NBER WORKING PAPER SERIES

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Working Paper 17048
http://www.nber.org/papers/w17048

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
May 2011

We thank the Ministerio de Ciencia e Innovación for financial support (research project ECO2008-06395-C05). The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 17048
May 2011
JEL No. H55,I18,J11

ABSTRACT

In this paper we analyze the trends in labor force participation and transitions to benefit programs of older workers in relation to health trends as well as recent Social Security reforms. Our preliminary conclusions are pessimistic regarding the effect of health improvements on the labor market attachment of older workers since we show that despite the large improvements in the mortality rates among older individuals in Spain, the employment rates of individuals older than fifty-five remain lower than the ones observed in the late 1970s. Some caution should remain in our conclusions as the evidence on health trends is inconclusive. Regarding the effect of Social Security reforms, we find that both the 1997 and the 2002 reform decreased the stock into old-age benefits at the cost of an increased share of the participation into disability. Finally, we find that there was a significant increase in the outflow from employment into disability after the 2002 reform.

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1. Introduction

Disability has always been an important social welfare program in developed countries and Spain is not an exception. The program represents an average of 1.5 % of GDP in the 1995-2010 period, slightly below the EU average of 2.2 % of the GDP. The relative importance of the program with respect to the pension program has varied in the last 20 to 25 years. In 1977 the ratio of benefits originated from disabilities to retirement benefits was 0.44, in 1985, by the end of the early 80 crisis, it reached a maximum of 0.58, and decreased slowly since then. By 1997 the ratio was again down to 0.45. Figures from 1998 are difficult to compare since all disability pensions from age 65+ are since then converted to retirement benefits but back of the envelope calculations[1] suggest that the ratio decreased in early 2000s and increased from 2008 because of the recent crisis.

The above ratio of benefits has a clear business cycle component because the disability program has been often used to cushion recessions and to alleviate transitions into and from economic inactivity in regions of high unemployment, as suggested by Disney and Webb (1991), McVicar (2006), and more recently Benítez-Silva et al (2010). In addition, disability programmes have often been used as an alternative to early retirement through pension programmes, either because of restrictions on early retirement, or because disability programmes offer more attractive after-tax benefit levels (Gruber and Wise, 1999, 2004; Jiménez-Martín et al. 2006, Jiménez-Martin and Vall-Castelló, 2009). This alternative 'route' into inactivity for older people proved particularly attractive when employers were seeking to shed older workers in periods of recession such as the early 1980s, early 1990s and late 2000s.

It is common in the literature to distinguish between 'health disability', which arises from clear diagnosed medical conditions, and 'work disability', which may also have its roots in economic and social circumstances. Although there is a link between work and health disability, economic conditions, and, the variations in the risk of unemployment over time, may play an important part in explaining the dynamics of the disability rolls (Benítez-Silva et al, 2010). Other factors, including the trend in the relative generosity of

[1] Own calculations using data from the MCVL ("Muestra Continua de Vidas Laborales"), which constitutes a random sample of administrative records provided by the Spanish Social Security Administration.

disability benefits relative to unemployment or pension benefits (Autor and Duggan (2003, 2006) and Burkhauser and Daly (2001) in the United States, and OECD (2006, 2007) more generally), and underlying demographic and morbidity trends, are also relevant.

As in many other OECD countries, in Spain the underlying demographic trends are very favorable. The increase in life expectancy at birth has also been translated in increases in life expectancy at age 65. In 1960 women aged 65 expected to live 15.3 more years, while the expectations were 21.9 in 2008. Similar improvements are also observed among men (from 13.1 in 1960 to 18.0 in 2008) (OECD Health Data, 2010). As a consequence there have been striking improvements in age-specific mortality rates over the last 50 years in Spain across individuals aged over fifty-five. The extent to which these changes translate into higher labor capacity depends on the evolution of ill-health. Thus, further reduction in the age-specific mortality rate will only translate in an increase in the population able to work at older ages if the average age of the onset of a work-related disability increases and, simultaneously, the requirement to work for the disabled are adjusted accordingly.

When analyzing trends of disability rolls it is also needed to take into account Social Security reforms as they may change the relative balance between the various exit routes into (retirement) benefits. There have been two main Social Security reforms since 1990. In 1997 the medical requirements of the disability system were tightened and the generosity of the old-age pension system was decreased, while in 2002 the job search criteria to receive unemployment benefits was tightened and more incentives to retire later were introduced.

The main purpose of the paper is to analyze the trends in labor force participation and transitions to benefit programs of older workers in relation to health trends. In particular, we explore questions such as: Do mortality improvements at older ages translate into more participation? Do we reach the same conclusions with other health variables? Do health improvements reduce the prevalence of disability among older workers? Have recent social security reforms favored the participation of older workers, and in particular, of disabled workers? Have these reforms affected transitions from employment to unemployment or disability at older ages? Do we find any substitution across programs?

Those questions referring to the link between program participation and health will be analyzed descriptively. Alternatively, those questions referring to the effect of reforms in program participation will be evaluated using stock and flow administrative data of participation into unemployment, disability and retirement for individuals approaching the normal retirement age complemented with data from the Spanish Labor Force Survey. In order to help identifying the key parameters of the model we use data aggregated at the gender and age-group (50-54, 55-59, 60-64) level using two levels of regional aggregation.

Our preliminary conclusions are pessimistic regarding the effect of health improvement on the labor market attachment of older workers since we show that despite the large improvements in mortality rates among older individuals in Spain, the employment rates of individuals older than fifty-five remain lower than the ones observed in the late 1970s. On the other hand, decreases in mortality rates do not necessarily go hand in hand with improvements in population health and we do not find any conclusive evidence on health improvements. Regarding the effect of Social Security reforms we find that both the 1997 and the 2002 reform decreased the stock into old-age benefits at the cost of an increased share of the participation into disability. More interestingly, the magnitude of the two opposite effects is the same suggesting a clear substitution effect among these two programs in the older age-groups. Finally, we find that none of these two reforms had any effect on the share of these age-groups into unemployment, which is highly explained by the total share of the population out of employment. Regarding the effects of these two reforms on the outflows from employment we find that there was a significant increase in the outflow from employment into disability after the 2002 reform.

The rest of the paper proceeds as follows. In section 2 we present the institutional setting and discuss disability insurance and pension reforms. In section 3 we review historical data on mortality, health status and use and labor force participation, and compare their trends during the last thirty years. We analyze the effect of program reforms on disability rolls and the substitution among the different programs in section 4. Last, section 5 concludes.

2. DI and social security reforms

The aim of this paper is to provide descriptive evidence on the relationship between past trends on health status and labor market participation at older ages and the role of Social Security reforms. Therefore, we first describe the disability system in Spain, as it is the pathway out of employment more closely linked to the individual's health. However, the transition into a program will also depend on the availability and characteristics of the other programs. Therefore, we also highlight the main changes in the unemployment and old-age systems. In all three cases, the Social Security is responsible for the payment of contributory benefits (old-age, disability, unemployment, temporary sick-leave, maternity-leave and survivor's benefits), while non-contributory benefits are managed by the regional authorities of each Autonomous Community and the IMSERSO (the Institute of Aged People and Social Services) in Ceuta and Melilla.

2.1 The Disability Insurance System

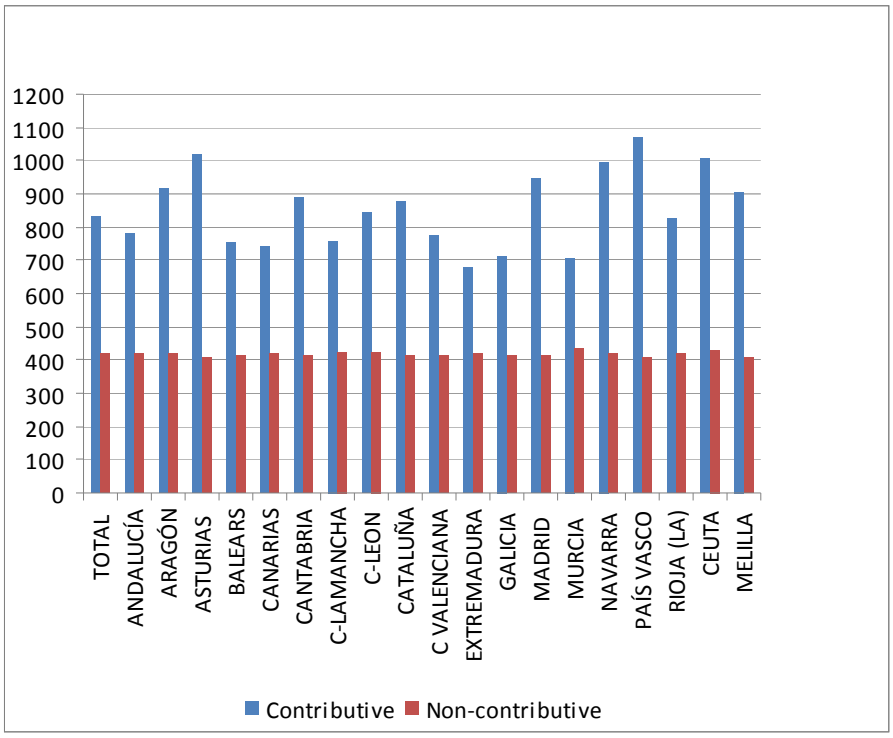
In Spain, there are two types of permanent disability benefits: i) contributory, which are given to individuals who have generally contributed to the Social Security system before the onset of the disabling condition; ii) and non-contributory, which are given to individuals who are assessed to be disabled but have never contributed to the Social Security system (or do not reach the minimum contributory requirement to access the contributory system). Non-contributory disability benefits are means-tested[2] and managed at the regional level.

The size of the non-contributory system is relatively small compared to the contributory system (197,126 individuals received non-contributory disability benefits in 2009, while 920,860 received contributory benefits during the same year). The amount of benefits received is also smaller in the non-contributory case (the average non-contributory pension is 417.09 Euros/month compared to an average contributory disability pension of 831.49 Euros/month). However, the benefit level for non-contributory disability pensions differs quite a lot across regions, as the benefits are managed at the regional level. Figure 1 shows the average contributory and non-contributory disability pension by Autonomous Community. It can be seen that in all cases the average contributory

[2] Income is evaluated yearly. The income threshold in 2010 was set at 4,755.80 Euros/year for an individual living alone. This amount is adjusted if the individual lives with other members.

pension exceeds the average non-contributory pension. In addition, while the average non-contributory disability pension amounts around 400 Euros/month in all the regions, the average contributory pension varies from 677 Euros/month in Extremadura up to 1,070 Euros/month in País Vasco. In the remaining of this chapter we mainly focus on the permanent contributory disability system in Spain.

Figure 1. Average contributory and non-contributory disability benefits across regions in Spain, 2009.



Source: own elaboration from data from the Ministry of Work and Immigration

The Social Security defines the permanent contributive disability insurance as the economic benefits to compensate the individual for losing a certain amount of wage or professional earnings when affected by a permanent reduction or complete loss of his/her working ability due to the effects of a pathologic or a traumatic process derived from an illness or an accident.

In order to capture the different situations in which a person can be after suffering from a disabling condition, the Spanish Social Security administration uses a classification of four main degrees of disability that depend on the working capacity lost:

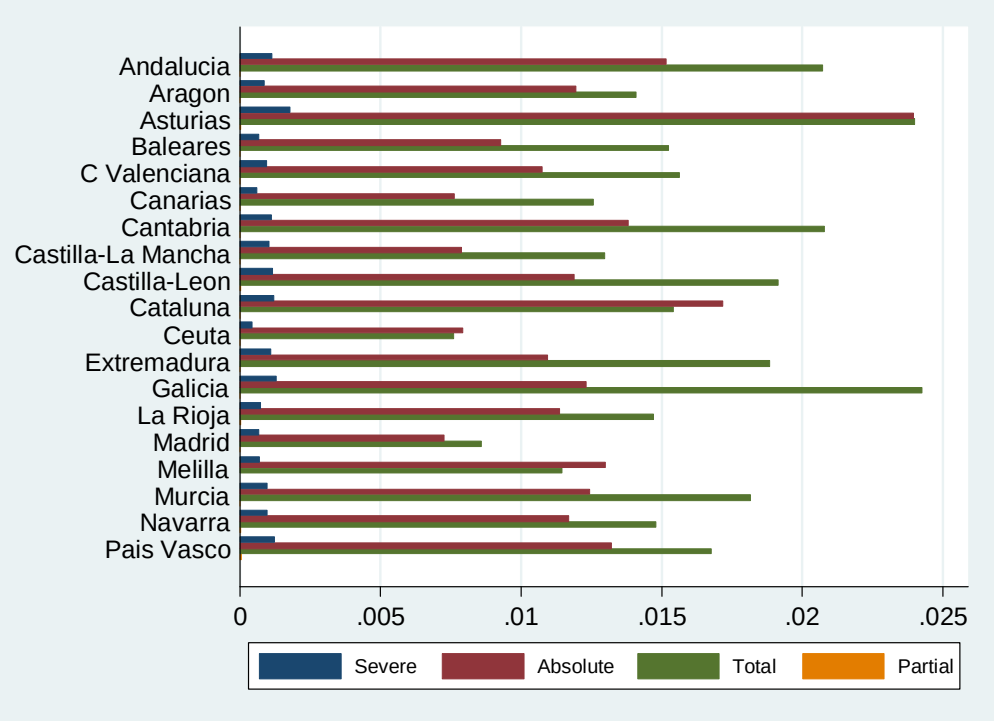
(i) Permanent limited disability for the usual job: the individual losses at least 33% of the standard performance for his/her usual job but the individual is still able to develop the fundamental tasks of his/her usual job or professional activity. Individuals in this level of disability only receive a one-time lump sum payment.

(ii) Partial disability: the individual is impaired to develop all or the fundamental tasks of his/her usual job or professional activity, but he/she is still capable of developing a different job or professional activity.

(iii) Total disability: the individual is impaired for the development of any kind of job or professional activity.

(iv) Severe Disability: Individuals who, as a result of anatomic or functional loses, need the assistance of a third person to develop essential activities of daily living such as eating, moving, etc…

Figure 2. Percentage of individuals receiving disability benefits, by region and degree of disability in 2009



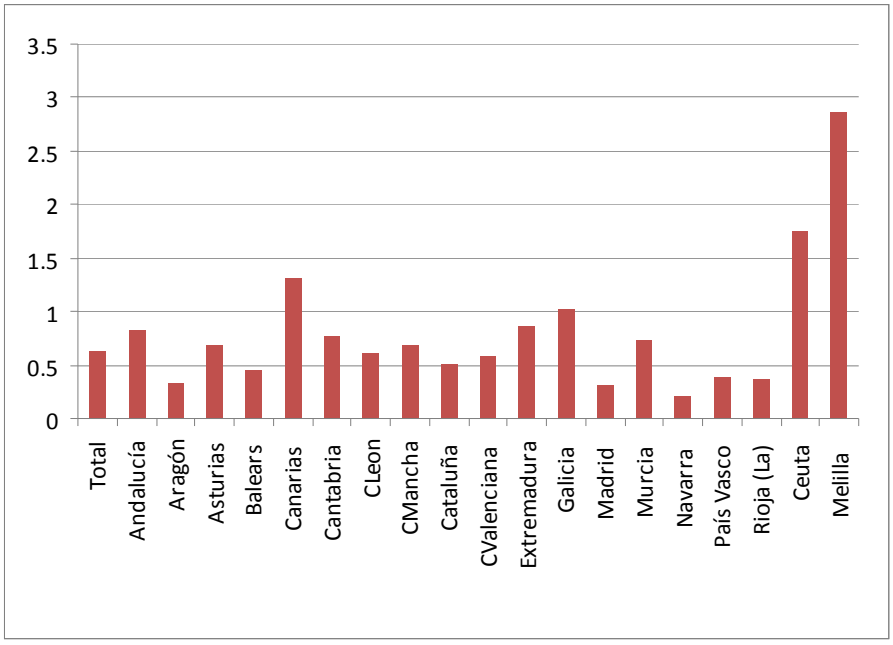
Source: own elaboration using data on disability pensions from the Ministry of Work and Immigration (www.mtin.es) and population from the Spanish Institute of Statistics (www.ine.es).
Note: the percentages have been computed as total number of disability beneficiaries / population aged 16-64

Figure 2 shows the distribution of individuals receiving disability benefits by degree of disability and region in 2009. It can be seen that in all the Spanish regions, the percentage

of individuals receiving permanent limited disability was rather small. In fact, at a national level, only 917 out of the 920,863 contributory permanent disability pensions were for individuals classified as permanent limited disabled for the usual job in 2009. The second dimension shown in Figure 2 is the regional variation not only in the percentage of the working-age population receiving disability benefits but also on its distribution across types. Asturias is the region with a higher share of the working-age population receiving contributory disability benefits (4.9%) followed by Galicia (3.8%), Andalucía (3.7%) and Cantabria (3.6%). On the other end, Madrid is the region with the lowest percentage of recipients of contributory disability benefits (1.6%).

Figure 3 shows the percentage of the population aged 16-64 that is receiving non-contributory benefits. As argued before, the share of the population receiving non-contributory benefits is smaller when we exclude the special autonomous regions of Ceuta and Melilla. Among the others, we find the highest percentages in Canarias, Galicia and Extremadura.

Figure 3. Percentage of the population aged 16-64 receiving non-contributory disability benefits, by region in 2009



Source: own elaboration using data on disability pensions from the Ministry of Work and Immigration (www.mtin.es) and population from the Spanish Institute of Statistics (www.ine.es). Note: the percentages have been computed as total number of disability beneficiaries / population aged 16-64

2.1.1 Eligibility and Pension Amount

The eligibility requirements and the pension amount depend on the source of the disability (ordinary illness, work related or unrelated accident or occupational illness), the level of the disability and the age of the onset of the disability. Table 1 summarizes the main parameters of both the eligibility criteria and the pension formula. The two main features to highlight are: i) there are not contributory requirements if the health impairment is due to either an accident or a occupational illness; ii) individuals older than fifty-five with a partial disability receive a higher replacement rate if it is considered difficult for them to find a job due to lack of education or the social and labor market conditions of the region where they live.

The total amount of the pension is obtained multiplying a percentage, which varies depending on the type of pension and degree of disability as shown in the last rows of Table 1, to the regulatory base, which depends on the source of the disability and on previous salaries[3]. The number of years included in the regulatory base depends on the source of disability.

Table 1. Summary of the parameters to calculate permanent disability pensions

	Ordinary Illness	Work-unrelated Accident	Work-related Accident or Professional Illness
Eligibility	Age >= 31: Contributed 1/4 time between 20 years old and disabling condition. Minimum of 5 years Age < 30: Contributed 1/3 time between 16 years old and disabling condition. No minimum number of years required	No minimum contributory period required	No minimum contributory period required
Regulatory Base	Average wage last 8 years of work	Average annual wage of 24 months within the last 7 years of	Average wage last year of work

[3] Benefit=Regulatory Base * Percentage

		work	
Percentage applied to the regulatory base	Partial Disability: 55% Individuals older than 55 with difficulties to find a job due to lack of education or characteristics of the social and labor market of the region where they live: 75%		
	Total Disability: 100%		
	Severe Disability: 100%+50%		

The income tax rules differ across type of disability. Partial disability benefits are taxable under the general income tax rules, while total disability pensions are always exempted from income taxes. Furthermore, if the individual works while receiving the pension, there is a reduction in the earnings used to calculate the income tax of 2,800 Euros/year if their degree of disability is low (between 33% and 65%) or 6,200 if the disability level is higher (more than 65%) or if the disabled has reduced mobility. In addition, individuals receiving partial disability benefits can combine the benefits with earnings from work, as long as the type of job is compatible with his/her disability.

In general, to be granted a permanent disability benefit, the individual must come from sick leave (also called temporary disability/incapacity), and after following the prescribed medical treatment, he/she still presents in principle anatomic or functional reductions that decrease or cancel his/her capacity to work. The application can be started by the provincial office of the National Institute of Social Security (NISS), by the institutions that collaborate in the process (such as hospitals), or by the individual himself (in which case, more documentation is required). The Disabilities Evaluation Team evaluates the medical report and the professional background of the solicitant, and on the basis of this analysis, the directors of the provincial office of the NISS decide on the type of disability pension granted (if any), the benefit level and the date of the next medical check-up. All permanent disability pensions are automatically converted to old-age pensions once the individual turns sixty-five[4].

2.1.2 Sick leave or temporary disability

Sick leave benefits are available to all workers who have contributed for at least 180 days during the five years prior to the onset of the illness in the case of common illness. If the

[4] Most of the outflows from the permanent disability system are due to death or automatic transfer to old-age pensions. Around 4% of the outflows are due to improvement of the health condition and 2.7% to a judicial process. Monthly outflows in 2010 were around 2,500-3,000.

origin of the sick leave is an accident (whether or not working accident) or an occupational illness, no minimum contributory period is required.

The amount of benefits also depends on the source of the disability. Individuals who have a disability because of a working accident or an occupational illness are entitled to 75% of the basic salary (including overtime pay) from the first day of leave. In the other cases, there is a waiting period of three days without benefits unless it is covered by a collective agreement, and from the fourth day until the twentieth the employee receives sixty percent of the basic salary. After the twenty-first day, the compensation represents seventy-five percent of the basic salary. The social security pays from the first day if a working accident or occupational illness, and from day sixteen otherwise. The employer pays in this case from the fourth until the fifteenth day. It is not possible to combine sickness benefits with any kind of paid work, even part-time work.

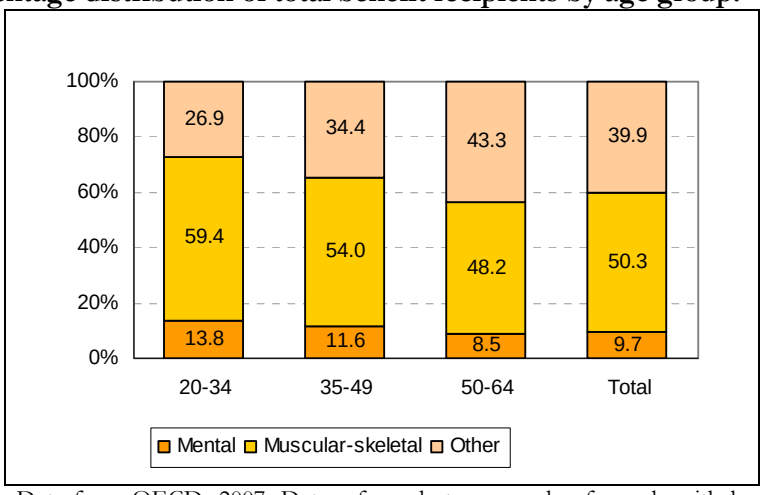
The duration of the benefits is for a maximum of 12 months with a potential extension of an additional six months when it is foreseeable that the beneficiary will become capable of working within this additional period of time. At the end of this period the individual is either considered non-disabled or can apply to permanent disability benefits. Certification and monitoring of the sick leave is ensured by a doctor (GP) of the Public Health Services (or from a doctor from a Mutual Work Fund).

2.1.3 Major health conditions of disability benefits recipients

Figure 4 shows the percentage distribution of total contributory and non-contributory disability recipients by health conditions, distinguishing among mental, muscular-skeletal and other health problems by three age-groups in 2004. First of all, it is important to note the importance of the musculoskeletal conditions as 50.3% of all the individuals receiving a disability benefit in Spain are on the basis of a musculoskeletal health problem. This condition is more prevalent among the youngest group, as it represents 59.4% among the individuals aged 20-34 receiving disability benefits. Its importance slightly decreases with age (54.0% of disability pensioners aged 35-49 and 48.2% of disability pensioners aged 50-64).

The figure also shows that 9.7% of all the individuals in the disability rolls are diagnosed with a mental condition, being the prevalence higher among the younger. The share of claimants due to mental health conditions is among the smallest in Europe. For example, the share of inflows into disability due to mental diseases was 34.3 % in UK in 2006, 41% in Switzerland in 2004, 43.4% in Denmark in 2005 or 25.4% in Norway in 2004 (OECD, 2008).

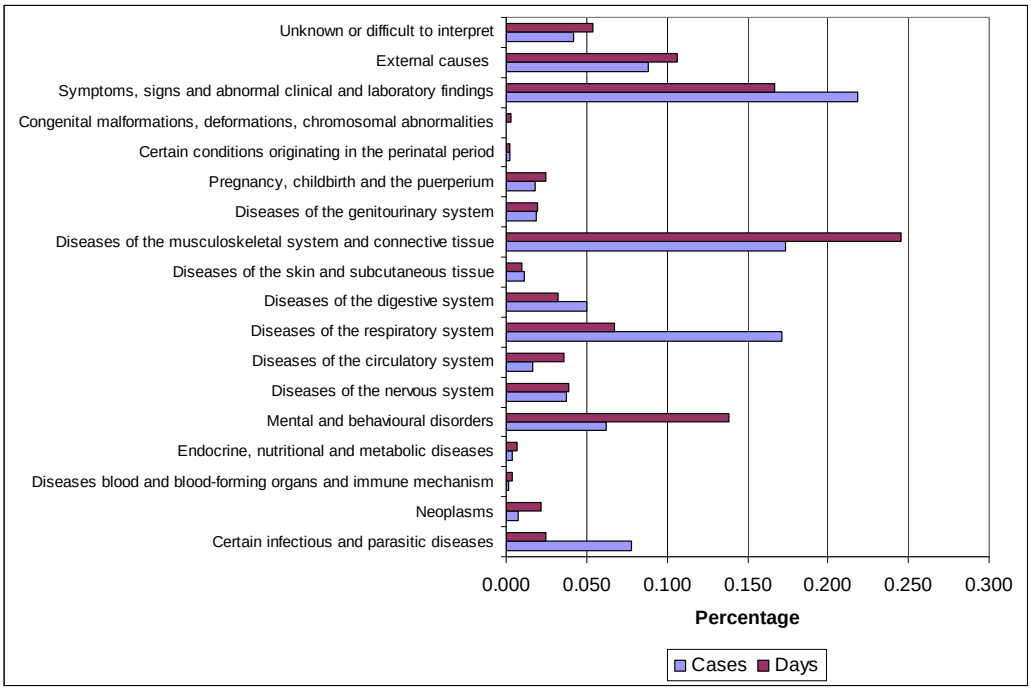
Figure 4. Major health conditions of disability benefit recipients in Spain, 2004. Percentage distribution of total benefit recipients by age group.



Source: Data from OECD, 2007. Data refer only to a sample of people with legal disability. This data comes from special tabulations provided by the University of Madrid, based on linked NISS and IMSERSO data.

The share of "other health conditions" varies across age-groups, as it represents from 26.9% of the pensioners aged 20-34 up to 43.3% of the pensioners aged 50-64. Unfortunately, there is no evidence available of the distribution of the other illnesses. In order to shed some light on its likely distribution, Figure 5 shows both the percentage of total cases and total days of sickness leave (temporary disability) in Spain in 2005. The biggest category within the specific illnesses is "Diseases of the musculoskeletal system and connective tissue", which corresponds to the main category among the recipients of disability benefits. Next, diseases of the respiratory system have the second highest share among the number of cases, while mental health problems have the second highest share in the number of days. Surprisingly, the share associated with circulatory problems both in days and cases is smaller, and similar to the share of diseases of the digestive and the nervous systems.

Figure 5. Distribution by health problems of temporary disability or sickness leave in Spain in 2004



Source: own elaboration using data from Oliva (2010)

2.1.4 Reforms of the Disability Insurance System

Permanent disability benefits were used extensively as an early retirement mechanism for workers in restructuring industries (such as shipbuilding, steel, mining, etc…) or as substitution for long-term unemployment subsidies in depressed regions during the late 1970 and 1980 (OECD, 2001), which resulted in an increase in the inflows into the disability system and permanent disability benefits.

These events prompted a number of reforms introduced during the second half of 1980 and beginning of 1990 in order to try to reverse these trends. The main aim of these reforms was to abolish the incentive effects to permanently leave the labor market before reaching the legal retirement age through the disability system.

Here we focus on some distinctive features of the main reforms since the creation of the National Institute of Social Security in 1979, while refer the reader to Table 2 for a summary of all the reforms in the disability system in Spain during this period.

Table 2. Main reforms of the disability system in Spain

1985	The terms of eligibility for disability pensions are tightened.
1990	Introduction of a means-tested non-contributory disability pensions for people aged 65+ and for disabled people aged 18+ who satisfy residency requirements.
1997	Stricter control of sickness status, reduction of long-term sickness benefit level, usual occupation replaces own job assessment. Permanent disability pensions individuals 65+ are converted to old-age pensions. New INSS disability assessment team to assess permanent disability instead of the GP. Entitlement to non-contributory benefits is not lost if working, and can be collected if losing the job.
1998	Possibility for doctors from INSS and mutual insurance companies to review health situation of beneficiaries.
2004-2005	Improve monitoring and control of sickness leave with new INSS tool. Possibility to combine non-contributory disability with some earnings.
2007	Minimum contributory period to access permanent disability is reduced for young workers. The formula to calculate the regulatory base of the benefit gets closer to the formula for old-age pensions.

The first biggest reform of the disability system took place in 1997 and it included 4 main points:

1) Sickness benefits: stricter control of the sickness status by doctors of the Social Security system, reduction of the level of long-term sickness benefits, replacement of the old own job assessment by a more objective definition of the usual occupation of the individual.
2) Permanent disability pensions of individuals aged at least sixty-five are automatically transferred to the old-age pension system. This is just a change in the classification within the pensions system.
3) There is also a major organizational reform as all the permanent disability matters are transferred to the NISS. Until that moment, the permanent disability status was assessed and granted by the local GP's and this reform created a group of experts (the disability assessment team; a newly created body inside the NISS) which was in charge of assessing the person's ability to work on the basis of the available medical files and a special medical assessment done by one of the NISS doctors.

4) The individual does not lose entitlement to non-contributory disability benefits if he/she starts working. He/she will then still be entitled to receive non-contributory disability benefits if he/she looses his/her job.

Apart from this major reform in 1997, the 1998 budget law introduced the possibility for doctors from the NISS and mutual insurance companies to review the health situation and status of beneficiaries. However, in reality very few individuals in the permanent disability system do effectively lose their benefits.

In 2004 and 2005 monitoring of the use of sickness leave was tightened with the creation of a new sub-department at the NISS and a new monitoring tool with the sole purpose of better monitoring and reducing absence rates. In 2005, a general absence control was put in place when the duration of absence was greater than six months.

Finally, in 2007 the minimum contributory period to access permanent disability pensions was reduced for young workers in order to adjust for the current later entrance into the job market of younger workers. At the same time, the formula to calculate the regulatory base of the benefit was slightly modified: the regulatory base of permanent disability because of a common illness is decreased by 50% if the individual had not contributed at least 15 years and it is lower the further the individual is from age 65.

All these reforms have ensured the financial stability of the disability system in Spain as inflow rates have remained at stable levels and have not experienced any dramatic increases like in other countries covered in this volume.

2.2 Reforms in other Social Security Programs in Spain

The extent to which reforms in the disability system are able to decrease the outflows from employment at older ages will depend on the evolution of other programs that can be used as alternative early retirement routes. Therefore, in this section we summarize other important reforms that have taken place in other Social Security Programs in Spain. In particular, we focus on reforms in the unemployment and old-age systems. Table 3 provides a chronological summary of these reforms[5].

[5] A detailed exposition of the changes in the old-age pension system in Spain is provided in Boldrin et al (2010)

In 1984, both temporary contracts and non-contributory unemployment benefits (also called unemployment assistance benefits) were introduced. In addition, a special provision was established for workers aged over fifty-five who were allowed to receive unemployment assistance benefits until retirement age. To receive these benefits, individuals had to satisfy the entitlement requirements of the retirement pension except for the age. The subsidy paid 75% of the minimum wage until reaching the age to be transferred to an old-age pension. Furthermore, the years spent unemployed under this special scheme were counted as contributive years towards an old-age pension.

In the following year, 1985, an old-age pension reform was passed which increased the minimum mandatory annual contribution to old-age pensions from 8 to 15 years, it also increased the number of years of contribution used to calculate the pension from 2 to 8 years[6] and introduced several early retirement programs linked to hiring a new worker, such as the Partial Retirement program that allowed part-time retirement at sixty-three combining part-time wages and old-age pension, and Special Retirement at sixty-four if the employer hired a registered unemployed.

In 1989 the special provision of unemployment assistance benefits until the retirement age of sixty-five for individuals aged at least fifty-five was extended to individuals aged fifty-two, thus increasing the incentives of older workers to leave the labor market at younger ages. The expected decrease in the labor force participation rates of older individuals observed in Spain during the 1980s and the early 1990s prompted the government to adopt a change in the strategy, and to start a series of reforms to reverse these negative labor market trends. Therefore, the reforms introduced during the 1990s had the objective of keeping older workers active in the labor market for longer.

There have been two main reforms since the mid 1990, in 1997 and 2002. In 1997 the number of contributory years used to compute the benefit bases was progressively

[6] The change in the minimum mandatory annual contributions to have access to an old-age pension affected all individuals since 1985, but the number of years used to calculate the pension was progressively increased: during the first year, the last 70 months were used, 72 months in the second year and 84 in the third year.

increased from 8 to 15 years[7] and the formula to calculate the replacement rate was also made less generous. On the other hand, the 8% penalty applied to early retirees between the ages of 60 and 65 was reduced to 7% for individuals with 40 (or more) years of contributions at the time of early retirement. Some changes in the incentives on the demand side were also introduced in 1997 to reduce the unemployment rates and the share of temporary contracts among the most disadvantaged groups, among them the individuals aged forty-five or older who were either unemployed or had a temporary contract.

In 2002 changes in both the old-age and the unemployment systems were introduced. Before 2002, only individuals who had contributed to the system earlier than 1967 could benefit from early retirement at sixty, while the rest had to wait until the normal retirement age at sixty-five. In 2002, earlier retirement at age sixty-one was made available for the rest of the population. At the same time, there was an impulse to the partial and flexible retirement schemes with the possibility of combining income from work with old-age benefits and the introduction of incentives for individuals to retire after the legal retirement age of 65. These consist on an additional 2% higher percentage per additional year of contribution beyond the age of 65 applied on top of the 100% applied to the regulatory base. In order to have access to this additional 2%, the worker needs to have a minimum contribution period of 35 years.

At the same time, the possibility to access retirement is extended to individuals who are unemployed for reasons beyond their willingness at the age of 61 and who have contributed for at least 30 years and have been registered in the employment office for the last 6 months.

On the other hand, the reform in 2002 opened up the possibility for individuals aged fifty-two or more who are receiving unemployment benefits to combine the receipt of these benefits with earnings, as they will receive 50% of normal benefits and the employer will pay the remaining quantity in wages. In addition, it extends the program that helps to integrate unemployed persons in the labor market[8] to all individuals aged at

[7] In 1997 the last 108 months are included, the last 120 months in 1998, the last 132 months in 1999, the last 144 months in 2000, the last 156 months in 2001, the last 180 months from 2002 onwards.
[8] This program is called Contrato de Integración (Integration Contract).

least forty-five who have been unemployed for one month and to people with disabilities, among others.

Last, in 2007 the incentives to retire later than age sixty-five were further increased providing an additional three percent, instead of the two percent agreed in 2002. Moreover, in order to have access to an old-age pension the individual must have contributed for at least two out of the last 15 years and the proportional part related to the extra monthly salaries will not be taken into account when computing the number of contributed years. On the other hand, the 8% penalty applied to early retirees between the ages of 60 and 65 was reduced to between 6-7.5%, depending on the number of years contributed, for those individuals with 30 years of contributions. In addition, the contributions for unemployed workers older than fifty-two were increased so that they would receive a higher old-age pension when retiring,

Table 3. Main reforms since 1980 of the old-age and unemployment systems in Spain

1984	Introduction of temporary contracts. Introduction of unemployment assistance (UA) benefits (non-contributory). Special provision for workers aged 55+; can receive UA until retirement if comply with requirements to get old-age pension (except age requirement).
1985	Increased the minimum mandatory annual contributions from 8 to 15. The number of contributive years used to compute the pension increases from 2 to 8. Several early retirement schemes are introduced; Partial retirement and special retirement at age 64.
1989	Special scheme of UA (permanent until retirement) extended to workers 52+.
1997	The number of contributive years used to compute the pension increases from 8 to 15 (progressively by 2001). The formula for the replacement rate is made less generous. The 8% penalty applied to early retirees between the ages of 60 and 65 is reduced to 7% for individuals with 40 or more contributory years. Introduction of a new permanent contract with reduced severance payments targeted to certain population groups. Lower social security contributions for employer's for the first two years if one of these new permanent contracts was signed.
2001	Broaden the 1997 labor market reform; Extension of new permanent contract of 1997 to more population groups. Suppression or reduction of social security contributions to support permanent employment for certain groups of the population.
2002	Early retirement only from age 61. Impulse partial retirement; possible to combine it with work. Unemployed aged 61 can retire if contributed for 30 years and 6 last months registered in employment offices.

	Incentives to retire after age 65. Individuals aged 52+ can combine unemployment benefits and a job. Extension of group of individuals that can benefit from the "integration contract" (program to help integrate unemployed into the labor market).
2007	15 "effective" contributory years are used to calculate the pension. Reduction from 8% to 7.5% of the per-year penalty applied to early retirees between 60 and 65 for individuals with 30 contributory years. Broaden incentives to stay employed after age 65. Increase contributions made by the social security administration for individuals receiving the special scheme of UA for 52+ (they will receive a higher old-age pension when retiring).

3. Historical data

Mandatory insurance for job related accidents was introduced in Spain in 1900, through a bill that also authorized the creation of some funds, for public employees only, paying disability and retirement pensions. In 1919, mandatory retirement insurance (*Retiro Obrero Obligatorio*) was introduced for private-sector employees aged sixteen to sixty-five whose total annual salary was below a certain threshold. In 1926, a universal pension system for public employees (*Régimen de Clases Pasivas*) was established, which still exists under the same name. By the late 1930s, most Spanish employees were covered by some minimal government mandatory retirement insurance program.

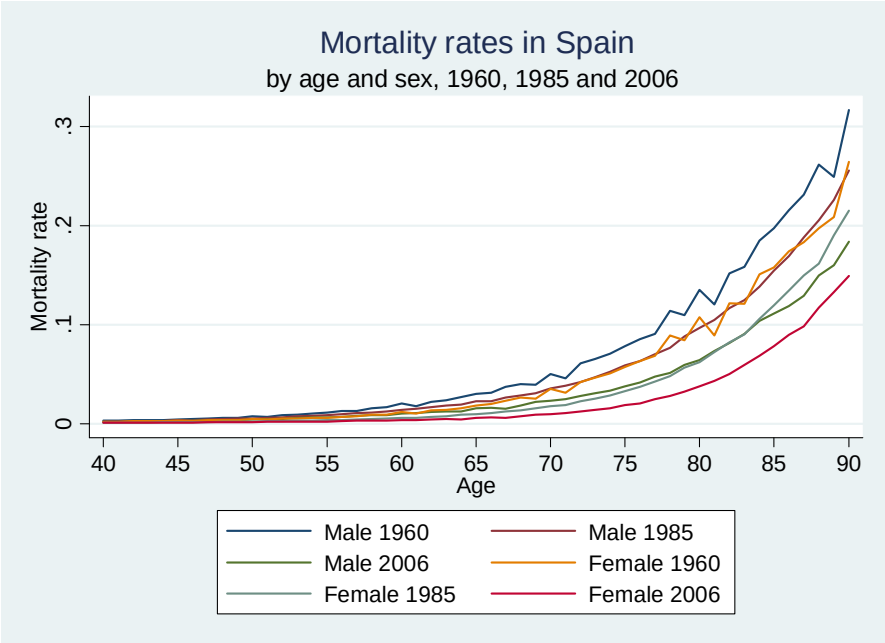
Since the introduction of the first insurance programs the life expectancy of the Spanish population has experienced an outstanding improvement; while the life expectancy at birth in 1930 was of 51.13 years for females and 47.46 for males, it achieved the 71.65 (females) and 66.66 (males) years in 1960, and up to 84.07 (females) and 77.58 (males) years in 2006 (Human Mortality Database, 2010). The labor force participation of older workers has not always gone hand in hand with the evolution of life expectancy. In this section we provide some descriptive evidence of the trends in mortality, health and labor force participation in order to unravel the existence of any common trends during the last 30 years.

3.1. *Mortality*

The increase in life expectancy at birth has also been translated in increases in life expectancy at age 65. In 1960 women aged 65 expected to live 15.3 more years, while the expectations were 21.9 in 2008. Similar improvements are also observed among men

(from 13.1 in 1960 to 18.0 in 2008) (OECD Health Data, 2010). Moreover, the higher decrements in mortality rates achieved since 1960 are concentrated among the population aged 65 and older as Figure 6 shows. Figures 7 (men) and 8 (women) show how much steeper the decrease in mortality was among individuals aged 65 compared to individuals aged 60 or 55.

Figure 6. Mortality rates by gender and age. 1960, 1985 and 2006.



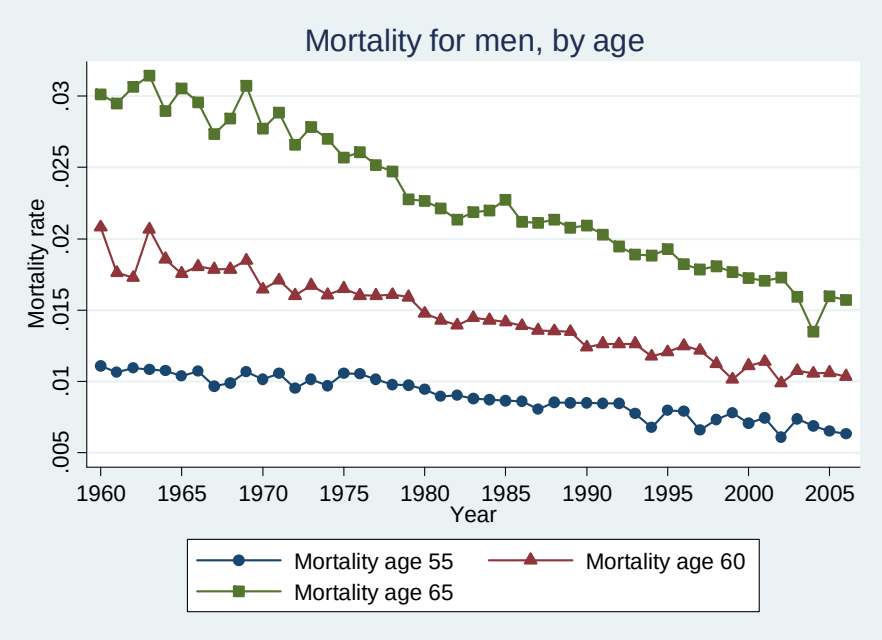
Source: own elaboration from data from the Human Mortality Database

Figure 6 also shows that the decrease in mortality rates observed from 1960 to 1985 is similar to the decrease from 1985 to 2006. In addition, it shows that male's mortality rates evolve after female's mortality rates, as the curve for men in 1985 overlaps the female's curve in 1960, and mortality rates of men in 2006 are similar to mortality rates of women in 1985. Therefore, one would expect further improvements in life expectancy and mortality rates, at least for men, in the coming years.

One of the conclusions to be derived from Figures 7 and 8 is that individuals in later years reach the same mortality rates at older ages compared to previous cohorts. For example, women aged fifty-five in 1960 had the same mortality risk as women aged sixty in 1980 and women aged sixty-five in 2005 (0.006). If one understands by old age the later part of life with some reference to deterioration, then one would probably agree that the experience of a given high mortality rate should be part of the elements to be considered when classifying a group of individuals as elderly. As recently pointed out by

Shoven (2010)[9], this raises some challenges to compare individuals through time. For example, if individuals were classified as elderly in the 1960s at age sixty-five, it seems somehow surprising that they were still classified as elderly in 2000 when their mortality rates were like the ones of individuals aged sixty in 1960 among men, and even lower among women. This suggests that age-since-birth is possibly not the best measure to compare the ageing of populations across time, and it poses some questions about its convenience to set the rules of the social security system.

Figure 7. Mortality rates at different ages by year. Men

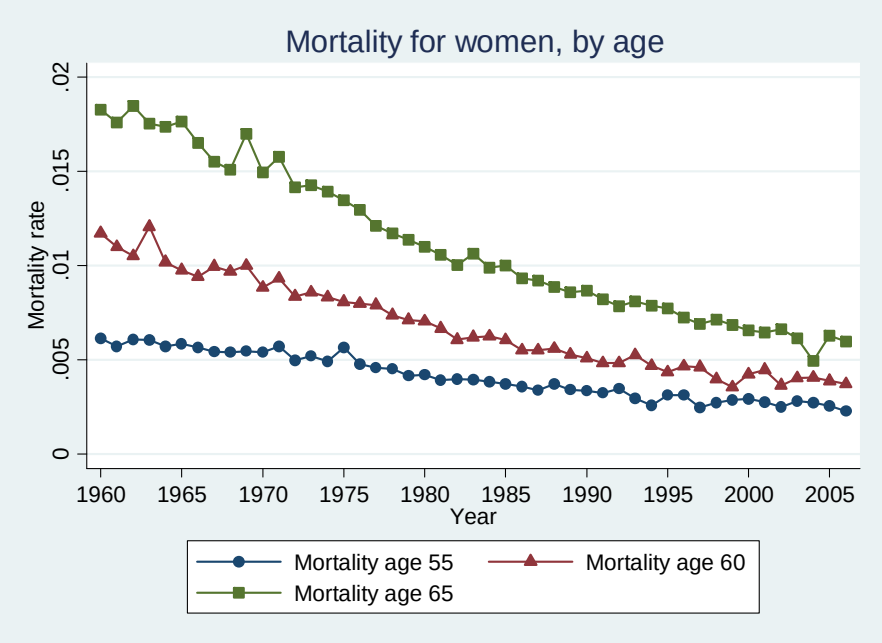


Source: own elaboration from data from the Human Mortality Database

Figures 9 and 10 show how individuals of different ages-since-birth could be considered to have the same age if measured by the same mortality rate. It plots the ages at which cohorts in different years face the mortality risk as sixty and sixty-five year olds in 1960. It can be seen that a men aged 72.7 (68.6) in 2006 had the same mortality risk as a 65 (60) year-old in 1960. Similarly, a women aged 74.8 (71.5) had the same mortality risk as a 65 (60) year-old in 1960. Then, a mortality-based age system would suggest that a 74.8 year-old woman in 2006 and a 65 year old woman in 1960 were the same age. Similarly, a 72.7 year old man in 2006 would have the same age as a 65 year old man in 1960

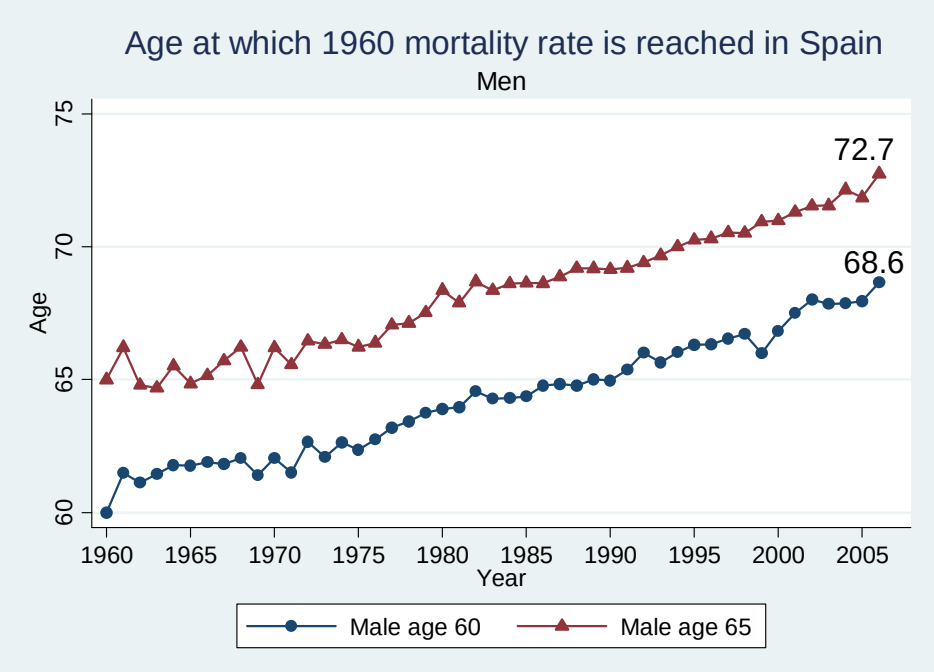
[9] As Shoven (2010) acknowledges, similar ideas were proposed earlier by others. See for example Fuchs (1984) or Cutler and Sheiner (2001)

Figure 8. Mortality rates at different ages by year. Women



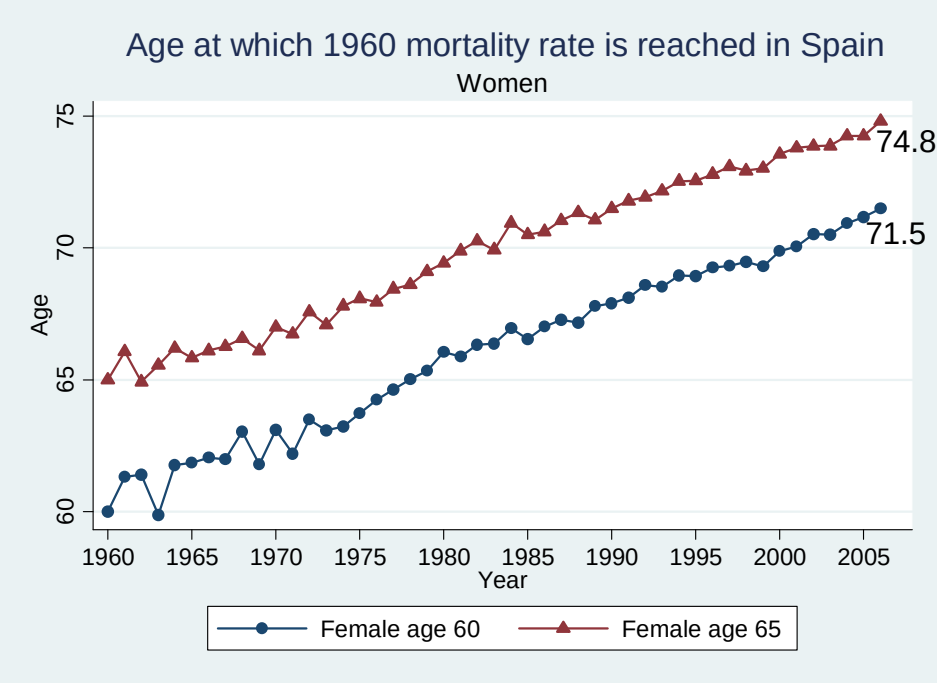
Source: own elaboration from data from the Human Mortality Database

Figure 9. Ages of equal mortality rate in Spain in 1960. Men



Source: own elaboration from data from the Human Mortality Database

Figure 10. Ages of equal mortality rate in Spain in 1960. Women



Source: own elaboration from data from the Human Mortality Database

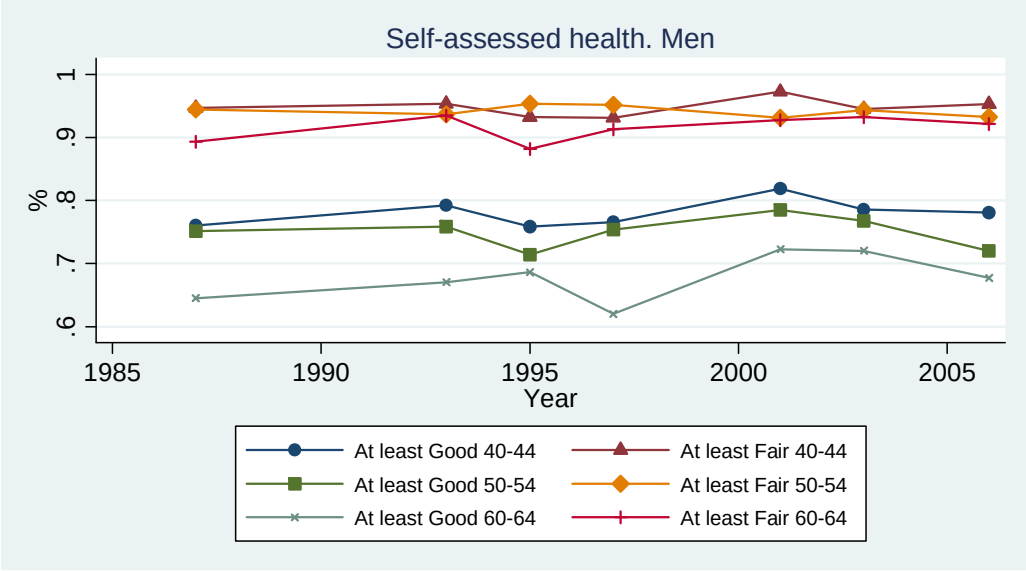
3.2. *Health trends*

We have previously shown that there has been striking improvements in age-specific mortality rates over the last 50 years in Spain across individuals aged over fifty-five. The extent to which these changes translate into higher labor capacity depends on the evolution of ill-health. Thus, further reduction in the age-specific mortality rates will only translate in an increase in the population able to work at older ages if the average age of the onset of a work-related disability increases. This would certainly be the case if the compression of morbidity hypothesis[10] (Fries, 1980) was satisfied. However, the international literature is inconclusive in this respect (Mackenbach et al. 2008). For example, the evidence provided by several studies that analyze disability trends in the US from the 1980s and 1990s suggests that while the prevalence rates for individuals older than sixty have decreased, the rates for the younger age groups have seen no improvement or even a deterioration (for example Crimmins et al 1999; Lakdawalla et al. 2004; Bhattacharya et al. 2008)

[10] Fries (1980) compression of morbidity states that the burden of lifetime illnesses will be concentrated in a shorter period before death as the age of functional impairment due to ill health will be increased.

In order to shed some light on the past-trends of health status in Spain we use data from the 1987, 1993, 1995, 1997, 2001, 2003 and 2006 editions of the Spanish Health Survey (ENS) available from the Ministry of Health and Social Policy (www.msps.es). These are nationwide cross-sectional surveys that collect information on health and socio-economic characteristics of individuals. The surveys contain separate samples for adults (16+) and children. The figures presented below are based on the adult samples. We use weighting factors to compute the different averages.

Figure 11. Evolution of self-assessed health. Men

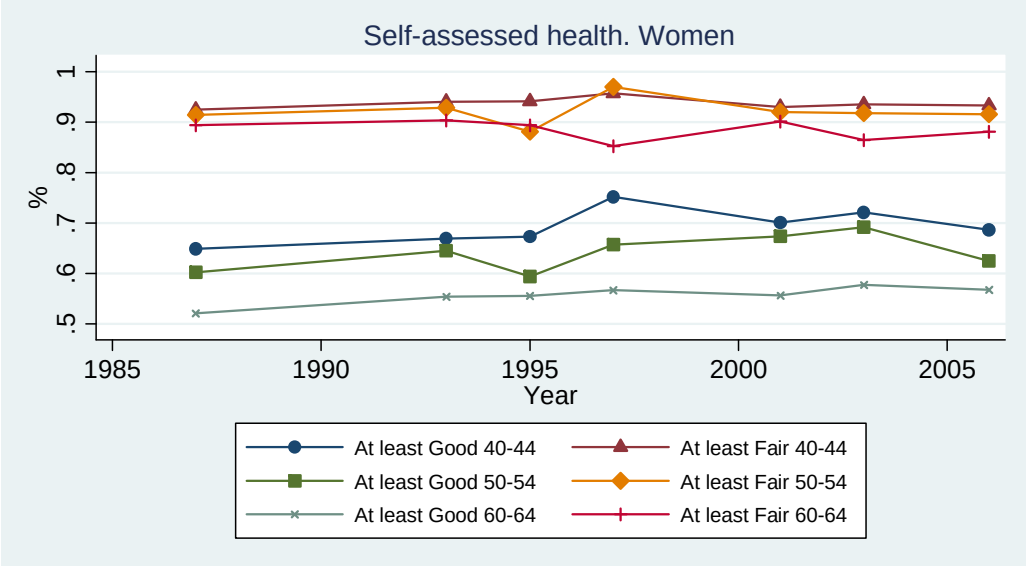


Source: own elaboration from data from the Spanish Health Surveys

Figures 11 and 12 show the evolution of self-assessed health status for men (Figure 11) and women (Figure 12) in the age-groups forty to forty-four, fifty to fifty-four and sixty to sixty-four based on the question "how would you rate your health during the last twelve months?". We show the percentage of each age and gender group that report being in good or very good health (good at least) and the percentage that report being in fair, good or very good health (fair at least). The figures do not show an overall improvement in self-reported health, neither a worsening, although the percentage of women in at least good health has experienced a slight increase among the three age groups considered during the last twenty years. This improvement in self-assessed health among women is not found when looking at the percentage of women in at least fair health. In addition, older individuals are on average in worse health if percentages in at least good health are compared, but the differences disappear if averages on at least fair health are compared. This could suggest that reporting heterogeneity among age-groups

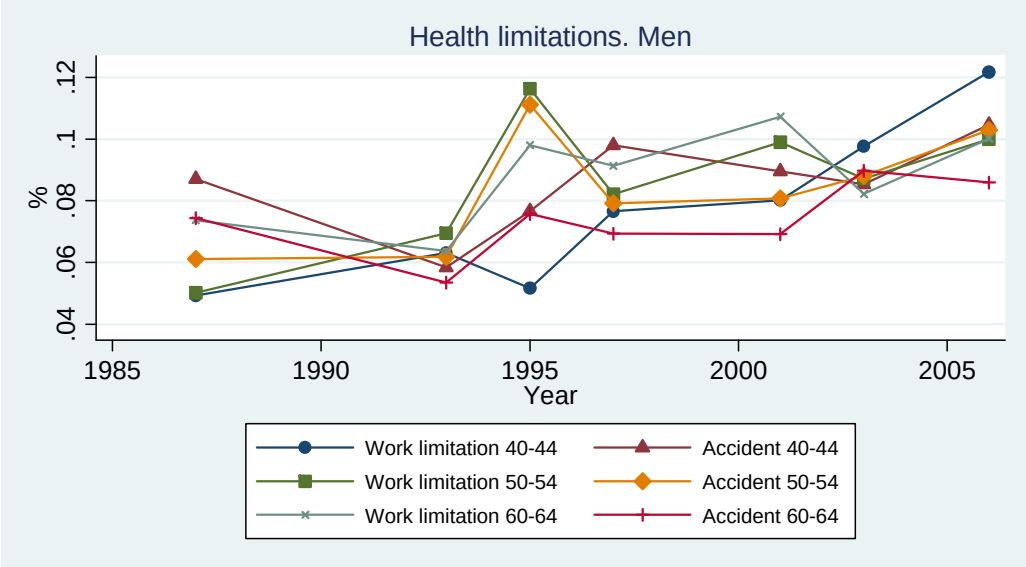
is stronger for reporting being in fair health, as one would expect a clear age-gradient in health status.

Figure 12. Evolution of self-assessed health. Women



Source: own elaboration from data from the Spanish Health Surveys

Figure 13. Evolution of health limitations. Men

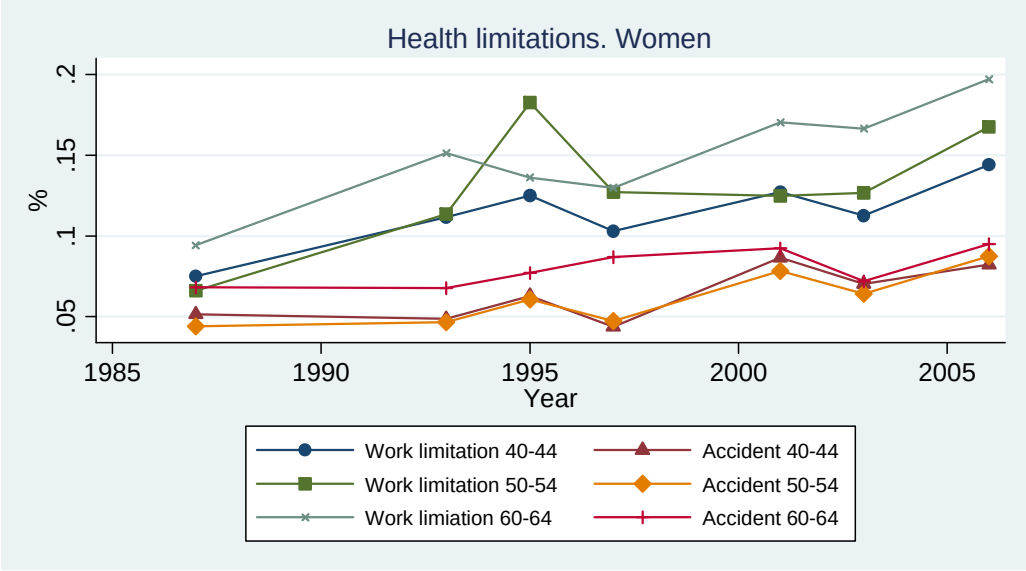


Source: own elaboration from data from the Spanish Health Surveys

In order to hypothesize what could have happened with the percentage of individuals with a health impairment to work, information which is not available for Spain, figures

13 (men) and 14 (women) depict the percentage of individuals with a work limitation[11] in the two weeks prior to the survey and the percentage of individuals who had any type of accident during the last year. First, they show that the percentage of individuals with a work limitation or who have experienced an accident has increased for all age-groups for both sexes during the last twenty years. On the other hand, while there is a clear age pattern among women, i.e., higher prevalence of both work limitations and accidents, the evidence among men is more mixed.

Figure 14. Evolution of health limitations. Women



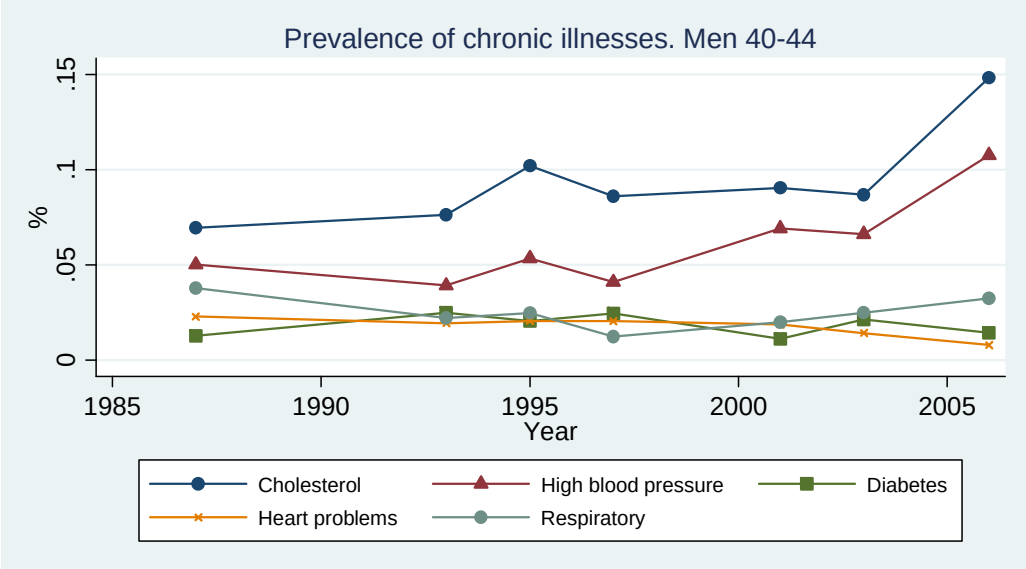
Source: own elaboration from data from the Spanish Health Surveys

Figures 15 to 20 show trends in the prevalence of several diagnosed chronic illnesses: cholesterol, high blood pressure, diabetes, heart problems and asthma or bronchitis (respiratory problems). The data show that the prevalence of cholesterol and high blood pressure have increased both for men and women across all age groups. Moreover, the reported prevalence of men and women in their forties at the end of the time period is similar to the one reported by individuals aged fifty twenty years ago. On the other hand, one should be cautious before concluding from these increasing trends that the prevalence of these two health problems has increased over the observed period as this could be due to a better awareness of the population, which would translate in higher self-reported rates. Johnston et al (2009) find that, while the rates of self-reported hypertension in England were 5.5% in 1998 and 8.5% in 2003, hypertension measured by

[11] It is based on the question: "Have you had to reduce your principal activity (work, study, house work) at least half a day due to a health discomfort or symptom in the last two weeks?"

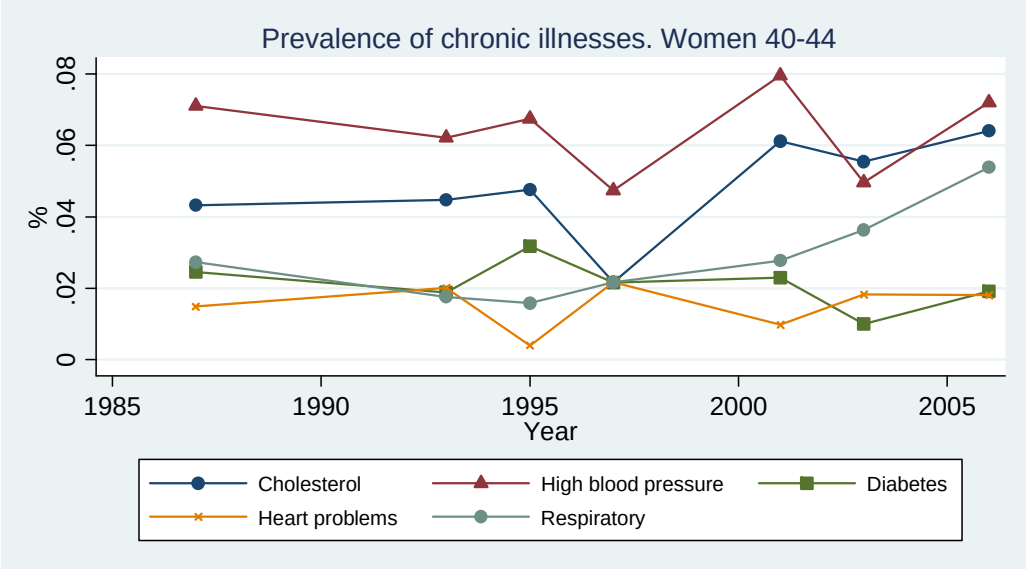
a nurse on the same sample decreased from 37% to 31% over the same period. Unfortunately, this objective information is not available for Spain through time.

Figure 15. Prevalence of chronic illnesses. Men 40-44



Source: own elaboration from data from the Spanish Health Surveys

Figure 16. Prevalence of chronic illnesses. Women 40-44

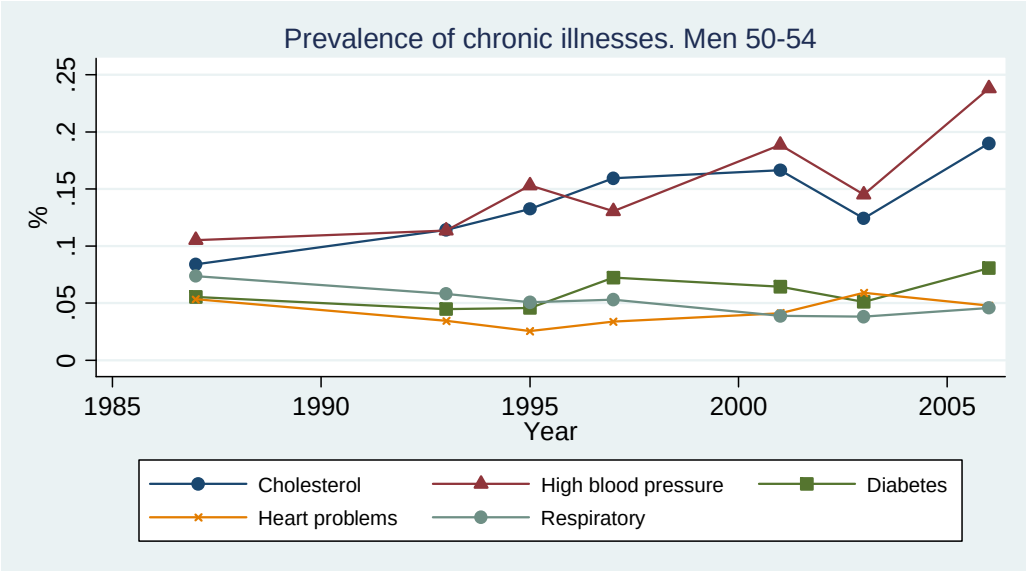


Source: own elaboration from data from the Spanish Health Surveys

On the other hand, the reported prevalence of diabetes, heart and respiratory problems remained stable through time with few exceptions: the prevalence of diabetes has increased among men older than fifty; the prevalence of bronchitis or asthma have

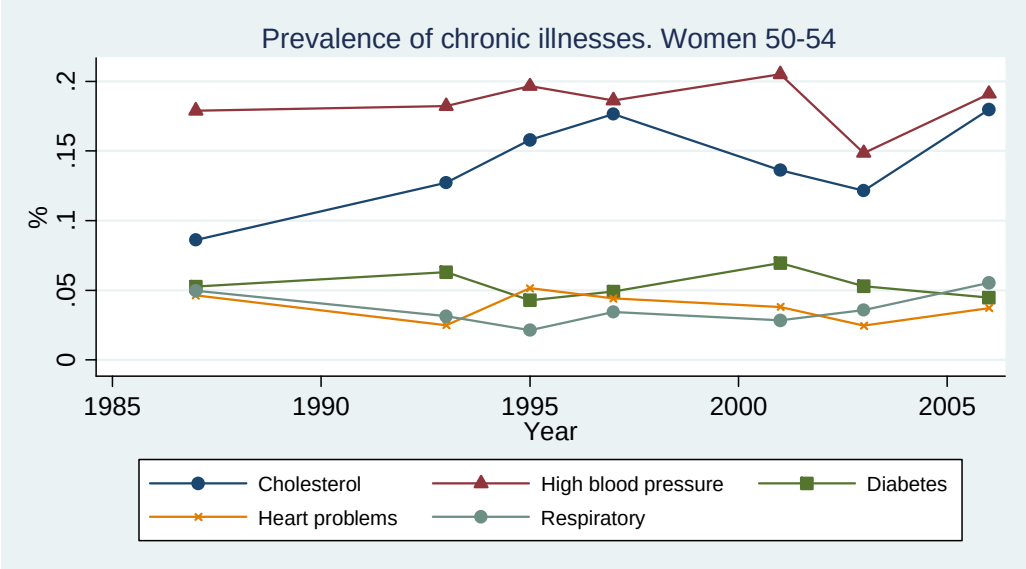
increased among the youngest and the oldest group of women; women in their sixties now suffer more heart problems.

Figure 17. Prevalence of chronic illnesses. Men 50-54



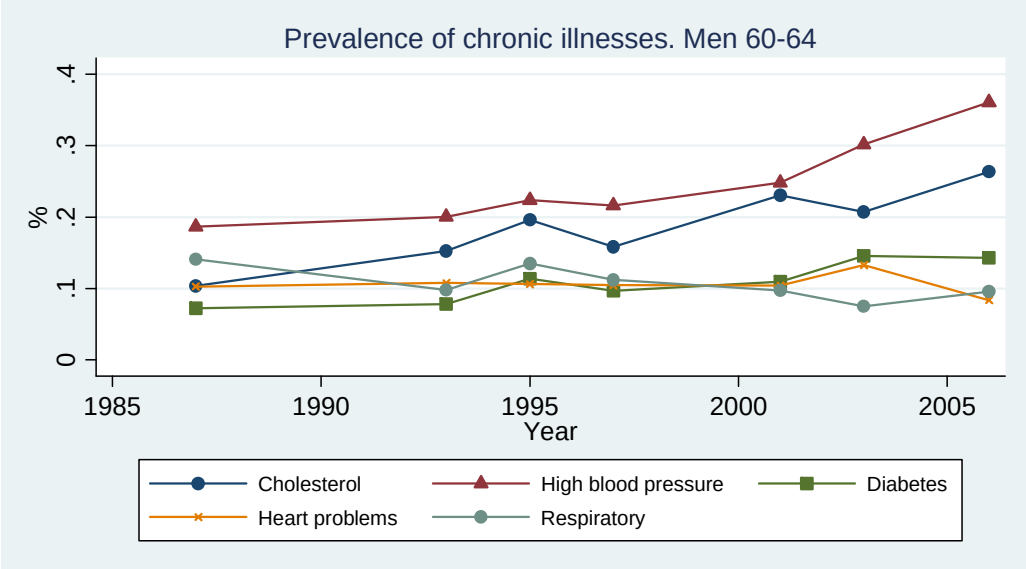
Source: own elaboration from data from the Spanish Health Surveys

Figure 18. Prevalence of chronic illnesses. Women 50-54



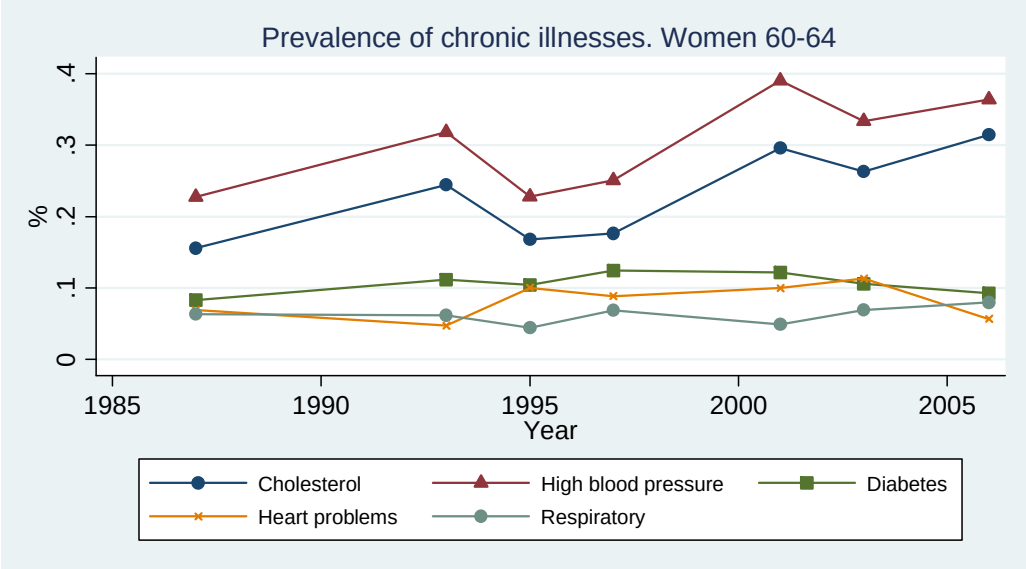
Source: own elaboration from data from the Spanish Health Surveys

Figure 19. Prevalence of chronic illnesses. Men 60-64



Source: own elaboration from data from the Spanish Health Surveys

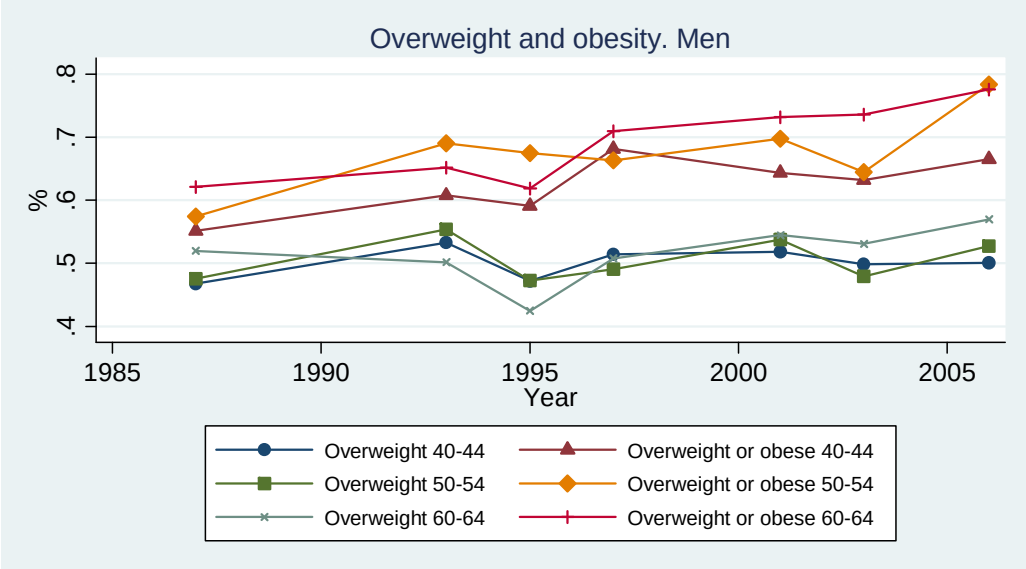
Figure 20. Prevalence of chronic illnesses. Women 60-64



Source: own elaboration from data from the Spanish Health Surveys

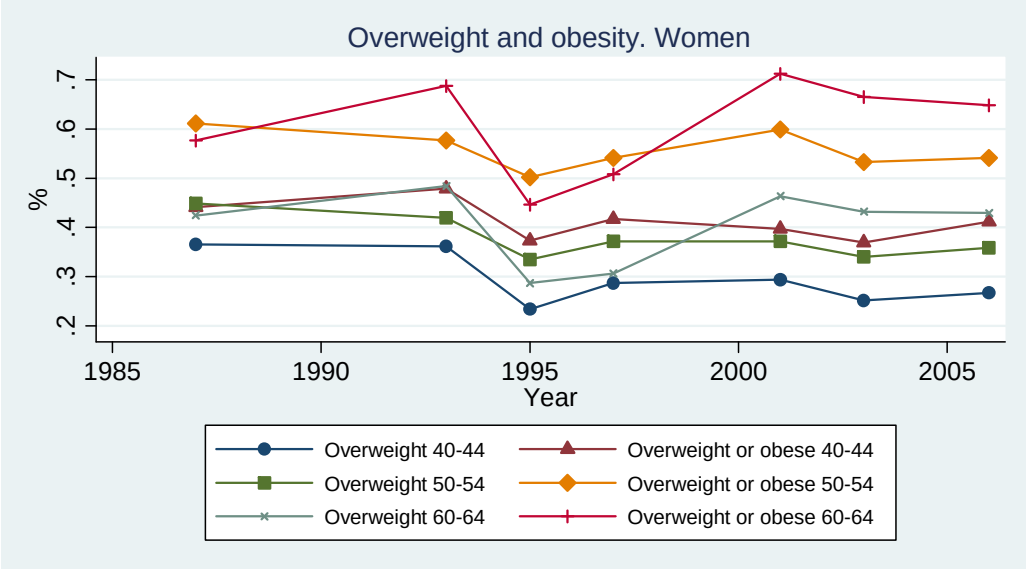
Figures 21 (men) and 22 (women) show the prevalence of overweight and/or obesity in the last twenty years, which are known to be risk factors that could increase the burden of disease in the future. The data show that both the percentage of men with overweight and obesity have increased during the last twenty years among all age-groups, being the increase in obesity rates steeper than the increase in overweight rates. In 2006 almost eighty percent of men older than fifty are either overweight or obese compared to sixty percent in 1987.

Figure 21. Prevalence overweight and/or obesity. Men



Source: own elaboration from data from the Spanish Health Surveys

Figure 22. Percentage overweight and/or obese. Women



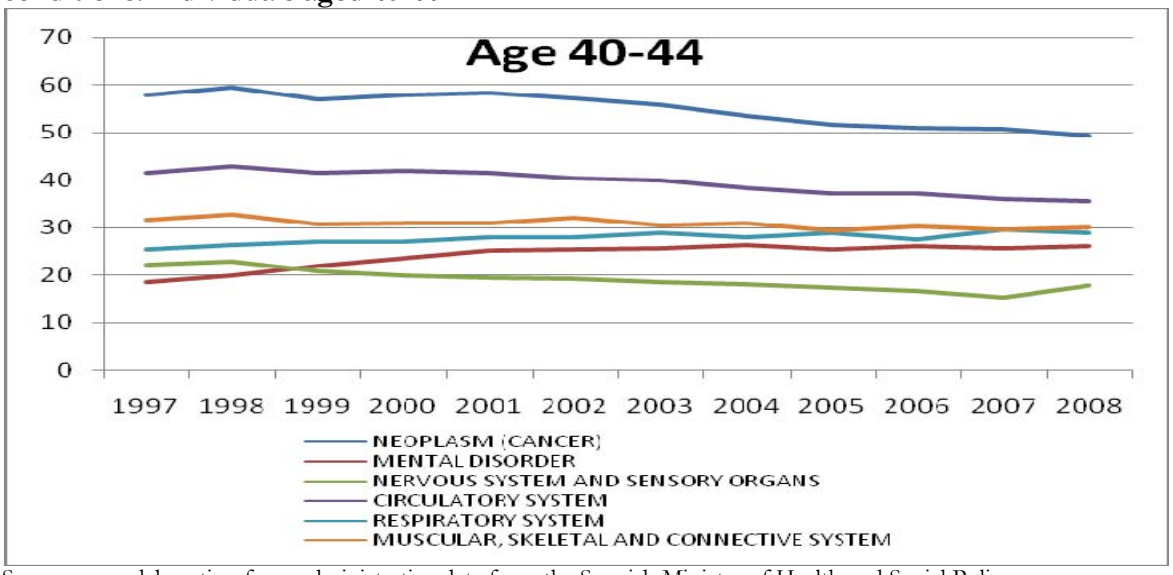
Source: own elaboration from data from the Spanish Health Surveys

The percentage of women who are overweight is lower compared to men, which is consistent with the evidence found by Andreyeva et al (2007) using data from the 2004 sample of the Survey of Health and Retirement in Europe. On the other hand, little have changed in the weight distribution of women aged forty to fifty-five. At the same time, the prevalence of reported obesity among women in their sixties has increased by ten percent in the last twenty years, while the percentage that report being overweight has remained around forty-five percent

In order to complement the self-reported descriptive evidence, we provide some information on the number of hospitalizations by type of diseases using administrative data from 1998 to 2007 from the Spanish Ministry of Health and Social Policy. We present data for the same three age groups, but unfortunately we are not able to show figures for men and women separately.

Figures 23 to 25 show the number of hospitalizations for each 10,000 inhabitants by age group and by major condition. The data show that neoplasm and circulatory diseases are the two main groups of health conditions leading into a hospitalization among all age groups. Neoplasm represents the first cause among individuals younger than fifty in the overall period but its incidence has decreased since 2000. On the other hand, while circulatory problems were the main cause of hospitalization among individuals aged fifty to fifty-four ten years ago, currently it ranks second after neoplasm due to a decrease in the number of hospitalizations due to circulatory problems during the last decade. There is a decreasing trend in the number of hospitalizations due to health problems related to the circulatory system among the older age group, which remains the first cause, but simultaneously there is an increase in the number of hospitalizations due to a neoplasm.

Figure 23. Number of hospitalizations for each 10,000 inhabitants by major conditions. Individuals aged 40-44

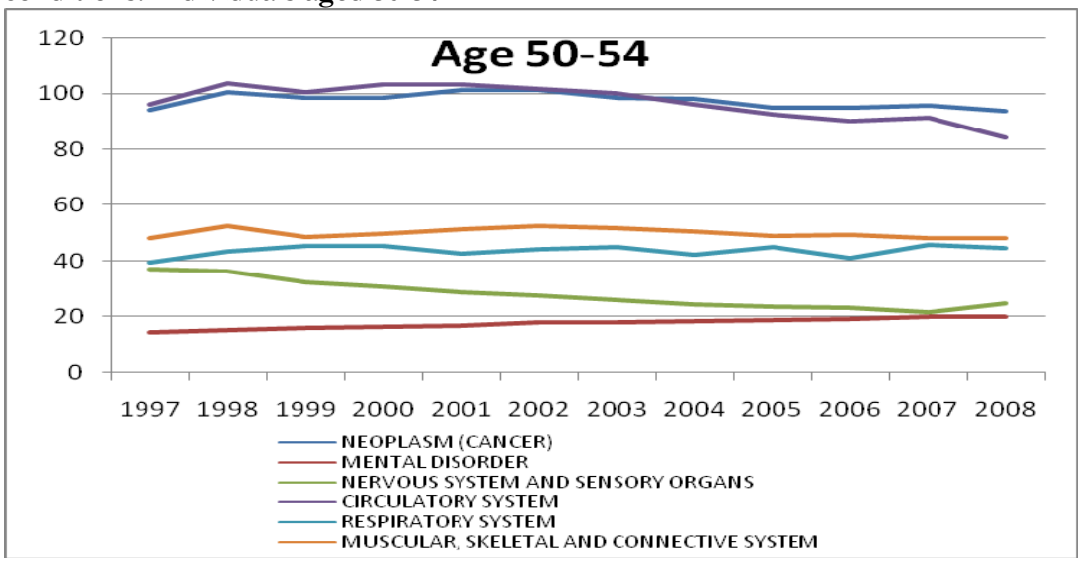


Source: own elaboration from administrative data from the Spanish Ministry of Health and Social Policy

It is also worth mentioning the observed increase in the number of hospitalizations due to mental problems, being it steeper among the youngest age group. The number of hospitalizations related to respiratory health problems has also increased among the

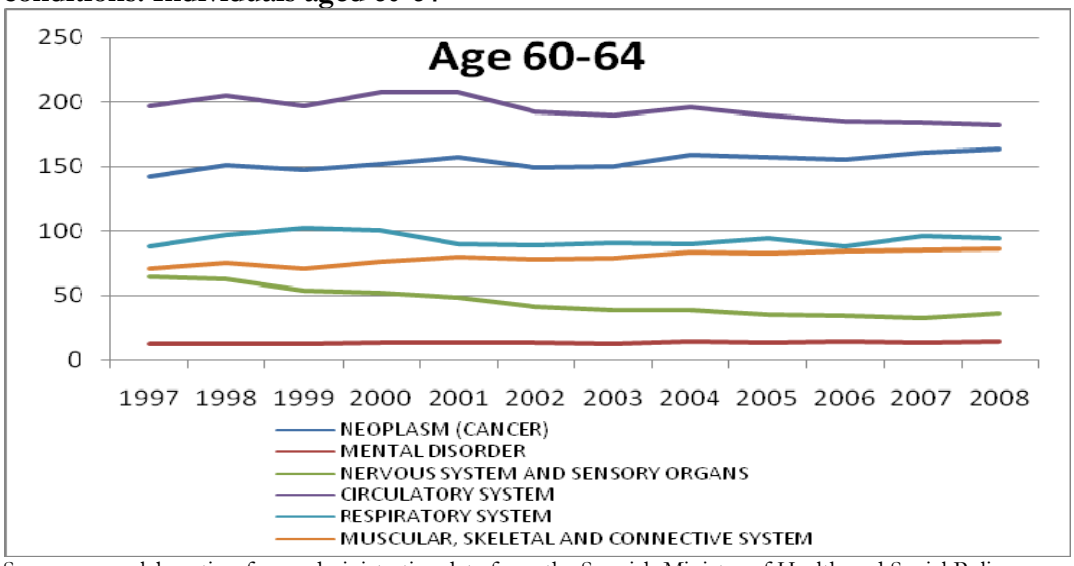
younger group, while a decreasing trend is found for the rest of the health problems considered.

Figure 24. Number of hospitalizations for each 10,000 inhabitants by major conditions. Individuals aged 50-54



Source: own elaboration from administrative data from the Spanish Ministry of Health and Social Policy

Figure 25. Number of hospitalizations for each 10,000 inhabitants by major conditions. Individuals aged 60-64



Source: own elaboration from administrative data from the Spanish Ministry of Health and Social Policy

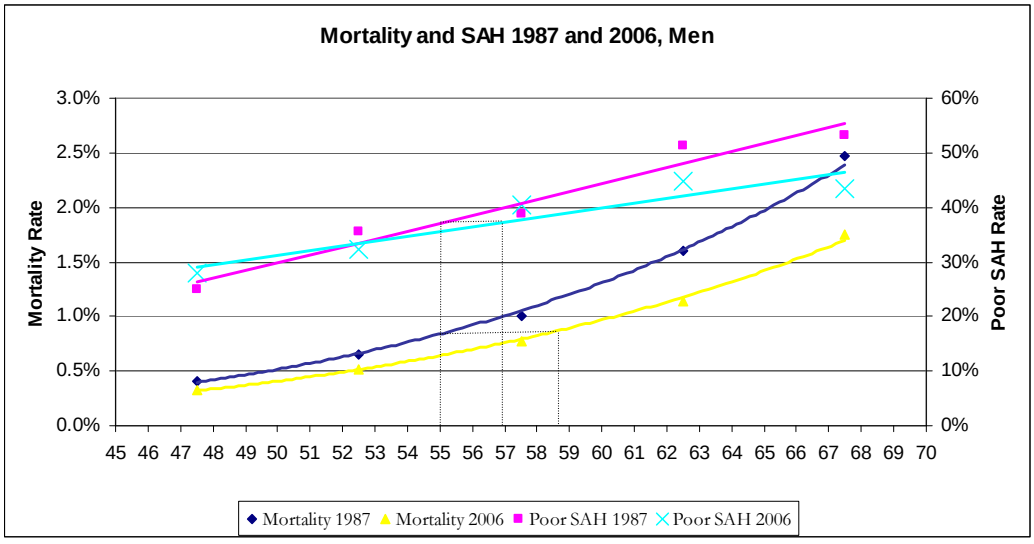
3.3 Mortality and health

In the previous two sections we have shown that, while age-specific mortality rates have decreased through time, the evidence on the health status of the individuals aged forty to

sixty-five is less conclusive, and it depends on the health measure used. Here we explore further the relationship of Mortality with the other health variables.

Figure 26 (men) and Figure 27 (women) compare Mortality Equivalent Ages versus SAH Equivalent Ages. We plot the average for each age-interval at the mid point of the intervals and then we fit a linear functional form for SAH and a power function for mortality. First, based on these rough estimates, Figure 26 shows that men aged 58.7 in 2006 had the same mortality rates as men aged 55 in 1987, a difference of almost 4 years. The difference is about one year higher for women (Figure xx) as women aged 59.9 in 2006 had the same mortality rates as women aged 55 in 1987. Second, both figures also show the proportion of individuals who reported that their health status was less than good in 1987 and 2006. The gain in SAH over this period is smaller than the gain in mortality as men aged 56.9 in 2006 reported similar SAH as men aged 55 in 1987 and women aged 57.7 in 2006 had about the same SAH as women aged 55 in 1987.

Figure 26. Mortality and Self-Assessed Health 1987 and 2006, Men



Figures 28 (men) and 29 (women) depict together trends in mortality, self-reported health status and self-reported work limitations as defined above. Figures 26 and 27 show that the large gains in mortality rates have not been translated into better SAH. This is further reinforced by the data shown in Figures 28 and 29. On the one hand, the percentage of individuals who reported that their health status was less than good in the last year slightly decreased over the last twenty years, while the percentage who reported

having to cut their principal activities at least half a day because of a health-related problem increased during the same period.

Figure 27. Mortality and Self-Assessed Health 1987 and 2006, Women

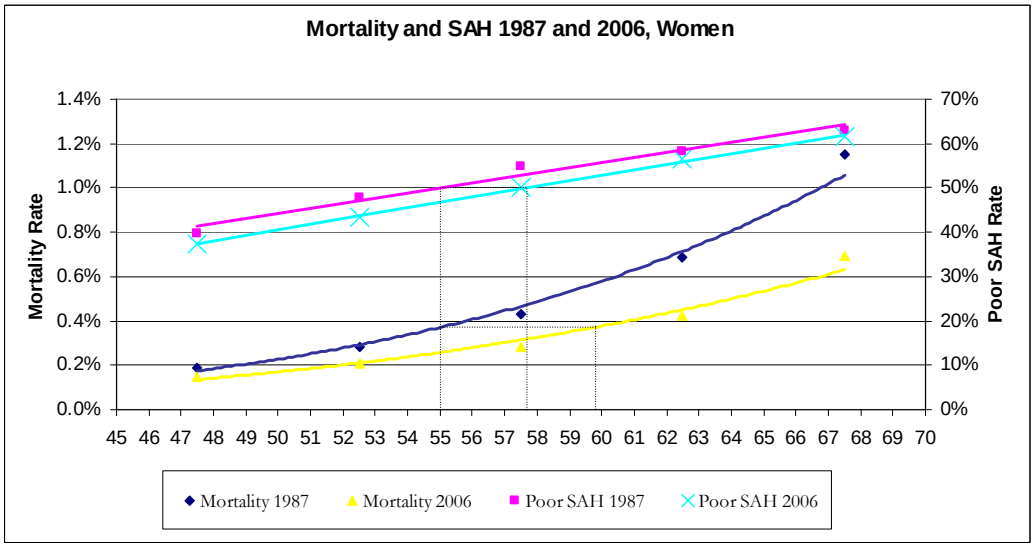


Figure 28. Mortality rate of men,% in less than good health and with work limitations, age 60-64

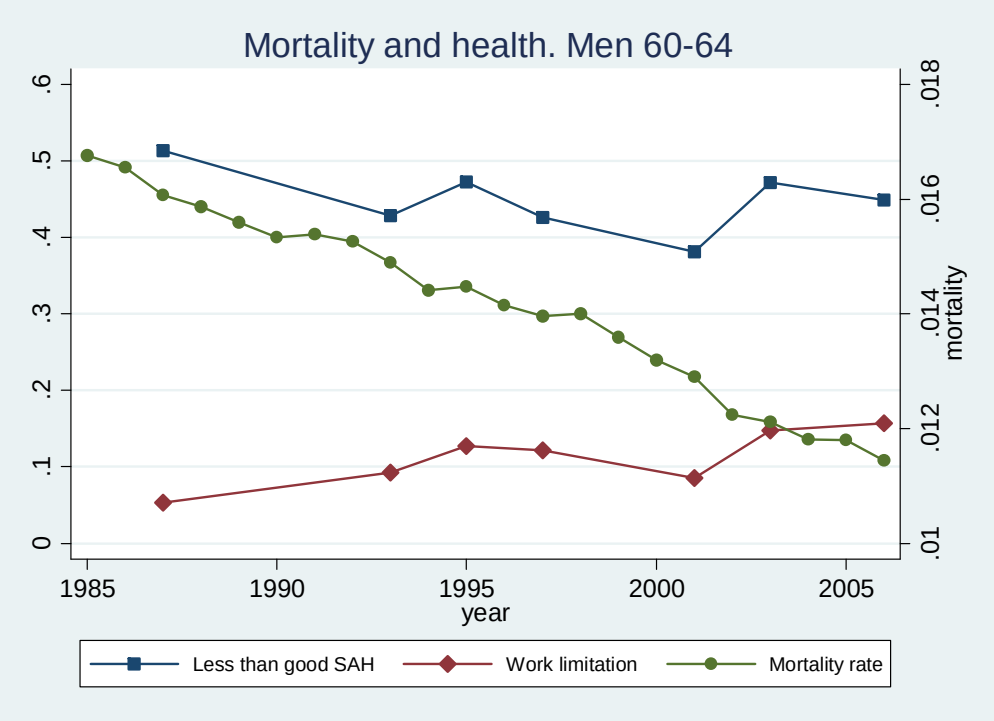
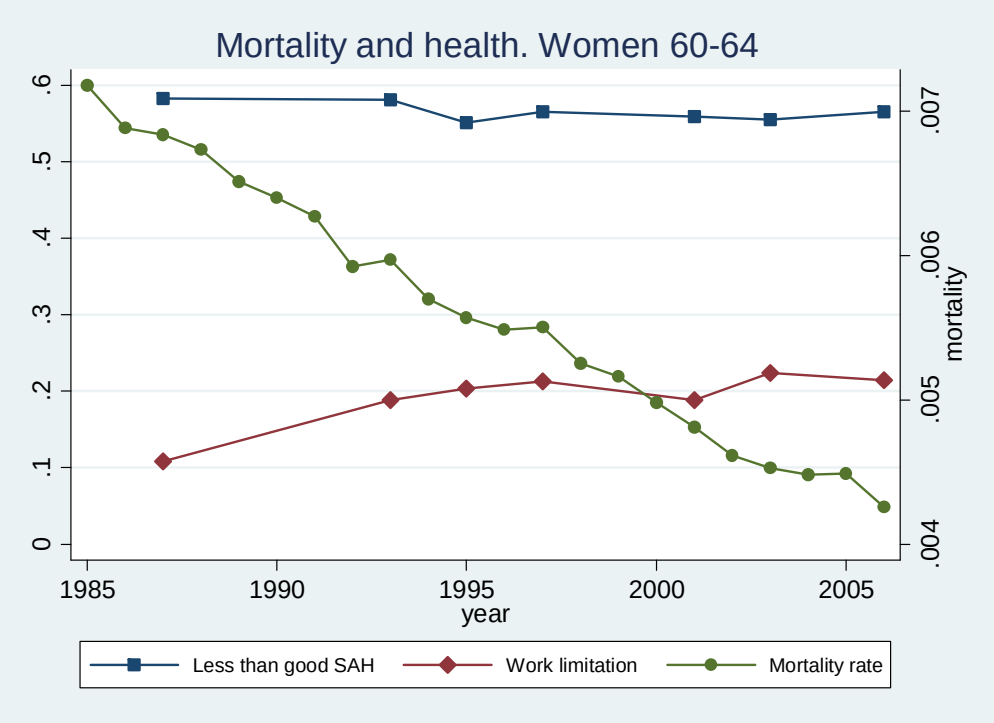


Figure 29. Mortality rate of women, % in less than good health and with work limitations, age 60-64



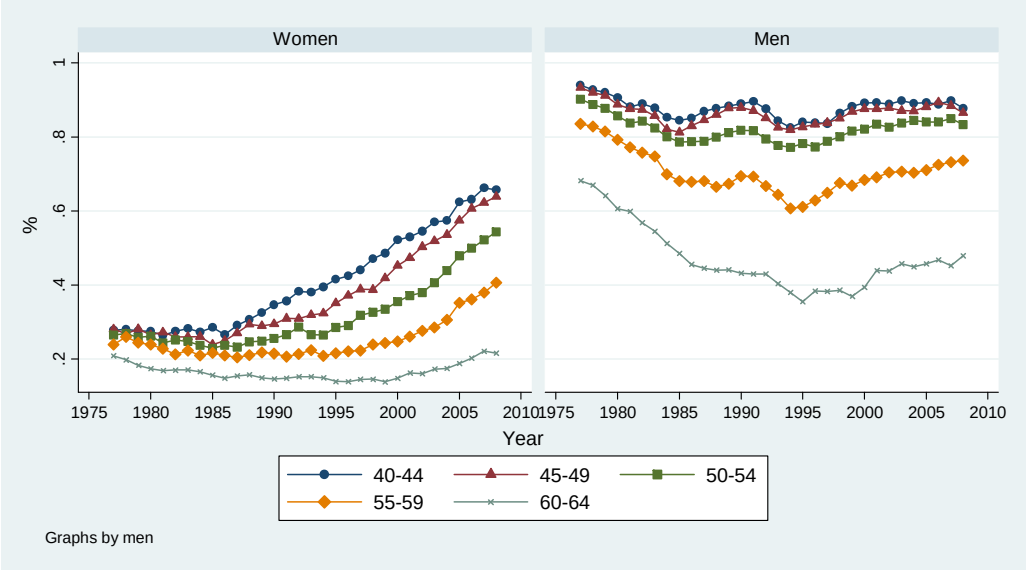
3.4 Trends in disability and labor force participation

In this section we provide some graphical evidence on labor force trends by age-groups and gender. Data on employment, unemployment and disability come from the *Encuesta de Población Activa* (EPA). The EPA is a rotating quarterly survey carried out by the Spanish National Statistical Institute (*Instituto Nacional de Estadística*, INE). The planned sample size consists of about 64,000 households with approximately 150,000 adult individuals. Although the survey has been conducted since 1964, publicly released cross-sectional files are available only from 1977. The 1977 questionnaire was modified in 1987 (when a set of retrospective questions were introduced), in the first quarter of 1992, in 1999 and 2004. The EPA provides fairly detailed information on labor force status, education and family background variables but, like most of the other European-style labor force surveys, no information on health is provided. The reference period for most questions is the week before the interview.

Figure 30 shows the evolution of employment rates by age-group for men and women separately. The data show that there has been an important increase in female labor force

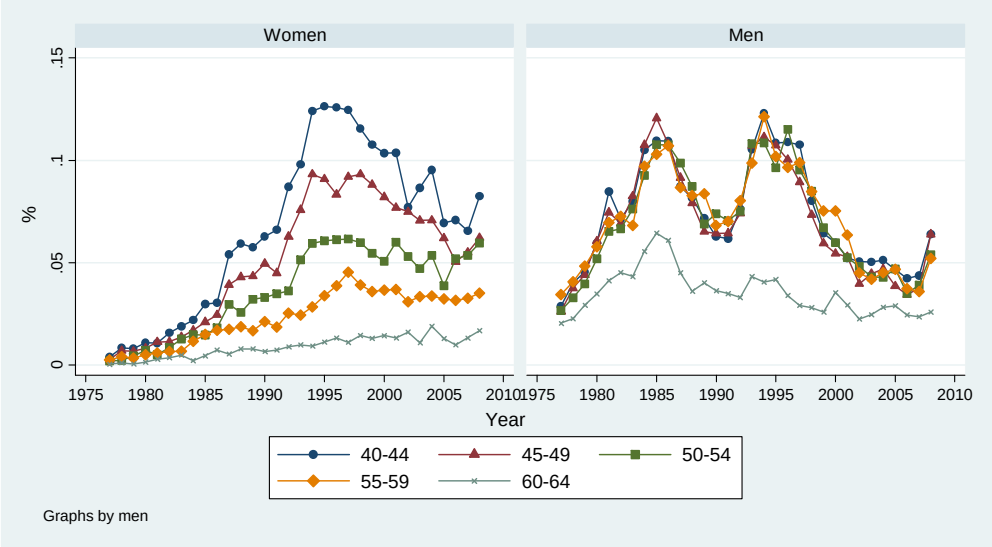
participation since the mid-1980s, although employment rates of women in their forties are still far below the rates of their male counterparts (around twenty percentage points difference). The increase in female participation also translates in an increase in unemployment rates (Figure 31). The unemployment rates of males and females move in parallel since the beginning of the nineties. In addition, the data show that there are no differences across age groups among men, except for the lower unemployment rate of the older group resulting from lower labor force participation as suggested also by the employment rate.

Figure 30. Employment by age-group. Men and Women



Note: own elaboration using data from the Spanish Labor Force Survey

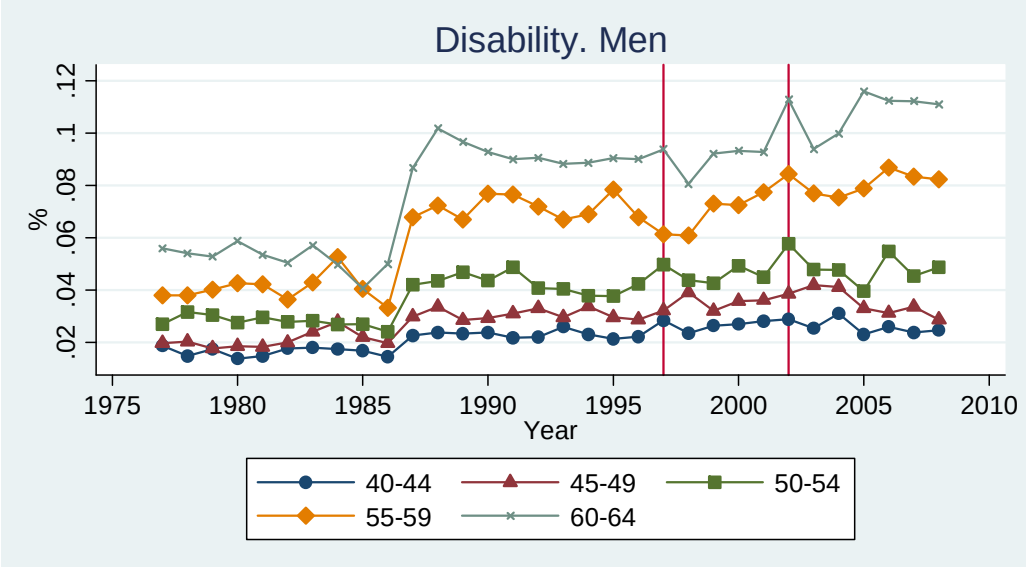
Figure 31. Unemployment by age-group. Men and Women



Note: own elaboration using data from the Spanish Labor Force Survey

In the same spirit, Figures 32 (men) and 34 (women) show the evolution of the percentage of individuals who classify themselves as permanently disabled when asked about their labor status in the previous week using data from EPA. It should be noticed that there was a change in the survey in 1987 that affects the numbers shown. Before 1987 there is information available about one state, while after 1987 individuals can be seen in up to three different states. This implies that some individuals could report being permanently disabled and doing some volunteer or paid work, for example. We have decided to count an individual as permanent disabled if he reports being so in any of the three possible states. This results in an increase in the percentage of disabled individuals after 1987, being the discontinuity higher among the older age groups.

Figure 32. Evolution of disability rates by age-group. Men



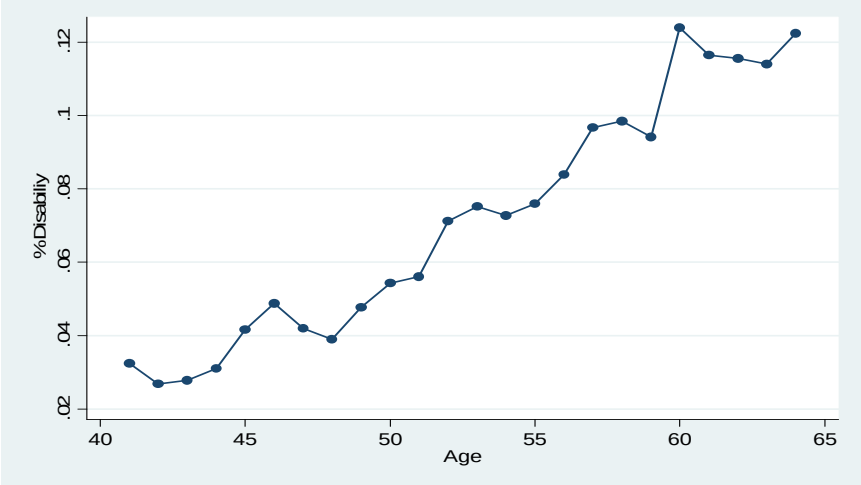
Note: own elaboration using data from the Spanish Labor Force Survey

The data show that, for both male and female, the percentage of permanent disabled is higher among the older age groups, although the difference across age groups is bigger among males. Figure 33 shows the different enrollment rates into DI by men by age for the last year of data available. The data show that the percentage of men collecting disability benefits increases with age from less than 4% among men aged forty to over 12% among men aged sixty-four.

The share of women who can claim a contributory disability pension has increased through time with their labor participation. This could explain the lower differences across age-groups among women, as well as the increase of the share in women in

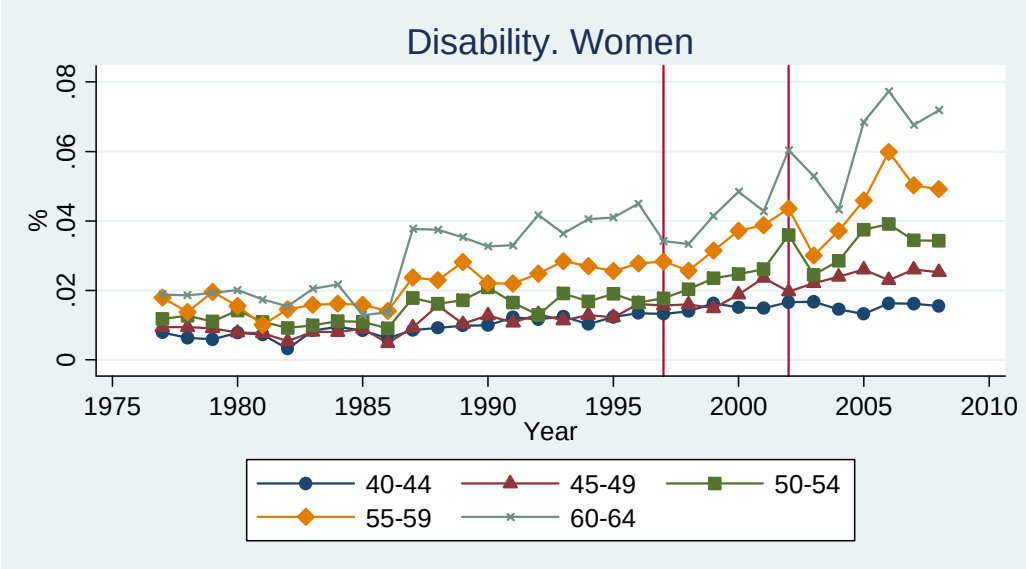
disability, while the share among men remains in general stable, except for the group aged over fifty-five.

Figure 33. Proportion of men collecting disability benefits at different ages



Note: own elaboration using data from the Spanish Labor Force Survey

Figure 34. Evolution of disability rates by age-group. Women



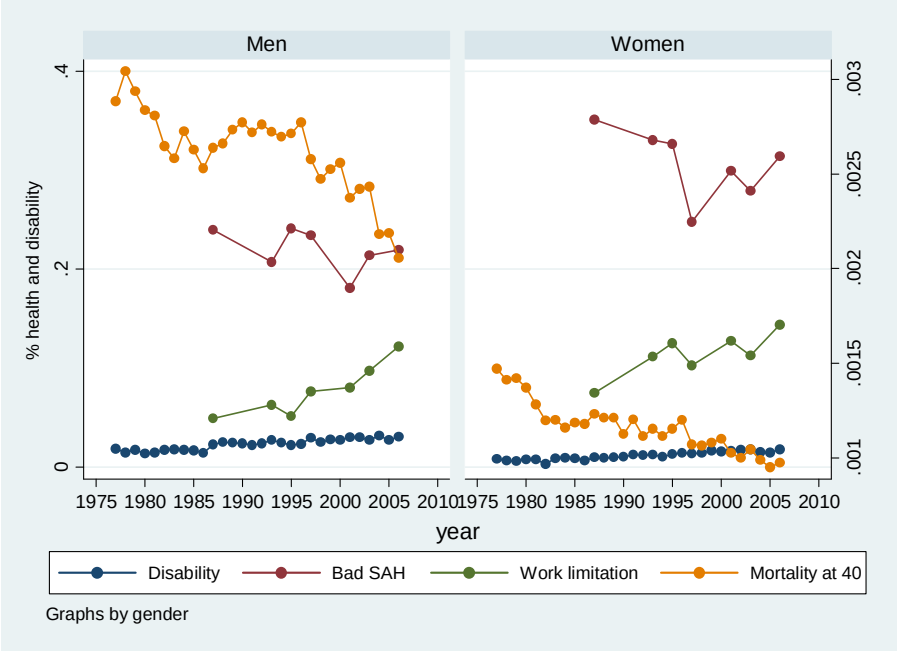
Note: own elaboration using data from the Spanish Labor Force Survey

Figures 32 and 34 also indicate the years in which the two main reforms took place (1997 and 2002). We will investigate their effects a bit more into detail later. However, it is now worth that neither the trends nor the levels seemed to change after their implementation.

3.5 Disability, health and mortality

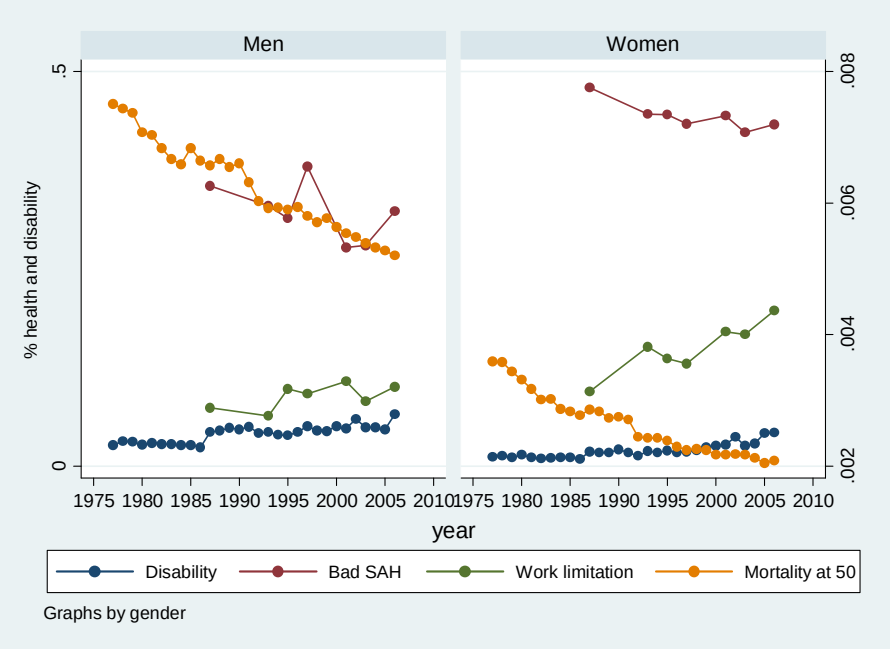
We combine in Figures 35 to 37 the information on permanent disability shown in the previous section with the health and mortality information shown above for three age groups: i) forty to forty-four (Figure 35); ii) fifty to fifty-four (Figure 36); iii) sixty to sixty-four (Figure 37). The data show that the trend of the percentage of individuals into disability does not follow any of the other health measures. So, despite the reduction in age-specific mortality, the percentage of individuals into disability remains almost constant. As argued above, we would expect a reduction of disability coming from an improvement in mortality only if the onset of the disabling condition happens later in life. Otherwise, the share of the population at a given age in ill-health could even increase. Unfortunately, we cannot take any conclusive evidence on this regard with the analysis shown here. On the other hand, the stability of the share into disability during the last twenty years suggests that any changes that could have happened in the population's health have not affected the inflows into disability. Thus, it is likely that other dimensions of the program are more important in explaining its evolution. We focus on the role of the different Social Security reforms in section 4.

Figure 35. Disability, self-reported health, work limitation and mortality at age 40. Individuals aged 40-44. By gender.



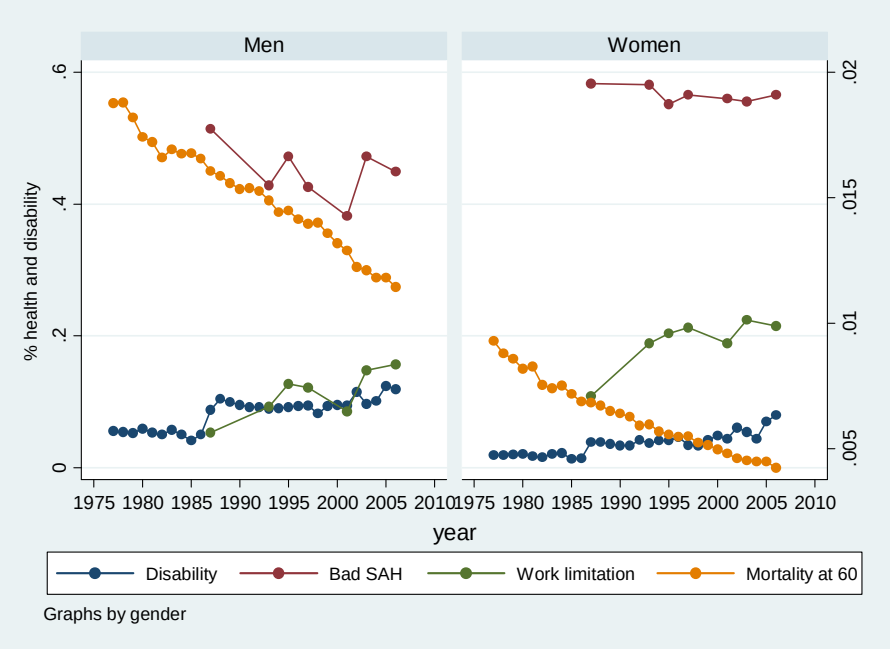
Note: the x-axis is common for the graph of men and women. The axis on the left is for the variables disability, bad self-assessed health and work limitation, while the axis on the right refers to the mortality rate.

Figure 36. Disability, self-reported health, work limitation and mortality at age 50. Individuals aged 50-54. By gender.



Note: the x-axis is common for the graph of men and women. The axis on the left is for the variables disability, bad self-assessed health and work limitation, while the axis on the right refers to the mortality rate.

Figure 37. Disability, self-reported health, work limitation and mortality at age 60. Individuals aged 60-64. By gender.



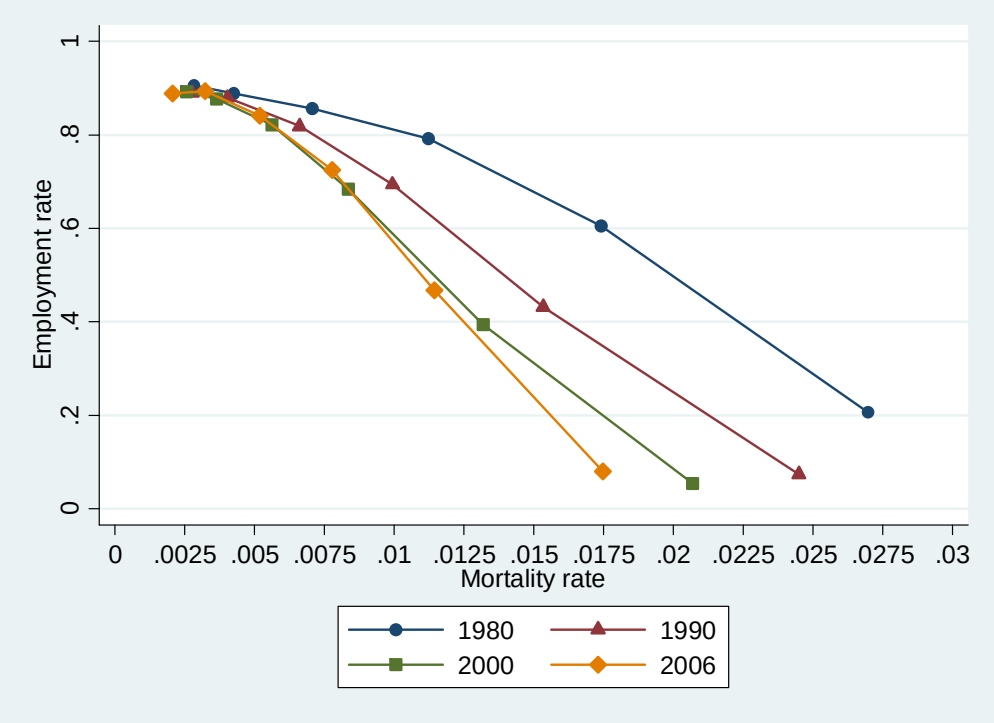
Note: the x-axis is common for the graph of men and women. The axis on the left is for the variables disability, bad self-assessed health and work limitation, while the axis on the right refers to the mortality rate.

3.6 Health, mortality and labor force participation

The data in Figure 30 above have shown that employment rates of men in their late fifties and early sixties in Spain decreased during the 80s until the mid 90s and, although they have slightly increased in the last decade, they are far from the rates observed in 1980. In this section we combine data on health status and labor force participation. We will not show figures for women as the increase in female participation rates in the past masks any relationship.

We first follow Shoven (2010) and look at a different definition of age based on mortality risks and compare the employment rates of individuals at the same mortality risk in different points in time. Then, if we assume that individuals with the same mortality risk experience the same health status, we can evaluate how participation rates change across time for individuals with the same health status. Figure 38[12] pictures the employment rate in 1980, 1990, 2000 and 2006 (last year for which both employment and mortality data are available) for each mortality risk for men.

Figure 38. Evolution of the employment rate by mortality rate. Men



[12] We combine the information presented above on employment rates from the EPA with information on mortality rates from the Human Mortality Database for individuals aged forty to sixty-nine. The rates refer to five-age group averages for both measures.

The conclusions we draw from Figure 38 are somehow different from the ones drawn before. First of all, we find that participation rates have not increased among the older group of individuals, defined as individuals with higher mortality, in the later years. On the other hand, the employment rate decreases, not for all the individuals, but among the ones whose mortality risk is at least 0.5 percent. Consistently, the decrease through time is higher among the groups with higher mortality risks to the extent that the employment rates of groups whose mortality risk is at least 0.01 have been halved. Looking at the data in another way, the mortality rate when 60 percent of men were employed was 0.0175 percent in 1980, but it was only 0.01 percent 26 years later. Therefore, men in 2006 had to be much healthier (by the mortality measure) in 2006 that they were in 1980 for the employment rate to be 60 percent.

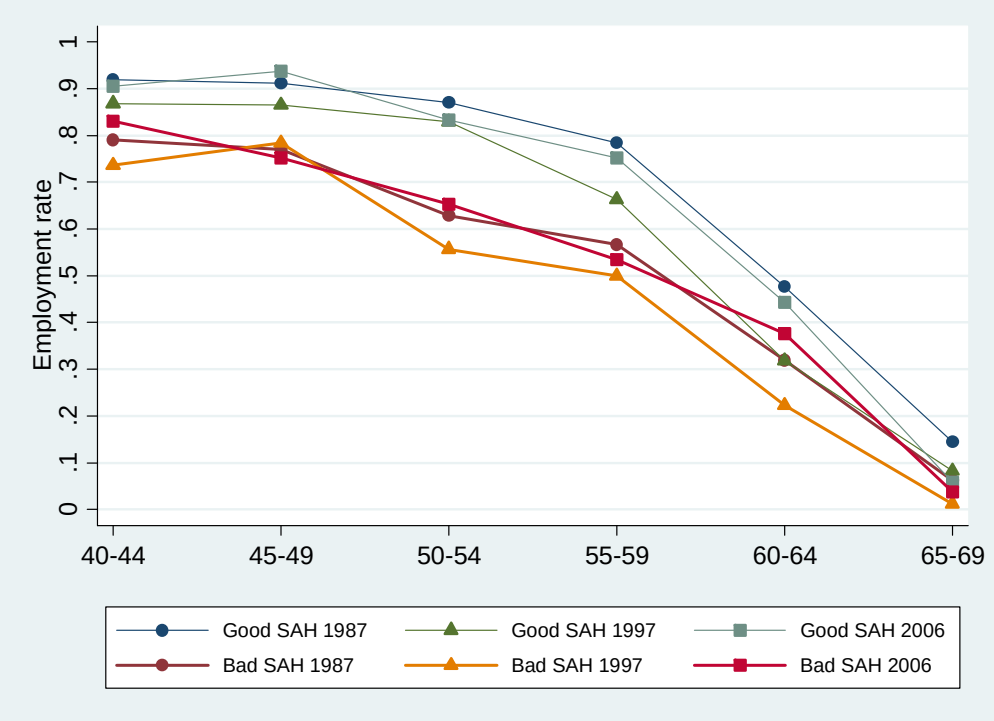
As argued above, individuals with the same mortality-risk do not necessarily face the same health status as health care technology improvements could have helped to decrease the age-specific mortality risks, but at the cost of higher prevalence of disability. In order to shed some light on this, we focus on the evolution of employment rates using both information on self-assessed health and the existence of a work limitation using ENS data.

Figure 39 shows the employment rates by individual's self-assessed health. We have grouped self-assessed health in two categories: good or very good health (thin lines in the Figure) and fair, bad or very bad health (thick lines in the Figure). We have used this division as it was found to capture better the age differences in health status (see Figure 11 above). The data show that employment rates of individuals in bad health are much lower compared to their healthy peers among individuals younger than sixty. More specifically, among men aged fifty to fifty-four who report being in bad health only about sixty percent is at work, while this number is higher than eighty percent among the healthy ones. The employment rates of healthy and unhealthy individuals converge among the group aged at least sixty.

The second feature shown by Figure 39 is that employment rates of individuals older than fifty-five in good health had fallen from 1987 to 1997 and, although some recovery is observed in 2006, employment rates are still below the ones observed in 1987. This is in line with the data shown in Figure 30. The evidence regarding individuals in bad health

is less clear-cut and it seems that employment rates of this group have remained stable through time.

Figure 39. Evolution of the employment rate by self-assessed health. Men



All together, the evidence presented here suggests that health status is an important variable in determining labor force participation among individuals younger than sixty, but it becomes less important as the social security incentives of the old-age pension system kick in. We then now focus on the role played by the different social security reforms in explaining the evolution of labor force participation trends in general, and more specifically, the participation in the disability program.

4. Pathways to retirement and program reforms

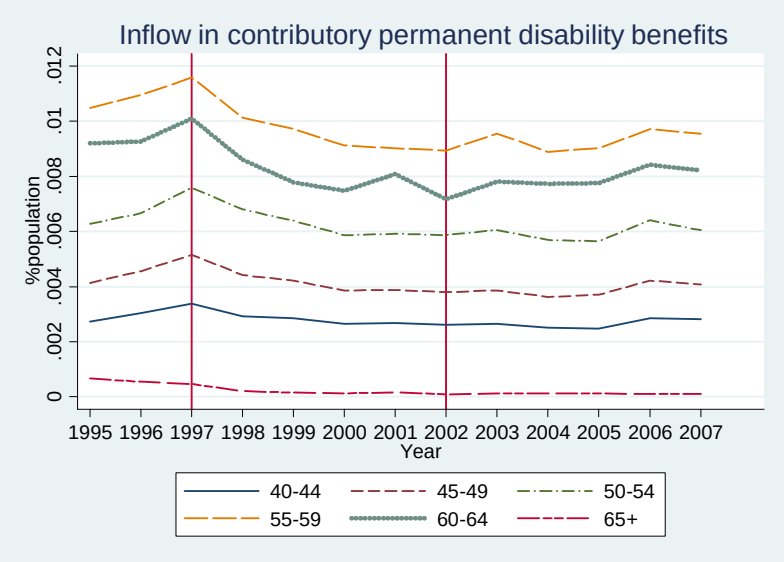
In the previous section we have shown that the trends in labor force participation are not likely to be driven by the evolution of the population health. Thus, in this section we analyze the relationship with the other usual suspect, i.e., the incentives that the Social Security system poses to individuals to withdraw from the labor market.

In particular, we first look at the association between the characteristics of the social security system and the inflow into and the stock of the main contributory social security programs (permanent disability, retirement and unemployment). Later, we provide a tentative evaluation of the two main reforms of the social security system that have affected the incentives of old-age workers to withdraw from the labor force during the period for which we have data available.

4.1. Descriptive evidence on the pathways to retirement

The evidence pictured in Figures 30 to 34 above using aggregate data from the Spanish Labor Force Survey, which uses self-reported labor status, did not show any change in behavior after the 1997 reform, neither after the 2002 reform. Let us recall that the main characteristics of the reform held in 1997 were the implementation of stricter medical control to apply for disability benefits, and the decrease in generosity of the contributory old-age benefits. The 2002 reform provided individuals with more incentives to continue working beyond the age of sixty-five, at the same time that a more stringent search criteria was required among the unemployed.

Figure 40. Inflow into contributory permanent disability by age-group.

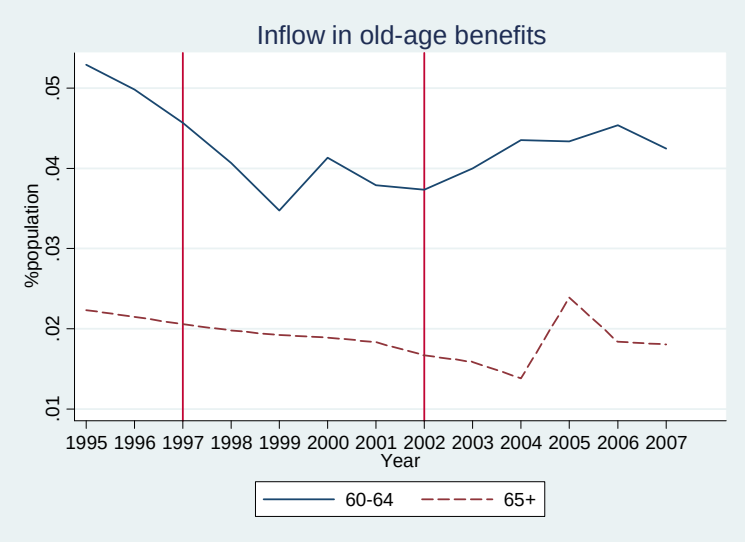


Source: Own calculations using administrative data from the Ministry of Employment and Immigration and population figures from the Ministry of Health and Social Policy.

Figure 40 shows administrative data on the inflows into contributory permanent disability benefits. This data is obtained from the Spanish National Social Security

Institute (www.seg-social.es). The data show that the percentage of individuals going into this system slightly decreased after 1997 for all the age groups considered (from forty to sixty-four) and it stayed constant thereafter. Figure 41 shows comparable data for the inflows into contributory old-age benefits. The trends and levels remain stable through the period despite the different reforms.

Figure 41. Inflow into old-age benefits. Individuals aged 60-64 and 65+.



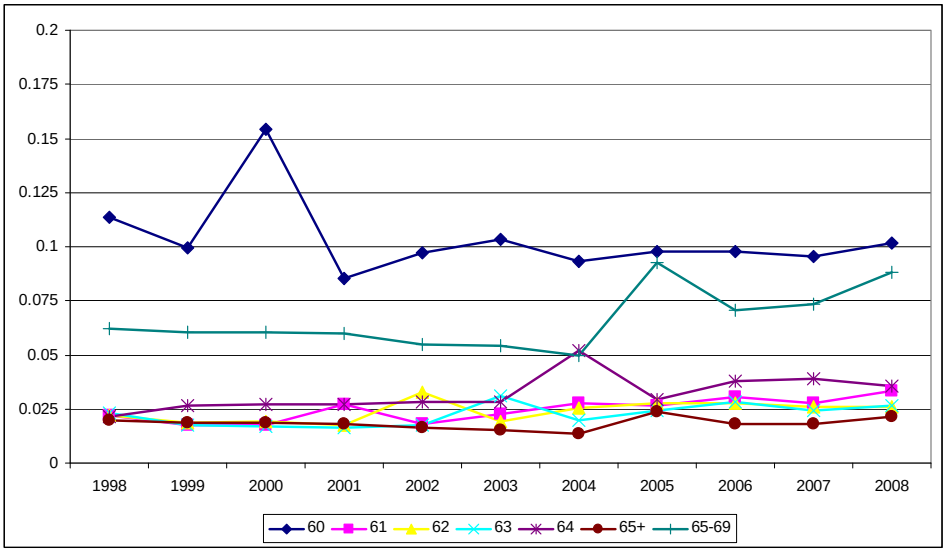
Source: Own calculations using administrative data from the Ministry of Employment and Immigration and population figures from the Ministry of Health and Social Policy.

In order to look at changes in the postponement of the retirement age, Figure 42 shows the percentage of the population that enters into contributory old-age benefits by age for individuals aged sixty to sixty-four. Unfortunately, we do not have information on the total number of inflows into old-age contributory pensions by individual ages for individuals aged sixty-five or older so we present two different shares. The first one considers inflow as a share of the total population aged at least sixty-five (as in Figure 41), while the second one uses the population aged sixty-five to sixty-nine, as retirement later than sixty-nine is anecdotic.

In order for the policy reforms to have effects on the sustainability of the system, they should influence the stock of individuals in the different programs. Figure 43 shows the total number of pensioners in the two previous programs from 1980 to 2009. Unfortunately, this information is not available by age groups. The general picture shows a slightly increasing trend in the number of pensioners in both programs. The total number of disability pensioners decreased in 1997 when all the disability pensions of

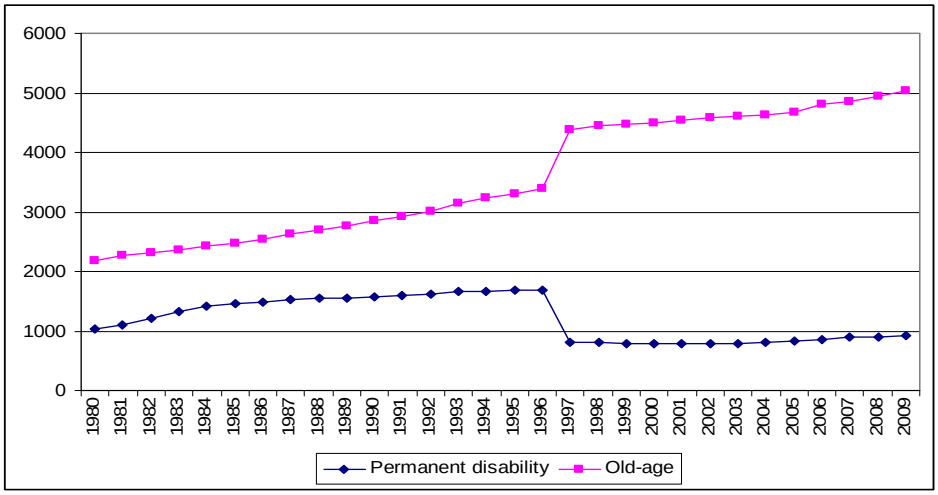
individuals aged sixty-five and older were reclassified as old-age pensions, so the amount of old-age pensioners increased correspondingly. The growing time trend could be at least partly explained by the incorporation of women into the labor market or the population ageing.

Figure 42. Inflow into old-age benefits for individuals aged sixty to sixty-four by individual ages.



Source: Own calculations using administrative data from the Ministry of Employment and Immigration and population figures from the Ministry of Health and Social Policy.

Figure 43. Total number of old-age and disability pensioners. Spain, 1980-2009.

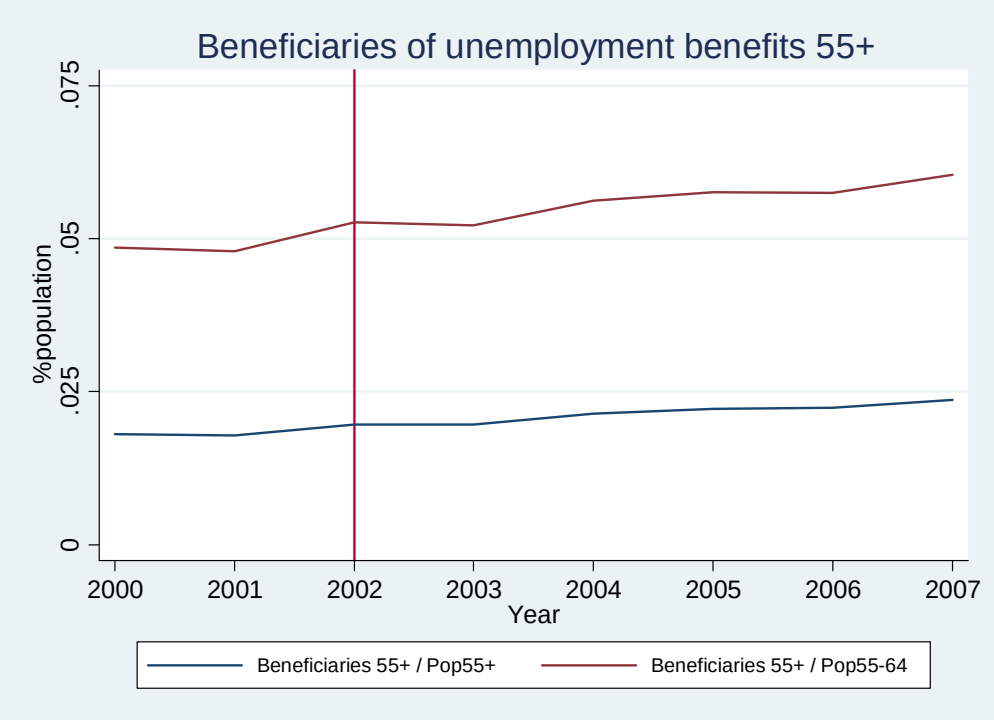


Source: Own calculations using administrative data from the Ministry of Employment and Immigration

From 2002 onwards, at least in theory, in order to claim unemployment benefits older workers also had to enroll in active searching at the same time that unemployed

individuals aged at least fifty-two could combine unemployment benefits with earnings. A priori, one would expect this reform to have some effects on the number of older individuals claiming unemployment benefits. However, the percentage of the population older than fifty-five that was receiving unemployment benefits did not change thereafter. This is shown in Figure 41, which uses administrative data from the Ministry of Employment and Immigration. In fact, the share of the population older than sixty-five receiving unemployment benefits continued to grow despite the economic growth.

Figure 44. Percentage of the population aged at least fifty-five receiving unemployment benefits. Spain, 1980-2009.



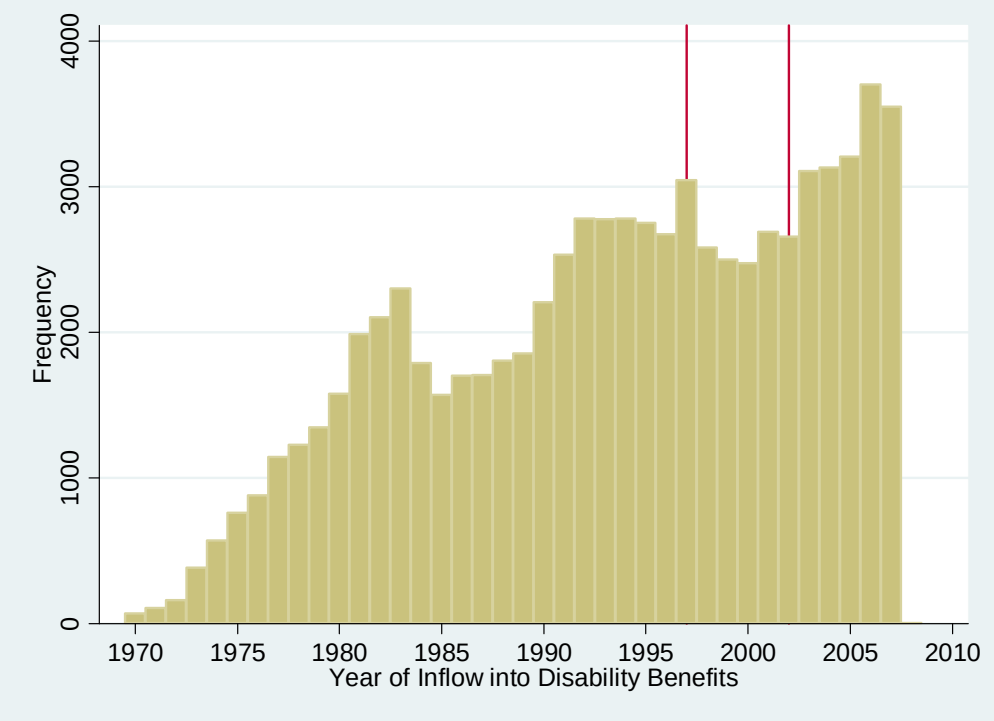
Source: Own calculations using administrative data from the Ministry of Employment and Immigration and population figures from the Ministry of Health and Social Policy.

In figure 45 we make use of another source of administrative data, the "Muestra Continua de Vidas Laborales (MCVL)", to contrast the results obtained above. The MCVL is a microeconomic data set based on administrative records provided by the Spanish Social Security Administration. It contains a random sample of 4% of all the individuals who, at some point during 2007, had contributed towards the social security system either by working, being in an unemployment scheme or receiving a contributory pension. The random sample selected contains over one million individuals. The MCVL provides rich employment history information at the cost of scarce representativeness as

we go back in time. This is particularly important here as the individuals of any cohort entering into disability benefits are expected to have higher mortality rates and therefore, to have lower probability of being selected in 2007. In this respect, the information provided here is complementary to the other sources

Figure 45 plots the number of individuals entering permanent disability benefits each year from 1970 until 2007. The two red lines correspond to the years of the 1997 and 2002 reforms. As for the reform in 1997, a possible anticipation effect is observed as inflows into permanent disability pensions increased in 1997. This could be either due to the expected future higher requirements or to the decrease in the generosity of the old-age pension system. However, the inflows in the disability system dropped in the subsequent years.

Figure 42 Number of individuals entering permanent disability benefits each year. Spain, 1970-2007.

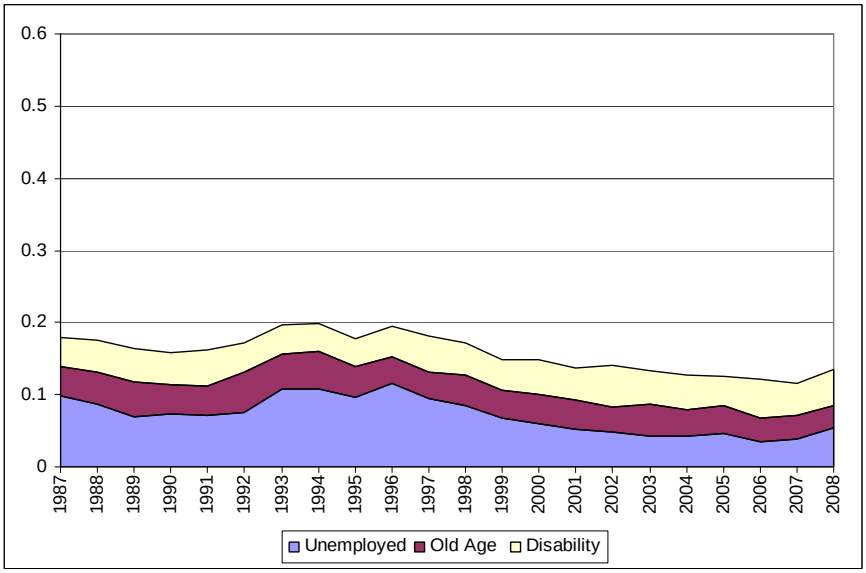


Source: Own calculations using administrative data from the Muestra Continua de Vidas Laborales.

On the other hand, the 2002 reform, which tightened the job search criteria for unemployed individuals, had a clear substitution effect of increasing the inflows into disability benefits. Recall that disability benefits are of a permanent nature and do not

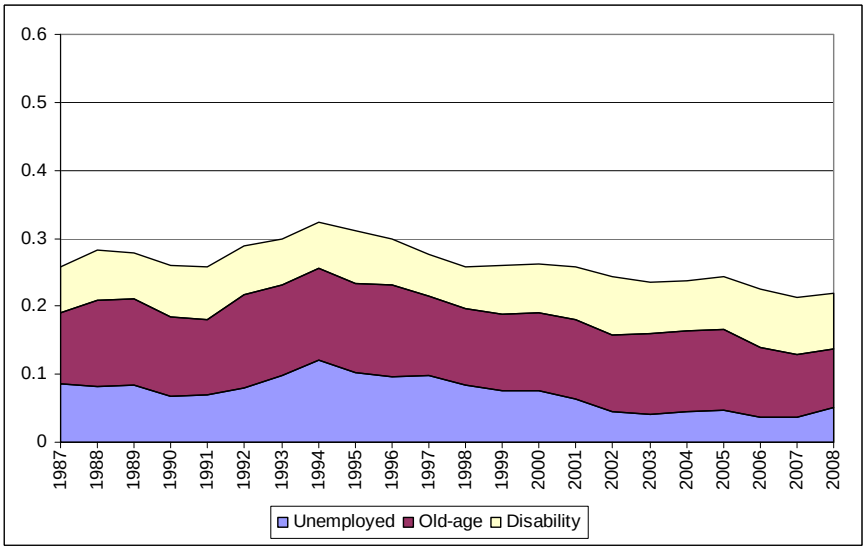
have any job search criteria attached to their eligibility requirements and are thus, much more attractive for older workers with already some previous health related problems.

Figure 46 Percentage of individuals in each social security program (self-reported). Men aged 50-54



Note: own elaboration using data from the Spanish Labor Force Survey

Figure 47. Percentage of individuals in each social security program (self-reported). Men aged 55-59

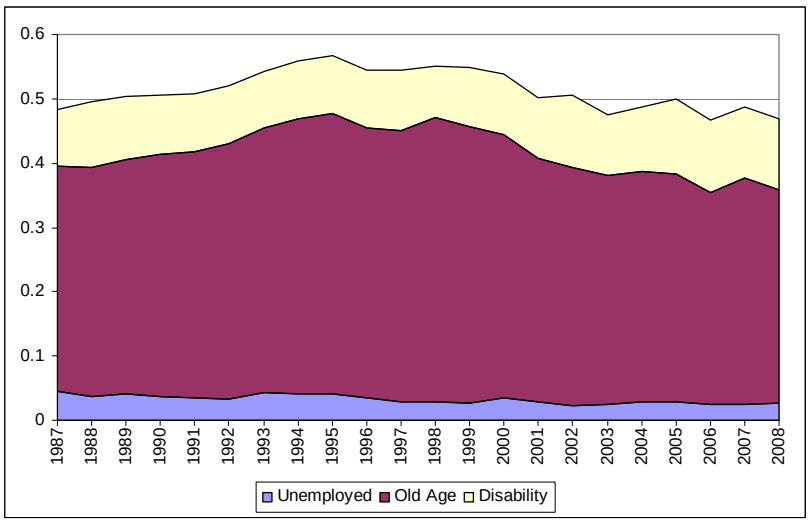


Note: own elaboration using data from the Spanish Labor Force Survey

Figures 46 to 48 report, for the three older five-years age groups of working-age individuals, the percentage that reports being in each program in the EPA. The data is also only shown for men and cannot be fully compared to the one shown in Figures 40

to 44; not only because it is self-reported, but also because individuals receiving a non-contributory pension should also report receiving a pension or benefit (either disability, old-age or unemployment) in the EPA, while they were not included in the previous figures.

Figure 48. Percentage of individuals in each social security program (self-reported). Men aged 60-64

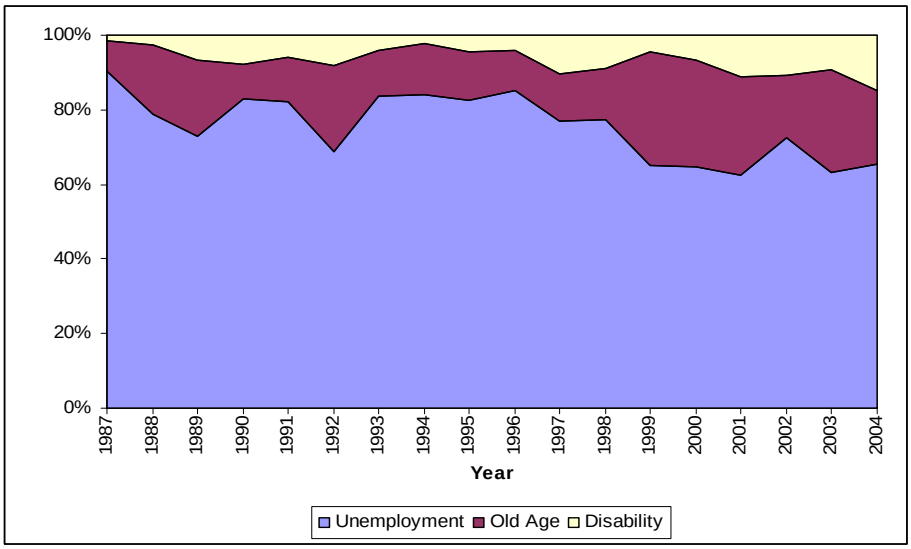


Note: own elaboration using data from the Spanish Labor Force Survey

The data from Figures 46 to 48 reinforces the previous evidence; the percentage of the population either unemployed, receiving disability or old-age benefits increases with age. On the other hand, the share of individuals that declare being disabled or retired is higher the older the group, while at the same time, the share of unemployed individuals becomes smaller. In fact, the share of individuals aged sixty-to-sixty-four that report being unemployed is below five percent compared to the rate of ten percent (except for the last years) of the other two groups. At the same time, the data does not show any substitution effects across programs after the different reforms or drops in the participation rates.

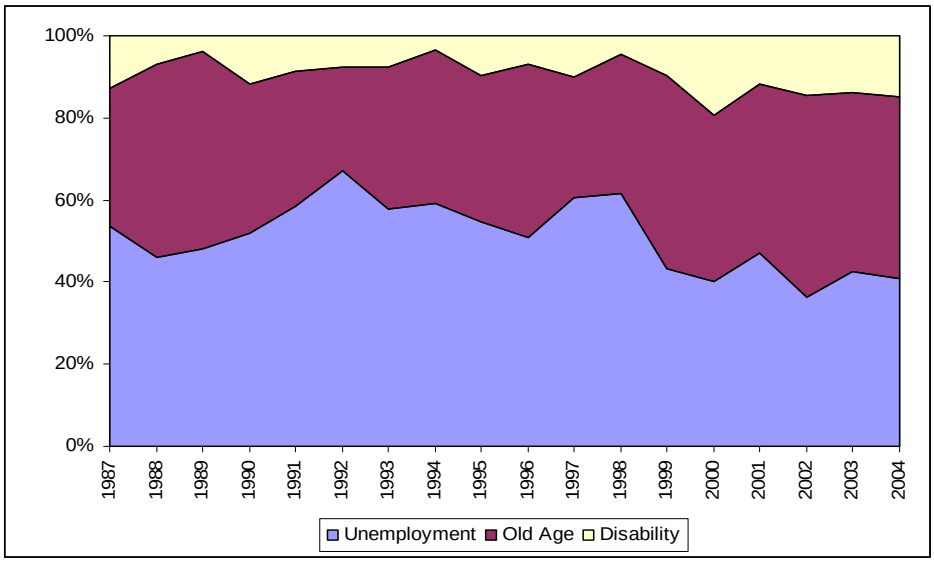
In order to better approach a measure of the pathways into retirement, we look at the exit routes from employment. We use the retrospective information available in the second quarter of the EPA regarding the labour status of individuals in the previous year. We calculate the percentage that transit from employment to each of the status of interest. This is shown in Figures 49 to 51. Unfortunately, the retrospective information does not distinguish between the different jobless status, which would have allowed us to identify the individuals that transit from unemployment or disability into retirement.

Figure 49. Outflows from Employment into unemployment, disability and old-age. Men 50-54



Note: own elaboration using data from the Spanish Labor Force Survey

Figure 50. Outflows from Employment into unemployment, disability and old-age. Men 55-59

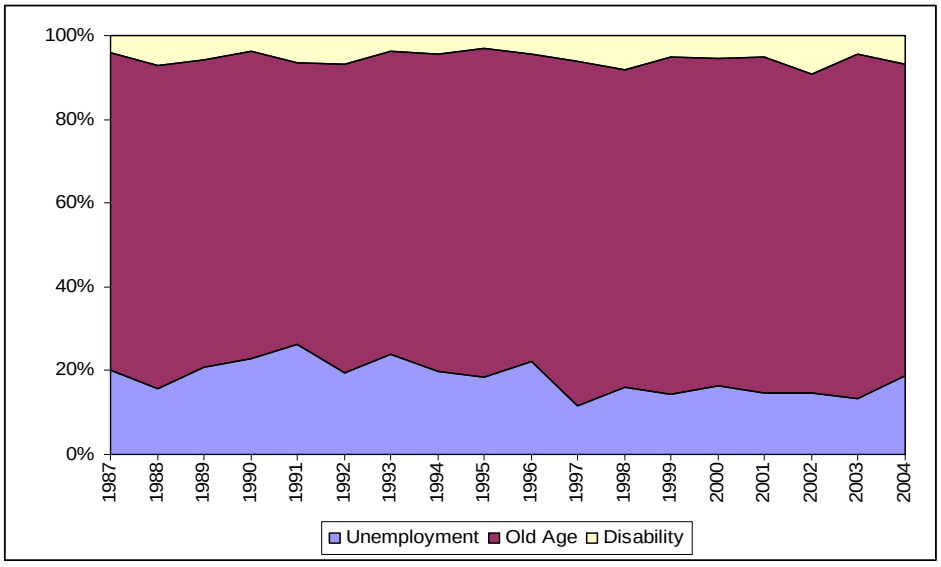


Note: own elaboration using data from the Spanish Labor Force Survey

The conclusions reached from these figures are similar to the ones presented above. The share of individuals that leave employment and transit into unemployment is higher among the relatively younger individuals than among the older groups (80% of men aged fifty-to-fifty-four that leave employment, and transit to one of the status of interest go to unemployment compared to 20% among men aged sixty-to-sixty-four). The main difference with previous Figures is the smaller percentage of individuals that leave employment to transit into disability among men older than sixty. This is consistent with

the numbers shown in Figure 40 for contributory permanent benefits, and suggests that the biggest share of individuals into disability in this age-group is mostly due to an accumulation of individuals who left employment and transit into disability earlier in their career and/or individuals receiving non-contributory disability benefits transiting from another jobless state.

Figure 51. Outflows from Employment into unemployment, disability and old-age. Men 60-64



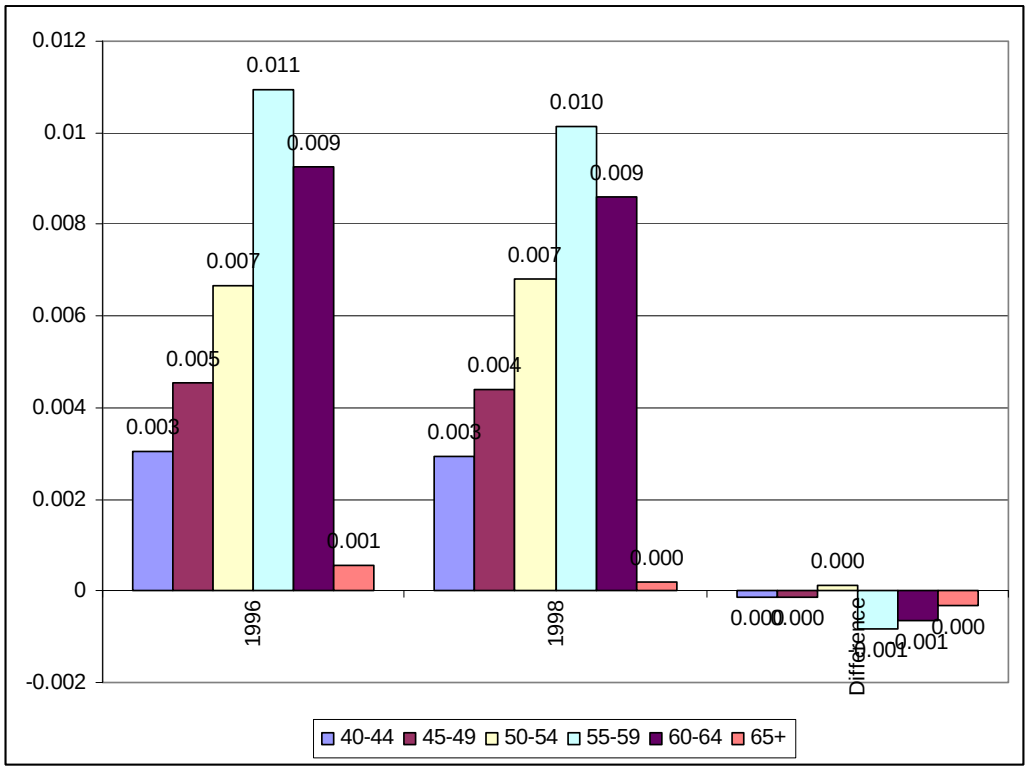
4.2. *A tentative analysis of the quantitative effects of the reforms*

The descriptive evidence shown in the previous sections of this chapter points out that the reforms had, if any, small effects on the labor market behavior of older workers. In this section we attempt to provide some estimates of both the effects of the different reforms in participation in different programs, as well as analyze the substitution effects among programs.

We first show in figure 52 the share of each age group that goes into permanent contributory disability before and after the set of reforms that took place in 1997 in both the disability and old-age pension systems using the administrative data from the Ministry of Employment and Immigration shown in Figure 40. The data shows that the share of individuals transiting into disability decreases among all the age-groups studied, except among individuals aged fifty to fifty-four. The drop is small in absolute terms among all

groups, but this is due to the small shares into disability. However, it represents a nine percent drop for the group with the largest inflow into disability (individuals aged fifty-five to fifty-nine).

Figure 49. Inflow into permanent disability before and after the 1997 reform. Data from the Ministry of Employment and Immigration.



These estimates represent a before-after analysis in a period of economic growth. As can be derived from the evidence shown above, the labour force participation has been increasing since the mid nineties for older workers. Therefore, we need to control at least for changes in total employment outflows before drawing any conclusion.

We provide estimates of how the percentage in each program (disability, unemployment and old-age) changes after each of the two reforms of interest when one controls for a time trend and the total share out of employment. We use data from EPA aggregated at the gender and age-group (50-54, 55-59, 60-64) level using two levels of regional aggregation. We first use the same figures shown previously in this chapter, and we later construct aggregates at the regional level (Autonomous Communities). Although there is no variation in the timing of the reforms across regions, it provides us with variation in the shares out of employment and in per capita GDP.

Thus, we estimate the following model:

$$S_{srgat} = \alpha_{s0} + \sum_r \alpha_{sr} D_r + \sum_g \alpha_{sg} D_g + \sum_a \alpha_{sa} D_a + \lambda_{st} + \beta_{s1997} D_{1997} + \beta_{s2002} D_{2002} + \delta_s O_{srgat} + \varepsilon_{srgat}$$

Where S_{srgat} is the share of individuals of gender g and age-group a in region r in year t that are in the status s (s being disability, unemployment and retirement), and O_{srgat} is the corresponding share out of employment. The other set of explanatory variables are region-dummies (D_r), gender-dummies (D_g), age-dummies (D_a), a time trend (λ_{st}) and two dummies capturing the effect of the reforms: D_{1997} takes value one from 1997 onwards and zero otherwise, and D_{2002} takes value one from 2002 onwards and zero otherwise.

In order to control for the endogeneity of the total outflow, we use regional GDP per capita as an instrument. When we provide estimates at the country-level, we use national values. We obtain GDP information from the Spanish Institute of Statistics (www.ine.es).

We repeat the same analysis but, instead of using information about the stock of individuals in the different programmes, we use information on the outflows from employment as shown in Figures 46 to 48 above. This analysis is only shown using the aggregates at the country-level because the data cells at the regional level were too small as only the information on individuals that were working on the previous year is used to obtain the different aggregate figures.

The results for the parameters of interest are shown in Table 4. Tables A1 to A3 in the appendix show both the first-stage estimates and the coefficients of the other variables. First, notice from Tables A1 to A3 that the total outflow and the share out of employment diminished after both the 1997 and the 2002 reform.

The sign of the effects of the two reforms on the participation in each program is the same using the data at the country-level (first three rows of Table 4) or exploiting the regional variation (second three rows of Table 4) except for the effect of the 1997 reform on the disability system. However, none of the effects at the country-level are significant

probably due to the small sample size (120 observations). On the other hand, the analysis at the regional level shows an interesting pattern: both the 1997 and the 2002 reform decreased the stock into old-age benefits at the cost of an increased share of the participation into disability. More interestingly, the magnitude of the two opposite effects is the same suggesting a clear substitution effect among these two programs in the older age-groups.

Table 4. Selected results of the estimate of the 1997 and 2002 reform on the stock of the different social security programmes, and the outflows from employment. Results based on national and regional aggregates.

		1997 Coef (SE)	2002 Coef (SE)	N	R^2
Stock national level	Disability	-0.0059 (0.0036)	0.0010 (0.0019)	120	0.649
	Unemployment	-0.0035 (0.0020)	-0.0007 (0.0026)	120	0.051
	Old-age	-0.0048 (0.0026)	-0.0061 (0.0042)	120	0.839
Stock regional level	Disability	*0.0085* (0.0045)	**0.0209** (0.0057)	1836	0.481
	Unemployment	-0.0045 (0.0045)	-0.0068 (0.0058)	1836	0.276
	Old-age	**-0.0111** (0.0048)	**-0.0193** (0.0066)	1836	0.733
Outflows from employment (national level)	Disability	0.0002 (0.0002)	**0.0008** (0.0002)	108	0.626
	Unemployment	-0.0024 (0.0015)	0.0002 (0.0009)	108	0.781
	Old-age	0.0001 (0.0007)	0.0020 (0.0011)	108	0.846

The results also show that none of these two reforms had any effect on the share of these age-groups into unemployment, which is highly explained by the total share of the population out of employment. Regarding the effects of these two reforms on the outflows from employment into the different programs shown in the last three rows of Table 4, we find that there was a significant increase in the outflow from employment into disability after the 2002 reform. The rest of coefficients are non-significant, although we cannot rule out that this is due to the lack of explanatory power due to the small sample size (108 observations).

5. Conclusions

In this chapter we have shown that despite the large improvements in mortality rates among older individuals in Spain, the employment rates of individuals older than fifty-five remain lower than the ones observed in the late 1970s, and the decrease in participation is more drastic when comparing different cohorts with the same mortality-based age than with the same age-since-birth.

Alternatively, decreases in mortality rates do not necessarily go hand in hand with improvements in population health. The descriptive evidence on health trends provided here remains inconclusive. On one hand, there is some evidence suggesting a health deterioration, as the percentage that reports having reduced their principal activity because of a health problem, as well as the prevalence of hypertension, cholesterol and obesity, and the number of hospitalizations due to mental disorders have increased. On the other hand, the percentage that reports being in good or very good health has also increased, while the number of hospitalizations due to other illnesses except for mental problems has decreased.

Health status is an important variable in determining labor force participation among individuals younger than sixty, but it becomes less important as the social security incentives of the old-age pension system kick in. The comparison of trends in mortality, health and employment and participation in different social security programs shows a lack of an overall association among these dimensions in the last twenty years in Spain. Thus we try to disentangle the effect of the main social security reforms since 1990. In 1997 the medical requirements of the disability system were tightened and the generosity of the old-age pension system was decreased, while in 2002 the job search criteria to receive unemployment benefits was tightened and more incentives to retire later were introduced. Using regional aggregate data, we find that both the 1997 and the 2002 reform decreased the stock into old-age benefits at the cost of an increased share of the participation into disability. More interestingly, the magnitude of the two opposite effects is the same suggesting a clear substitution effect among these two programs in the older age-groups.

An avenue for further research is the evaluation of the aforementioned reforms using longitudinal individual data in order to follow the different transitions. Moreover, it would be of interest to use the time variation in the implementation of the different old-age reforms in order to disentangle the effects of interest.

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Appendix

Table A1. Outflows from employment into the different programs. Data aggregated at the national level

	out of employment		employment-disability		employment-unemployment		employment-retirement	
	Coef.	SE.	Coef.	SE.	Coef.	SE.	Coef.	SE.
out of employment			0.030	0.017	0.093	0.040	0.118	0.033
women	-0.003	0.003	-0.003	0.000	-0.012	0.002	-0.018	0.005
50-54	0.012	0.004	0.001	0.000	-0.005	0.002	0.004	0.004
55-59	0.072	0.004	-0.001	0.001	-0.016	0.006	0.014	0.007
d1997	-0.015	0.007	0.000	0.000	-0.002	0.002	0.000	0.001
d2002	-0.015	0.008	0.001	0.000	0.000	0.001	0.002	0.001
GDP	$1.5x10^{-7}$	$4.2x10^{-8}$						
constant	-0.028	0.023	0.001	0.001	0.017	0.003	0.006	0.006
N	108							

Table A2. Stock in the different programs. Data aggregated at the national level

	Non-working		Disability		Unemployed		Retired	
	Coef.	SE.	Coef.	SE.	Coef.	SE.	Coef.	SE.
non-working			-0.191	0.028	0.370	0.142	0.169	0.192
women	0.391	0.010	0.035	0.011	-0.176	0.069	-0.215	0.108
50-54	0.108	0.012	0.039	0.014	-0.048	0.024	0.028	0.048
55-59	0.281	0.012	0.089	0.018	-0.143	0.045	0.165	0.048
d1997	-0.010	0.021	-0.006	0.004	-0.003	0.002	-0.005	0.003
d2002	-0.003	0.026	0.001	0.002	-0.001	0.003	-0.006	0.004
trend	0.012	0.005	0.001	0.000	0.001	0.001	0.002	0.001
GDP	$-6.5x10^{-7}$	$2.5x10^{-7}$						
constant	0.570	0.117	0.098	0.017	-0.022	0.029	0.049	0.058
N	120							

Table A3. Stock in the different programs. Data aggregated at the level of the Autonomous Communities

	Non-working		Disability		Unemployed		Retired	
	Coef.	SE.	Coef.	SE.	Coef.	SE.	Coef.	SE.
non-working			0.276	0.124	0.264	0.141	0.006	0.148
women	0.403	0.004	-0.149	0.051	-0.135	0.058	-0.168	0.063
50-54	0.107	0.004	-0.014	0.014	-0.036	0.015	0.049	0.020
55-59	0.278	0.004	-0.047	0.035	-0.109	0.039	0.215	0.041
d1997	-0.026	0.007	0.008	0.004	-0.005	0.005	-0.011	0.005
d2002	-0.035	0.006	0.021	0.006	-0.007	0.006	-0.019	0.007
trend	0.009	0.002	0.000	0.000	0.001	0.000	0.002	0.000
GDP	$-1.1x10^{-5}$	$2.1x10^{-6}$						
constant	0.363	0.010	-0.021	0.043	0.013	0.050	0.099	0.057
N	1836							