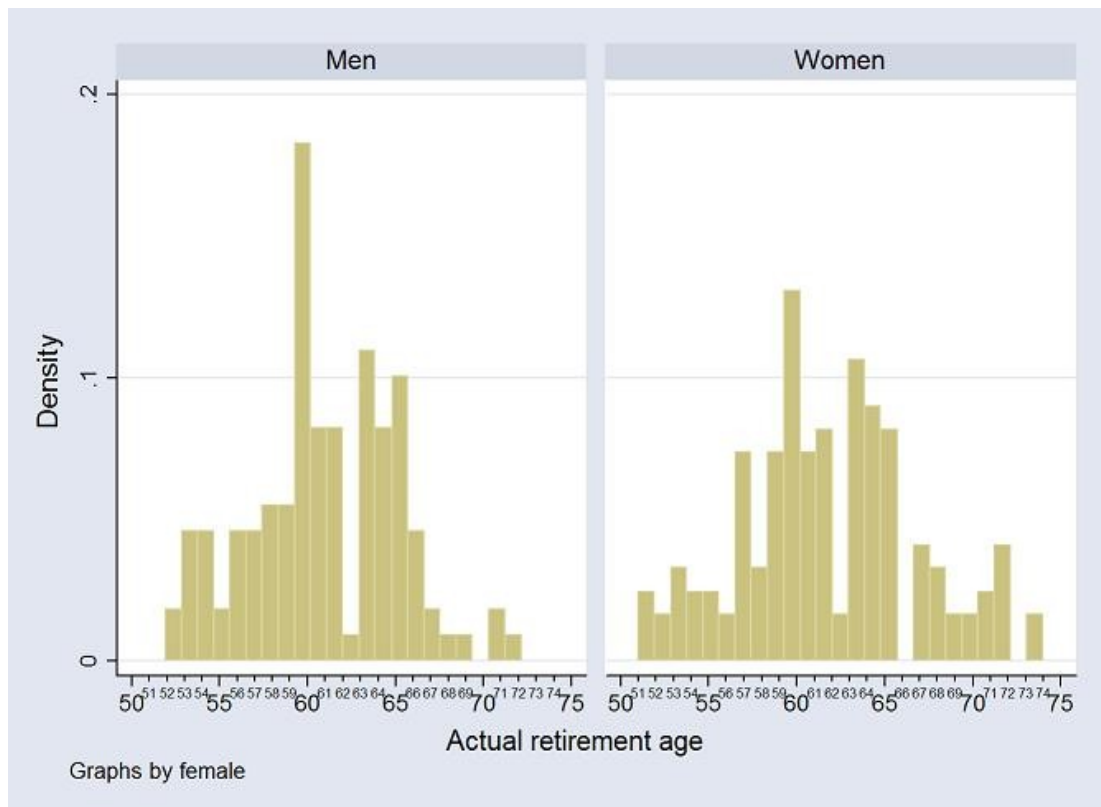


Illustration 2: Distribution of the actual retirement ages by sex

Source: SAVE-Data 2001 – 2009; employees only; N(men) = 141; N(women) = 183

Nonetheless, we can argue that the answers are still informative about individuals' expectations. First, not-sophisticated individuals might have a specific retirement age in mind rather than a distribution of probabilities, and it could be difficult for them to translate such specific ages into probabilities. Second, reported retirement ages vary with individual characteristics in a reasonable manner: several studies find out that observable characteristics, known to affect actual retirement decisions, co-vary with retirement expectations in a similar way. They also find that the reported expectations are strong predictors of the actual age of retirement also after including a large number of observable characteristics.⁷

A further piece of evidence in favour of the informativeness of the answers especially in relation with the effect of a change in the LRA can be found looking at the evolution of the FPs over time for different cohorts. Table 3 shows the percentage of respondents reporting specific FPs by sex and reform affectedness. First of all we can note that the percentage of people reporting an ERA of 66 years increases from less than 1% in 2005 to about 4% for both men and women. The increase is however much more pronounced among the cohorts with a LRA after the reform of 66 years, while it is almost not existent among the cohorts with a new LRA of 67. The

⁷ Disney and Tanner 1999, Dwyer and Da Silva 2002, Loughran et al. 2001, Heider and Stephens 2007

respondents appear therefore to adjust meaningfully their answers.

Men					Women				
	Retire at 65	Retire at 66	Retire at 67	Total		Retire at 65	Retire at 66	Retire at 67	Total
2005					2005				
ERA 60	16.2%	22.2%	12.4%	15.6%	ERA 60	29.8%	26.1%	24.5%	26.4%
ERA 65	50.3%	48.9%	45.4%	47.6%	ERA 65	44.8%	50.6%	49.7%	48.5%
ERA 66	0.0%	0.0%	1.2%	0.6%	ERA 66	0.0%	0.0%	1.3%	0.6%
ERA 67	0.0%	5.3%	12.5%	7.2%	ERA 67	1.5%	2.5%	3.2%	2.6%
Observations	115	75	175	365	Observations	138	122	216	476
2006					2006				
ERA 60	14.2%	10.2%	11.2%	11.9%	ERA 60	20.6%	23.2%	13.5%	17.7%
ERA 65	44.6%	33.1%	30.6%	35.0%	ERA 65	41.3%	33.9%	32.8%	35.5%
ERA 66	1.2%	7.7%	2.9%	3.4%	ERA 66	1.2%	0.0%	0.0%	0.4%
ERA 67	4.2%	18.2%	28.6%	19.6%	ERA 67	4.1%	19.1%	28.2%	19.3%
Observations	82	54	136	272	Observations	110	81	171	362
2007					2007				
ERA 60	6.5%	6.9%	8.4%	7.7%	ERA 60	17.3%	15.5%	9.2%	12.5%
ERA 65	48.5%	25.1%	20.0%	27.5%	ERA 65	43.9%	44.9%	22.3%	32.4%
ERA 66	4.3%	15.1%	0.7%	4.5%	ERA 66	6.4%	1.6%	0.0%	1.9%
ERA 67	5.6%	30.0%	37.0%	28.5%	ERA 67	5.6%	18.4%	39.1%	26.5%
Observations	70	53	130	253	Observations	93	73	161	327
2008					2008				
ERA 60	8.7%	9.1%	10.0%	9.5%	ERA 60	19.3%	13.1%	11.4%	13.7%
ERA 65	48.9%	32.0%	24.2%	30.9%	ERA 65	35.2%	51.2%	28.3%	35.1%
ERA 66	5.1%	13.7%	1.6%	4.7%	ERA 66	8.6%	1.4%	1.4%	3.2%
ERA 67	5.0%	12.2%	28.8%	20.5%	ERA 67	3.4%	13.2%	34.8%	22.2%
Observations	59	47	124	230	Observations	88	69	146	303
2009					2009				
ERA 60	8.1%	6.7%	5.2%	6.1%	ERA 60	14.8%	11.2%	8.9%	10.7%
ERA 65	51.0%	27.7%	26.6%	32.0%	ERA 65	41.8%	34.4%	23.8%	30.3%
ERA 66	3.8%	16.8%	0.0%	4.2%	ERA 66	3.4%	11.2%	0.0%	3.5%
ERA 67	7.0%	13.3%	39.2%	27.1%	ERA 67	2.6%	24.3%	41.2%	28.8%
Observations	55	44	107	206	Observations	64	66	127	257
Total					Total				
ERA 60	11.8%	11.9%	9.6%	10.7%	ERA 60	21.6%	18.9%	14.0%	17.1%
ERA 65	48.6%	34.6%	30.0%	35.6%	ERA 65	41.8%	43.7%	32.3%	37.4%
ERA 66	2.3%	9.7%	1.3%	3.3%	ERA 66	3.4%	2.4%	0.6%	1.7%
ERA 67	3.6%	15.4%	28.4%	19.5%	ERA 67	3.3%	14.1%	28.0%	18.4%
Observations	381	273	672	1326	Observations	493	411	821	1725

Table 3: Percentage of respondents reporting specific ERAs

4. Who plans an early retirement?

In this section we want to look at factors affecting the decision of early or later retirement: which are the determinants of an early retirement? Do we observe any change in these determinants after the implementation of the reform?

Table 4 reports the percentage of respondents planning to retire before, at or after the LRA by sex over time. As the LRA after the 2007 reform is in many cases not an entire number (individuals born in 1954, for example have to retire with 65 years and 8 months – see Table 1 for further details) while the reported ERAs can be only entire numbers (that is, the respondents can specify the age at which they plan to retire only in years, and not in years and months) in order to classify the answers in one of the three categories, we have to make some assumptions on how individuals are rounding. In the following we assume that individuals round their answers to the lowest entire number, so that individuals who have for example a LRA of 65 + x

months and plan to retire exactly at the LRA, will report an ERA of 65 years.

Table 4: Expected vs. Legal retirement age

Year	Percentage of respondents planning to retire...			Observations
	...before LRA	...at LRA	...after LRA	
Men				
2005	34.0%	49.3%	16.8%	352
2006	29.0%	36.5%	34.4%	260
2007	38.3%	38.9%	22.7%	226
2008	47.1%	32.4%	20.5%	213
2009	43.9%	41.7%	14.4%	184
Women				
2005	43.3%	50.5%	6.3%	458
2006	34.2%	37.0%	28.7%	345
2007	50.3%	34.7%	15.0%	302
2008	56.2%	29.6%	14.2%	280
2009	46.4%	36.0%	17.6%	241
Total				
2005	39.2%	49.9%	10.8%	810
2006	32.0%	36.8%	31.2%	605
2007	45.2%	36.5%	18.3%	528
2008	52.2%	30.8%	17.0%	493
2009	45.3%	38.4%	16.3%	425

First of all we can observe a large part of the adjustment in the ERA took place already in 2006, that is before the reform became officially law. We can in fact observe a sudden decrease in the percentage of individuals planning an early retirement and, at the same time, an increase in the percentage of respondents who report an ERA above the LRA (which in 2006 is still set at 65 years for everybody). The change is even more impressive for women: while in 2005 only 6% of the female respondents planned to retire later than 65 years, in 2006 this percentage jumped to almost 30%. The magnitude of the revision, however, has not been big enough to cope with the actual increase in the LRA. All in all, we observe between 2005 and 2009 an increase in the percentage of individuals reporting an ERA lower than their LRA from 39% to 55%, while the percentage of individuals planning to retire exactly at the LRA dropped from 50% in 2005 to 34% in 2009.

It becomes therefore important at this stage to assess who plans an early departure from the labour market: indeed, if the increase in the legal threshold for retirement induces the more productive workers (who might have at the same time accumulated more savings during their life) to plan an early retirement, something has to be changed in the law, in order to avoid such an undesirable effect.

To answer this question we run therefore an ordered probit to see which determinants affect the probability of ending up in one of the three categories retiring before, at or after the legal retirement age.⁸ As the threshold that defines the three categories

⁸ Our dependent variable takes value 1 if the ERA is smaller than the LRA; 2 if they coincide and 3 if

changes over time and across cohorts, we run separated regressions for the various cohorts and for the years before and after the implementation of the reform. Table 5 reports the estimated coefficients and their p-values.

We find that women are generally more likely to plan an early retirement than men: the coefficient, however, is significant only for the younger cohorts. Probably older women who are still working (and therefore who are still in our sample) represent a self-selection of women with a higher propensity to work, and who therefore tend to retire later than average. Interestingly, for the younger cohorts in the years after the reform (i.e. 2007 to 2009) the coefficient becomes smaller and less significant: younger women have probably revised their expectations in a stronger fashion than men. Nonetheless, the fact that relatively young women are still more likely to plan an early retirement might be cause of concern: women tend to have a less continuous employment history and are more often employed only part-time, so that they tend to accrue lower pension benefits. Furthermore, as women have on average a higher life expectancy, an early departure from the labour market means that they will have to live for a longer time on a meager pension.

Education appears to be a significant determinant of retirement plans: better educated individuals (either in the form of a better secondary school leave certificate or in the form of a completed post-secondary education) are more likely to end up planning to retire at or even after the LRA. There are no big differences in the magnitude and/or in the significance of the coefficients in the years before and after the reform: if anything, an increase in the positive effect of the secondary school leaving certificate emerges for the cohorts born between 1958 and 1963, and for those born after 1963. This is a good news: if better educated individuals are also more productive, we can conclude that the higher threshold for retirement did not push productive workers prematurely out of the labour market.

For the cohorts born before 1963, long unemployment spells (lasting 2 years or longer) become a positive determinant of delayed retirement plans only in the years after the reform was officially implemented. This is a reasonable result: as the increase in the LRA practically trims future pension benefits, individuals with a less continuous employment history have to work longer to compensate for the reduction in their future pensions. The fact that after 2007 individuals who were for long time unemployed are more likely to end up planning a retirement at or after the LRA speaks again in favour of the effectiveness of the reform in changing individual expectations.

The results provide some evidence that individuals living in wealthier households are

ERA > LRA. For individuals whose LRA after the reform is not an entire number, ERA and LRA are supposed to coincide if the ERA equals the lowest entire number in the LRA.

more likely to plan an early retirement: although the accumulated financial wealth does not play any significant role in shaping the expectations concerning future retirement, the ownership of real estates or of assets which are specific for the old-age (such as occupational pension plans or private old-age provisions) affect negatively the retirement plans, at least for the older cohorts. Household's income appears to be a significant and negative determinant of the retirement plan for the younger cohorts.⁹

Actual smoking attitudes, here used as a proxy for future health status, are also a significant determinant of the retirement plans. However, while smokers belonging to the eldest cohorts are more likely to report a later retirement, actual smokers in the middle and younger cohorts are more likely to plan an earlier retirement. The positive sign of the coefficient for the older individuals could be due again to self-selection. Older smokers are most probably long-time smokers; as our reference group consists of individuals who suffer no chronic health conditions, these smokers appear to have reached their middle age without suffering the negative consequences of smoking. Their bodies, therefore, appear to be particularly resistant and they are comparative healthier: this pool of respondents, therefore might expect to live longer and in better conditions than the other (despite the smoking attitude), planning therefore to work also longer. On the contrary, younger smokers might expect to suffer from poor health in the future, so that they could be forced to retire before the LRA is reached.

⁹ It is worth to stress here, that while the sociodemographic characteristics as well as statements concerning health and expectations refer to the individual, the SAVE survey elicit wealth and income at the household level. The link between education and wealth and/or income is therefore less straightforward: we can still have poorly educated individuals living in rich households because of their marriage.

	Cohorts 1947 – 1957		Cohorts 1958 – 1963		Cohorts 1964+	
	Before 2007	After 2007	Before 2007	After 2007	Before 2007	After 2007
age	-0.03 0.28	-0.1 0	0.07 0.11	-0.05 0.38	-0.01 0.14	-0.01 0.06
Female	-0.21 0.49	0.2 0.51	-0.1 0.69	-0.33 0.31	-0.54 0	-0.24 0.09
partner	0.02 0.93	0.42 0.09	0.63 0.02	-0.01 0.98	-0.04 0.79	-0.09 0.54
Female*partner	0.26 0.44	-0.45 0.17	-0.72 0.02	-0.47 0.23	0.2 0.28	0.1 0.57
Number of children	0.15 0.02	0.09 0.18	0.1 0.07	-0.05 0.43	-0.03 0.59	-0.01 0.8
Grandchildren? J/N	-0.6 0.01	-0.27 0.13	-0.73 0.02	-0.75 0.01	-0.06 0.88	0.01 0.97
East Germany	-0.01 0.97	-0.34 0.09	0.29 0.11	0.63 0	-0.14 0.22	-0.06 0.55
Mittlere Reife	0.2 0.31	0.14 0.46	-0.1 0.58	0.16 0.46	-0.01 0.96	0.22 0.06
(Fach-)Abitur	0.34 0.22	0.05 0.84	0.46 0.05	0.66 0.01	0.12 0.43	0.2 0.15
Vocational training	1.32 0.01	-0.15 0.65	-0.21 0.43	-0.32 0.32	0.24 0.08	0.16 0.25
University degree	1.7 0	0.6 0.19	0.07 0.85	0.05 0.9	0.47 0.03	0.42 0.03
Currently unemployed	0.41 0.1	-0.3 0.19	0.14 0.6	-0.37 0.25	0.04 0.76	0.01 0.93
Past unemployment (< 6 months)	-0.17 0.53	0.33 0.14	0.33 0.08	0.39 0.07	0.17 0.15	0.05 0.66
Past unemployment (6 months to 2 years)	0.15 0.51	0.56 0.01	0.08 0.71	0.39 0.13	0.31 0.03	0.2 0.12
Past unemployment (more than 2 years)	-0.22 0.45	0.57 0.03	0.13 0.62	0.84 0.01	0.4 0.03	0.15 0.4
Financial wealth (/1000)	0 0.39	0 0.79	0 0.67	0 0.54	0 0.29	0 0.26
Financial wealth squared	4.11E-006 0.67	-4.70E-008 1	0 0.3	-8.51E-006 0.62	-8.56E-006 0.54	-4.10E-006 0.4
Occupational pension? J/N	-0.58 0.01	-0.67 0	0 1	0.48 0.02	0.12 0.32	0.17 0.15
Private old-age provision? J/N	-0.13 0.51	-0.04 0.84	0.22 0.2	-0.66 0	0.06 0.56	0.11 0.26
Real Estates? J/N	-0.41 0.03	0.05 0.78	-0.39 0.02	-0.29 0.13	-0.1 0.3	-0.02 0.8
Household net monthly income (/100)	0.01 0.33	-0.03 0.16	0 0.93	0.01 0.55	-0.01 0.07	-0.02 0
Household income squared	0 0.41	0 0.31	0 0.43	0 0.4	8.18E-006 0.78	0 0.03
Actual smoker? J/N	0.3 0.09	-0.01 0.96	-0.4 0.01	-0.63 0	-0.19 0.05	-0.13 0.18
Severe chronic conditions	-0.52 0.05	-0.09 0.7	-0.05 0.83	-0.06 0.83	-0.14 0.38	-0.08 0.59
Mild chronic conditions	-0.08 0.65	-0.35 0.06	0.19 0.22	-0.14 0.42	0.11 0.27	0.05 0.6
Inheritance expected	-0.03 0.87	-0.06 0.74	-0.02 0.92	-0.5 0.01	-0.03 0.76	0.03 0.77
Worsening of health condition expected	0.54 0.04	0.52 0.01	-0.85 0	-0.07 0.79	-0.15 0.53	0.02 0.93
Improving income expected	0.54 0.12	-0.32 0.4	-0.16 0.53	-0.34 0.23	0.07 0.55	-0.09 0.44
Unemployment expected	0.14 0.56	0.21 0.34	0.07 0.77	-0.22 0.34	0.17 0.22	-0.15 0.25
Subjective life expectancy (years)	0.02 0.16	0.01 0.67	0.03 0.01	0.01 0.37	0.02 0	0.01 0.06
Expected replacement rate state pension	0 0.85	0 0.72	0 0.78	0 0.98	-0.01 0.13	0 0.37
Expected replacement rate: dont'know	0.13 0.78	0.45 0.37	0.07 0.86	-0.19 0.68	-0.33 0.12	-0.07 0.78
Unsatisfied with current job	-0.11 0.61	-0.01 0.97	-0.08 0.68	0.12 0.61	-0.04 0.74	0.02 0.9
Year 2006	0.32 0.05		0.39 0.01		0.53 0	
Year 2007		0.28 0.13				0.02 0.85
Year 2008		0.12 0.5		-0.12 0.56		-0.1 0.34
Year 2009				0.36 0.11		
Observations	279	290	321	327	670	734

Table 5: Expected vs. Legal retirement age: ordered probit, coefficients and p-values

Taken together our results tell a positive story: less educated individuals, more likely to suffer from poor health (due to their smoking attitudes), with a relatively continuous employment history and living in wealthier households are more likely to plan an early retirement. If that was true also before the increase in the LRA, it became even more so after year 2007. If the individuals will behave according to their reported plans, we can conclude that once the reform 2007 will be fully implemented, while the most productive workers will remain in the labour market, those who decide to quit appear to have saved enough (or at least more than the average) to afford an early departure.

5. By how many years did the ERA increased?

After having characterised who is more likely to plan an early or a later retirement, we want now to explicit measure the effect of the reform on the ERA: did the reform 2007 induced any update of the ERA? If yes, by how many year did the ERA increase as effect of the reform?

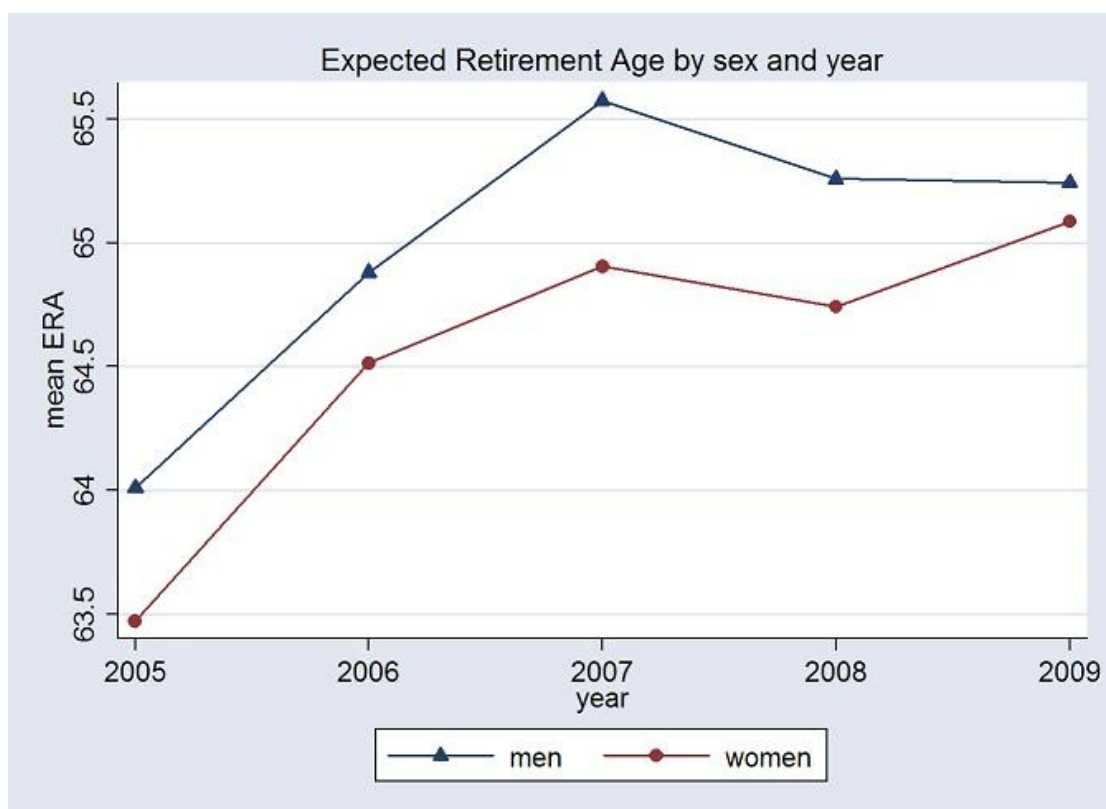


Illustration 3: ERA by sex and year

Figure 3 shows that on average the ERA increased over time for both genders; for women, however, the increase is even more pronounced so that over time the gap in the retirement expectations between men and women is by 2009 almost closed.

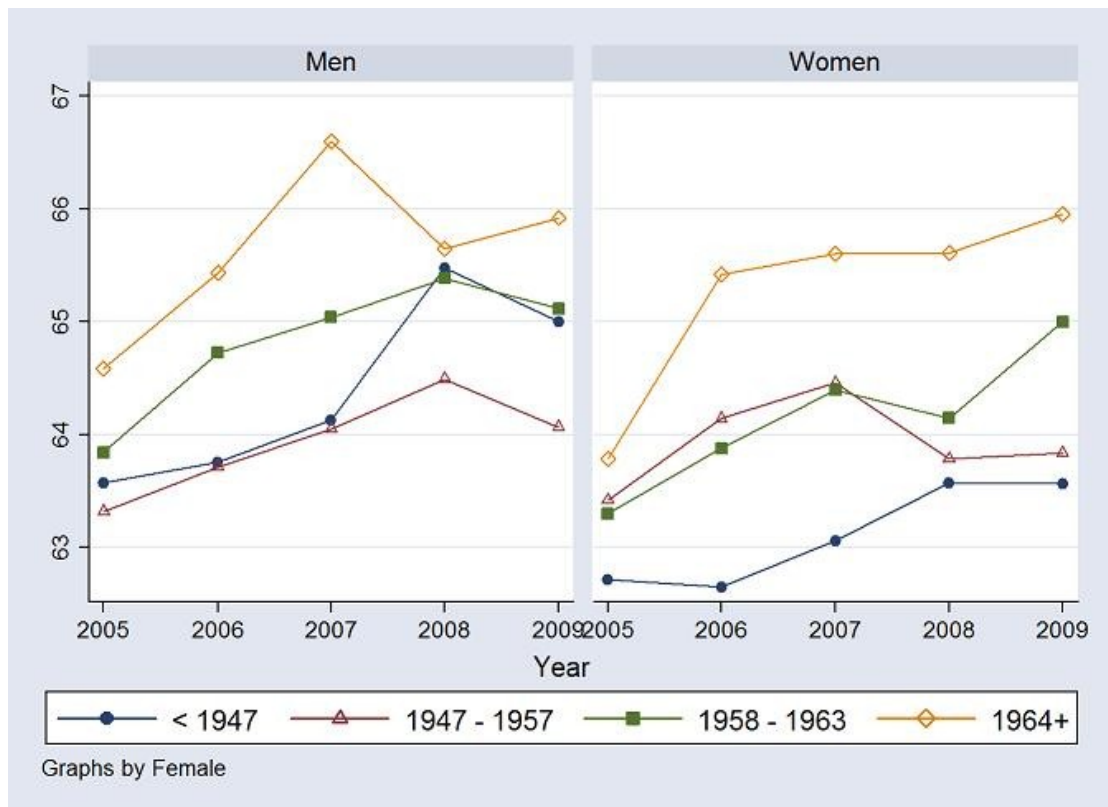


Illustration 4: ERAs over time by sex and birth cohort

Moreover, we observe that younger cohorts (born 1964 or later) expect to retire on average significantly later than middle-aged (born between 1958 and 1963) or older cohorts and over time the increase in their ERAs is stronger. However, expectations so far have not been adjusted to the full extent, but remain at best roughly one year below the statutory retirement age. The upward trend is furthermore more accentuated for younger cohorts than for older cohorts (Figure 4).

This evidence, however, cannot be causally interpreted, as the trend might be driven by other factors, not related with the reform 2007. For example, individuals may be simply revising their expectations upward because they get older: Dwyer and Da Silva, 2002 for example find that individuals tend to postpone their ERA as they get closer to their retirement age. So, the fact that the individuals in our sample simply get older over time (we have indeed a panel), may drive the upward trend. More generally, it could be that an upward trend in the ERA was already in place (maybe as an effect of previous reform of the pension system, which -as sketched in section 2, abolished some of the most common used possibility to claim early retirement).

To single out the effect of the reform on expectations, we rely therefore on a difference-in-differences (DD) approach. The basic idea of the DD estimator is to compare over time the outcomes of individuals who are affected by the reform with the outcomes of individuals who are not affected: the change in the outcome of the

untreated group should identify any temporal variation in the outcome that is not due to the policy. Therefore, once we control for all the possible observable characteristics that may determine a difference in the outcome, any remaining difference in the ERA between the two groups is due to the reform. In doing so, we are assuming that any unobservable difference between treated and control remains constant over the period under analysis. The critical assumption underlying this estimator is that the control group represents the “right” counterfactual for the treated, that is, they should perfectly mirror the evolution in the ERAs of the “treated” in the case the reform had not taken place. It is therefore extremely important to choose the control group very carefully. In the following we focus only on the younger cohorts (born 1964 and later) which are fully affected by the reform (that is, they have to retire at 67 years).

The institutional aspects of the reform 2007 offer two possible control groups. As the reform affects only employees born after 1947, a first comparison group can be found in the cohorts of employees born before 1947. In our first regression, therefore, compare the outcomes of employees born after 1964 (who have to retire with 67 years) with those of employees born before 1947 (who can still retire at 65 years). Of course, the two groups are supposed to differ: ERAs are shaped, in the end, by unobservable preferences concerning working and leisure, and the two cohorts (cohort < 1947 and cohort > 1964) have for sure different preferences as those individuals grew up in two completely different economic and social environments. We are however assuming that over time and without the reform, the differences in the ERAs between young and old individuals are constant.

Two aspects, however, are cause of concern. First, it could be that ERAs of older individuals, who are closer to their retirement, are more stable over time, while ERAs of younger individuals, with many years to go before retirement and who are facing a much higher degree of uncertainty, might evolve with a different pace. Second, as we are analysing a panel dataset, selectivity of the older individuals might represent a problem. Indeed, we might expect that the sample of older employees becomes from year to year biased toward individuals with a higher preference for working: as the comparison group is mainly made up of individuals who can already retire (the younger individual is already 59 years and the median age is 62 years), individuals with a lower taste for working will choose to retire, dropping out of the sample. The remaining individuals in our sample are increasingly those with higher preferences for work and therefore with higher ERAs on average.

These two factors question the validity of the time-invariance assumption and therefore the validity of our identification strategy.

A second control group can be found in the self-employed. The idea here is to

compare the outcomes of employees fully affected by the reform (born after 1964) with those of self-employed belonging to the same cohorts. As the individuals in both groups belong to the same cohorts and are therefore at the same stage of their life-cycle, we get rid of the first problem (i.e. the different time horizon that younger and older cohorts have when reporting their ERA). Furthermore, we have no reason to assume that in one group the panel selectivity should be different as in the other. The two groups have of course different underlying preferences for leisure, but the difference should stay constant over time and any observed difference in the evolution of their ERAs over time should be due to the fact that employees are affected by the reform and self-employed not.

Another choice that has to be done concerns the cut-off point, that is the years that correspond to the „before“ and „after“ period. Here we also made 2 different choices: we consider first the period 2005-2006 as „before“ and the years 2007-2009 as „after“. Then we run the same regressions using 2005 as „before“ and 2007-2009 as „after“. The second specification is more appropriate if the discussion of the reform before the bill was approved prompted individuals to react in anticipation. Indeed, as the analysis in section 3 and Figure 3 and 4 highlight, individuals revised their ERAs a lot already in 2006.

Table 6 reports the results of the estimation. The coefficient of interest is that on the interaction term between the dummy for the period “after” the reform and the dummy identifying the treatment group.

The regression confirm the fact that much of the adjustment in the ERAs happened already in 2006: indeed, when we use 2007 as cut-off point to define our before/after time span, we find no significant difference between the treatment and control groups in the period after the reform. On the contrary, when 2006 is selected as threshold, the interaction term becomes significant.

We find that, on average, individuals belonging to the cohorts that are fully affected by the reform increased their ERAs over time more than individuals in the control group. In the period after the reform the average increase in the ERAs of individuals born after 1964 over that of employees not affected by the reform is about 1 year and three months, while when compared with self-employed belonging to the same birth cohorts, the average increase is about 1 year and 8 months. The null hypothesis that the coefficients on the interaction terms are equal to 2 (that is, the number of years by which the expectations of the individuals fully affected by the reform should be increased if these individuals fully incorporated the new LRA in their expectations) cannot be rejected by a Wald test. We can therefore conclude that the reform 2007 was extremely successful in shifting retirement expectations.

Variable	Young vs. Old cohorts		Employees vs. Self-employed	
	Cut-off= 2007	Cut-off= 2006	Cut-off= 2007	Cut-off= 2006
Treated	0.88 <i>0.07</i>	0.23 <i>0.70</i>	-0.24 <i>0.61</i>	-1.21 <i>0.06</i>
Post reform	0.82 <i>0.27</i>	0.4 <i>0.58</i>	0.64 <i>0.30</i>	-0.06 <i>0.93</i>
treated* post reform	0.33 <i>0.66</i>	1.27 <i>0.09</i>	0.5 <i>0.44</i>	1.69 <i>0.02</i>
Female	-0.97 <i>0.00</i>	-1 <i>0.00</i>	-1.14 <i>0.00</i>	-1.16 <i>0.00</i>
partner	-0.47 <i>0.15</i>	-0.49 <i>0.13</i>	-0.54 <i>0.11</i>	-0.57 <i>0.08</i>
Female* partner	0.49 <i>0.22</i>	0.53 <i>0.18</i>	0.42 <i>0.31</i>	0.42 <i>0.30</i>
Mittlere Reife	0.2 <i>0.42</i>	0.21 <i>0.40</i>	0.39 <i>0.13</i>	0.39 <i>0.12</i>
(Fach-)Abitur	0.16 <i>0.61</i>	0.13 <i>0.68</i>	0.6 <i>0.06</i>	0.55 <i>0.08</i>
Vocational training	0.55 <i>0.06</i>	0.53 <i>0.06</i>	0.67 <i>0.02</i>	0.66 <i>0.03</i>
University degree	0.84 <i>0.05</i>	0.78 <i>0.06</i>	0.91 <i>0.03</i>	0.87 <i>0.04</i>
Blue collar worker	-0.67 <i>0.01</i>	-0.67 <i>0.00</i>	-0.63 <i>0.02</i>	-0.63 <i>0.01</i>
East Germany	-0.18 <i>0.42</i>	-0.17 <i>0.45</i>	-0.31 <i>0.19</i>	-0.28 <i>0.24</i>
Currently unemployed	0.05 <i>0.89</i>	0.06 <i>0.86</i>	-0.12 <i>0.76</i>	-0.1 <i>0.79</i>
Past unemployment (< 6 months)	0.43 <i>0.08</i>	0.38 <i>0.12</i>	0.61 <i>0.02</i>	0.56 <i>0.02</i>
Past unemployment (6 months to 2 years)	0.39 <i>0.18</i>	0.34 <i>0.24</i>	0.71 <i>0.02</i>	0.65 <i>0.03</i>
Past unemployment (more than 2 years)	0.22 <i>0.55</i>	0.19 <i>0.60</i>	0.52 <i>0.19</i>	0.45 <i>0.25</i>
Parttime worker	0.06 <i>0.81</i>	0.08 <i>0.75</i>	0.37 <i>0.15</i>	0.4 <i>0.12</i>
Household net monthly income (/100)	-0.04 <i>0.04</i>	-0.03 <i>0.08</i>	-0.04 <i>0.03</i>	-0.03 <i>0.07</i>
Household income squared	0 <i>0.39</i>	0 <i>0.51</i>	0 <i>0.37</i>	0 <i>0.50</i>
Financial wealth (/1000)	0 <i>0.93</i>	0 <i>0.91</i>	0 <i>0.92</i>	0 <i>0.98</i>
Financial wealth squared	-1.88E-006 <i>0.87</i>	-1.20E-006 <i>0.92</i>	-1.51E-006 <i>0.91</i>	-1.98E-006 <i>0.88</i>
Occupational pension? J/N	0.04 <i>0.89</i>	-0.02 <i>0.95</i>	-0.01 <i>0.97</i>	-0.08 <i>0.77</i>
Private old-age provision? J/N	0.13 <i>0.54</i>	0.06 <i>0.77</i>	0.04 <i>0.85</i>	-0.02 <i>0.94</i>
Real Estates? J/N	-0.25 <i>0.23</i>	-0.2 <i>0.33</i>	-0.27 <i>0.21</i>	-0.21 <i>0.33</i>
Actual smoker? J/N	-0.02 <i>0.92</i>	0 <i>0.99</i>	-0.17 <i>0.43</i>	-0.14 <i>0.50</i>
Severe chronic conditions	-0.13 <i>0.68</i>	-0.09 <i>0.78</i>	-0.22 <i>0.52</i>	-0.14 <i>0.68</i>
Mild chronic conditions	0.12 <i>0.55</i>	0.03 <i>0.90</i>	0.18 <i>0.37</i>	0.1 <i>0.62</i>
Inheritance expected	-0.08 <i>0.70</i>	-0.17 <i>0.43</i>	-0.05 <i>0.83</i>	-0.11 <i>0.60</i>
Worsening of health condition expected	-0.25 <i>0.57</i>	-0.2 <i>0.65</i>	-0.08 <i>0.87</i>	-0.03 <i>0.95</i>
Improving income expected	0.05 <i>0.86</i>	0.06 <i>0.82</i>	0.01 <i>0.98</i>	0.01 <i>0.96</i>
Unemployment expected	0.03 <i>0.91</i>	0.02 <i>0.94</i>	0.14 <i>0.63</i>	0.13 <i>0.66</i>
Subjective life expectancy (years)	0.06 <i>0.00</i>	0.06 <i>0.00</i>	0.05 <i>0.00</i>	0.05 <i>0.00</i>
Expected replacement rate state pension	-0.01 <i>0.11</i>	-0.01 <i>0.11</i>	-0.01 <i>0.11</i>	-0.01 <i>0.12</i>
Expected replacement rate: dont'know	-0.67 <i>0.14</i>	-0.63 <i>0.16</i>	-0.71 <i>0.13</i>	-0.66 <i>0.15</i>
Unsatisfied with current job	-0.23 <i>0.41</i>	-0.21 <i>0.44</i>	-0.23 <i>0.44</i>	-0.23 <i>0.44</i>
Constant	60.84	60.66	62.14	62.26

Table 6: Difference in Differences estimation

Interestingly, the average ERA is still well below the LRA: when employees belonging to the younger cohorts are compared to self-employed belonging to the same cohorts (column 4 on Table 6), the average ERA for the treated after the reform turn out to be 62.7 years, that is, almost 3 years before the LRA. Nonetheless, if these individuals are going to behave coherently with their reported expectations, the increase of about 2 years in their ERA tells us that they will stay in the labour market longer than it would have been the case under the old institutional setting.

6. Conclusions

This paper contributes to the literature that examines individuals' retirement decisions and the effect that policy changes have on them. More specifically, we wanted to answer two questions: who is going to stay longer in the labour market and who plans an early retirement? By how much an increase in the legal retirement age shifts individuals' expected retirement age? To answer those questions we considered the legislative reform introduced in Germany in 2007, whose institutional settings offer a nice quasi-experimental setting to properly single out the effect of the policy on expectations.

We find out that less educated individuals, more likely to suffer from poor health (due to their smoking attitudes), with a relatively continuous employment history and living in wealthier households are more likely to plan an early retirement. If that was true also before the increase in the LRA, it became even more so after year 2007. If the individuals will behave according to their reported plans, we can conclude that once the reform 2007 will be fully implemented, while the most productive workers will remain in the labour market, those who decide to quit appear to have saved enough (or at least more than the average) to afford an early departure.

We also find that the reform succeeded in shifting the retirement expectations of the younger cohorts: using a difference-in-differences estimator, we find that on average the ERAs of individuals born after 1963 increased in the period after the implementation of the reform by about 2 years. Although the average ERA of those individuals is still below the LRA, the shift in the expectations means that these workers are going to stay in the labour market longer than they would have been without the increase in the LRA. Despite being still preliminary, these results provides some evidence about the effectiveness of reforms aimed at keeping productive people longer at work.

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