The financial sustainability and the income adequacy of the Spanish pension system

UNIVERSITAT DE BARCELONA

Walter Hugo Peralta Brullo

UB – Faculty of Economics and Business

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ABSTRACT AND KEY WORDS

Social insurance program is a universal model provided by the Pubic Sector with the aim of covering risks such as retirement, widowhood or disability over the population with the provision of either cash payments or services. One of the popular cash payments is the pension-retirement income. In Spain, this pension is based on a pay-as-you-go system (PAYG). But the Spanish pension system has to face some structural problems, like the aging of population and the increase in the dependency ratio. After some reforms were initiated in order to improve the financial sustainability of the pension system, some other strategies have been proposed to enhance these reforms, such as changing the way pensions are based, i.e. a shifting from PAYG to other pension plans like defined-benefit plans (DB) or defined-contribution plans (DC). A cross-country comparison between Spain and Denmark will give us an insight of the differences between these two countries and try to ask whether the pension system of a well-performed country can also be a good solution for Spain.

Social security, PAYG, DB, DC, pensions, provision, financial sustainability, income adequacy, dependency ratio

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INTRODUCTION

The aim of this essay is to analyze the problem of the sustainability of the Spanish pension system, its challenges and also some solutions that have been proposed. The present essay is structured as follows: First, I will describe some concepts and definitions about social insurance programs, pension retirement typologies and how they are provided to the population. Then I will introduce the Spanish pension system, in order to analyze the balance and the reasons of its unsustainability, basically due to the aging of population and unemployment which affect the dependency ratio. Possible strategies have been proposed to address these imbalances, such as maintaining the current system by changing some minor parameters, or finding extra resources by allowing the entrance of private provision plans. While Spain has decided for the first strategy, some EU countries have chosen the second option. The last section is a cross-country comparison between the Spanish pension system and the Danish system, in order to evaluate social and financial sustainability. Finally, some conclusions are developed about the advantages and drawbacks of the discussed reforms.

A) CONTEXT AND PROBLEMS

1. DEFINITIONS

Social insurance programs[1]

A social insurance program can be generally defined as the set of programs that under a more or less direct supervision of the public sector provide citizens with cash payments or services, either when they face a lack in their income or suffer a physical disability to generate them. Thus, it protects citizens from a number of risks that arise in a given society. Typical risks that can be considered among others are unemployment, old age, sickness or work accident, family responsibilities or death.

Covered risks, benefit levels and source of funding differ from one country to another. However, it is easy at least to recognize two different social security systems (INAP, 2008). The first social insurance system is the professional model or Bismarck model. It was aimed to protect only salaried workforce, being their wages what determine the amount of contribution and the perceived benefits. This model was first appeared under the mandate of Bismarck in Germany back in the late nineteenth century and it is considered the first social insurance program introduced in Europe.

The other historical model of social insurance is the universal model, created after the New Deal of US President Roosevelt, as a political response to the social consequences of the Great Depression. It was intended to provide a minimum level of income required for subsistence of all beneficiaries. The main difference with the professional model is that it covers a single risk by a uniform granted protection to the entire population.

Some other classifications have been employed to distinguish more precisely social insurance programs over the last years. Two of them were developed by international organizations such as the World Bank and the OECD. In the first place, the World Bank's

1 A note on terminology: in Spain we are more used or inclined to use the term social security system to refer to our PAYG pension scheme.

classification (World Bank, 1994) begins to distinguish three pillars of social insurance programs. The first one represents a public payment with a mandatory participation. Its aim is to reduce poverty among the old people. The first pillar has a parallel feature with the universal model. On the other side, the second is a privately managed mandatory savings system or earnings-related pension similar to the professional model. Finally, the third pillar constitutes all the rest of voluntary savings.

This taxonomy applied by the World Bank is however prescriptive rather than a descriptive classification. Alternatively, the OECD classification wanted to improve the social insurance classification by distinguishing three tiers. (OECD, 2006) (OECD, 2014). These tiers are more or less similar to World Bank's three pillars, but with the slightly difference in the second group, in which the earnings-related pension provision has not only an insurance role and mandatory participation, but also it can either be provided by the public or the private sector.

Finally, there is another classification that categorizes pension systems with its respective aims. In this case, we can classify pension systems as either those with a redistributive aim or with an insurance one. Whereas redistributive designs ensures that pensioners achieve some minimum standard of living, insurance components are arranged to achieve a proportional target of adequacy in retirement incomes compared with previous working earnings. However, both of them can also be compared to the professional model and the universal model.

Using the descriptive taxonomy employed by OECD, we may observe that one of the risks that are usually covered by social insurance programs is the loss of income that people suffer when they retire from the labour market. Retirement is usually covered by providing retirement-income payments or pensions to retirees. In this essay, we will focus specially on the second-tier provision. In this group, pension plans are the only vehicles for retirement, which can be financed by paying contributions to different plans during the working life, so that they are accrued to finance retirement pension. Such pension plans include pay-as-you-go (PAYG) public pension plans, as well as defined benefit (DB) and defined contribution (DC) funded private pension plans. Contributing to these plans can be either mandatory or voluntary.

PAYG plan is the unfunded version of a DB plan. A PAYG means that at all times the pension is already defined and obtained at the time of retirement according to some actuarial rules and the contributor's labour history. Furthermore, social benefits such as retirement, disability, widowhood, orphans and others are paid from the income received each year from the contributors. Thus, a pension that a retiree receives in 2016 depends on the contributions of workers on this year. Yet, associated reserves may cover immediate expenses or reduce contributions in public schemes within given time periods, such as economic or financial crisis.

The other retirement plans are based either in DB-funded or DC plans. While in DB schemes the amount a pensioner will receive depends on the number of years of contributions made during the working life, like in a PAYG plans, in DC plans each contribution's worker are saved and invested into an annuity (a guaranteed pension payment until death), and when retirement comes the annuity is converted into a pension-income stream. The future returns on the investments in DC schemes are however not known in advance, so it may be that a certain level of contributions won't be enough to meet determinate benefits.

In a DB funded model, the pension uses contributions to build a fund in which the sponsoring employer promises to pay a future benefit calculated as a proportion of salary and years of service. The DC scheme also uses contributions to build a fund, but in this case the pension that is eventually paid out depends on the investment performance of the assets acquired by the pension fund, minus fees charged by the supplier and other intermediaries (Blackburn, 2006). DB plans can be provided either by the private or by the public sector. On the other hand, DC are provided by the private sector. Finally, there are other pension plans based on accounts called notional defined contribution system (NDC), which is a combination of the previous plans.

2. SPANISH PENSION SYSTEM

Situation of the Spanish earnings-related pension system

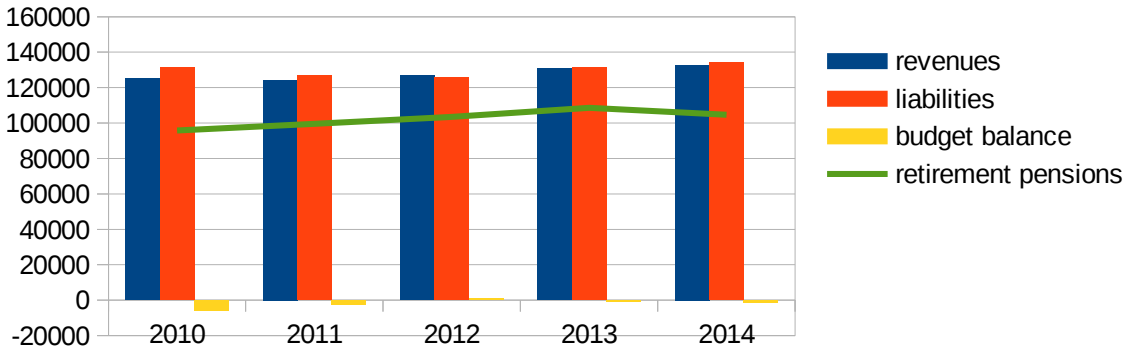
The national social security in Spain managed by the "Instituto Nacional de la Seguridad Social" (INSS) is the main public social insurance system established since 1978 (Española, 1978). The earnings-related pension system are called contributive pensions and its expenditures are structured below in **Table I**. As we may observe, more than a 50% represents the payout for providing retirement-income pensions. According to INE data, only contributive pensions represents more than 85% of the total expenses.

Table I: Expenditure in contributive benefit programs, average 2006-2015. Source: INE

The retirement pension system is based on a PAYG scheme. It consists of a single, earnings-related benefit with a professional scope, covering certain categories of the population, and funded according to social contributors by a payroll tax (INAP, 2008) (CEFS, 2013). This way of funding through its own payroll tax differs from most government programs, due to the fact that the system was meant to be originally designed as self-financing. Paid partly by employees and partly by their employers, the revenues from this tax go into special trust funds that finance benefit payments and cover determinate outlays.

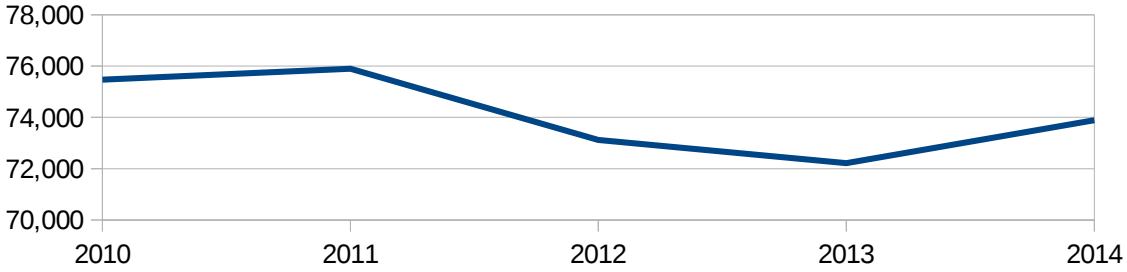
If we analyze the balance of contributive pensions (**Table II**), the budget balance has been stabilizing during the last couple of years, after a huge deficit had appeared during the financial and public debt crisis years,. However, revenues are still not enough for covering liabilities. It is also important to notice that even though there is a light reduction of retirement pensions during 2013, the upward trend since 2010 is expected to increase in the following years.

Table II: INSS Balance. Revenues and Net Expenses
Source: INE



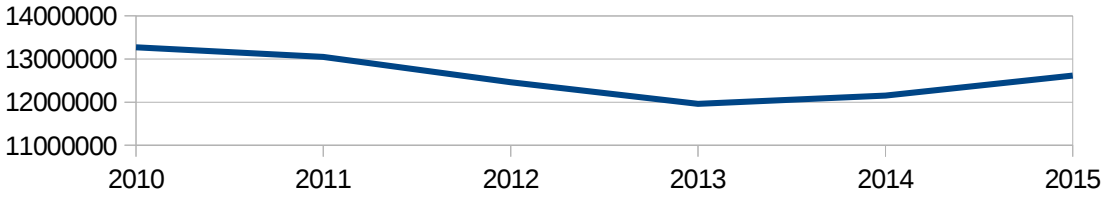
On the revenues side, contributions had plummeted from around €76,000 in 2011 to almost 72,000 in 2013 (**Table III**). This is due to the huge reduction of paid employment in the economy as a consequence of the financial and public debt crisis during these years. The raising trend detected up until 74,000 since 2013, however, has not reached the previous levels of 2011.

Table III: Contributions (general program)
Source: INE



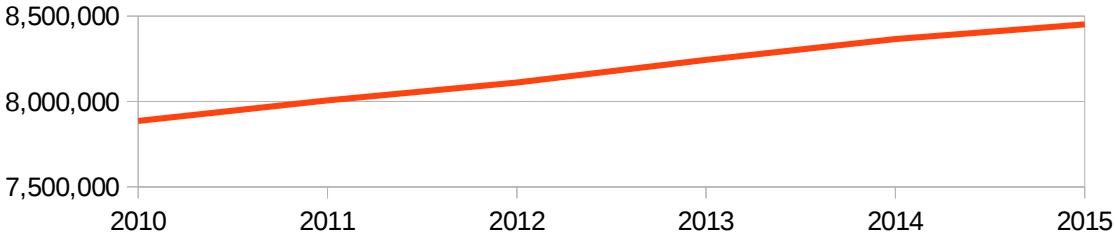
A high-job destruction is most likely to be the explanation of this fall during the crisis period, reaching its lowest point in 2013. The level of contributors (**Table IV**) has not reached yet half of the loose of jobs during the last years, but it is expected to rise in the future if the economical situation would improve.

Table IV: Contributors (general program)
Source: INE



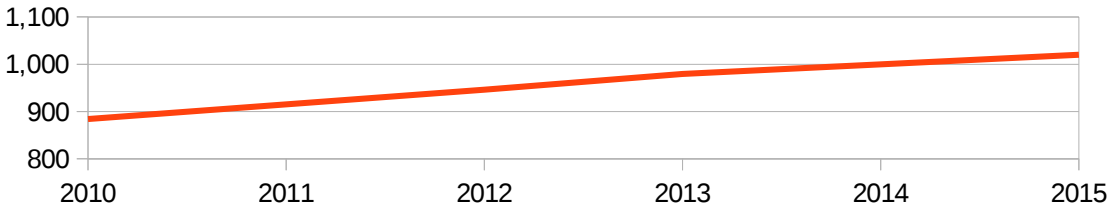
On the expenditures side, the increase of retirees has a definite trend (**Table V**), surpassing the amount of 8,400,000 in 2015. This translates into an increase of almost 7% since 2010.

Table V: Retirees
Source: INE



Also, if we measure the average pension retirement income as the relative to the entire pension scheme (**Table VI**), it has risen over the last 6 years, from an average pension income of less than €900 in 2010 to more than €1,000 in 2015. In conclusion, the two last line charts show us a financial problem, meaning that the Spanish pension system is not sustainable anymore.

Table VI: Average Pension
Source: INE



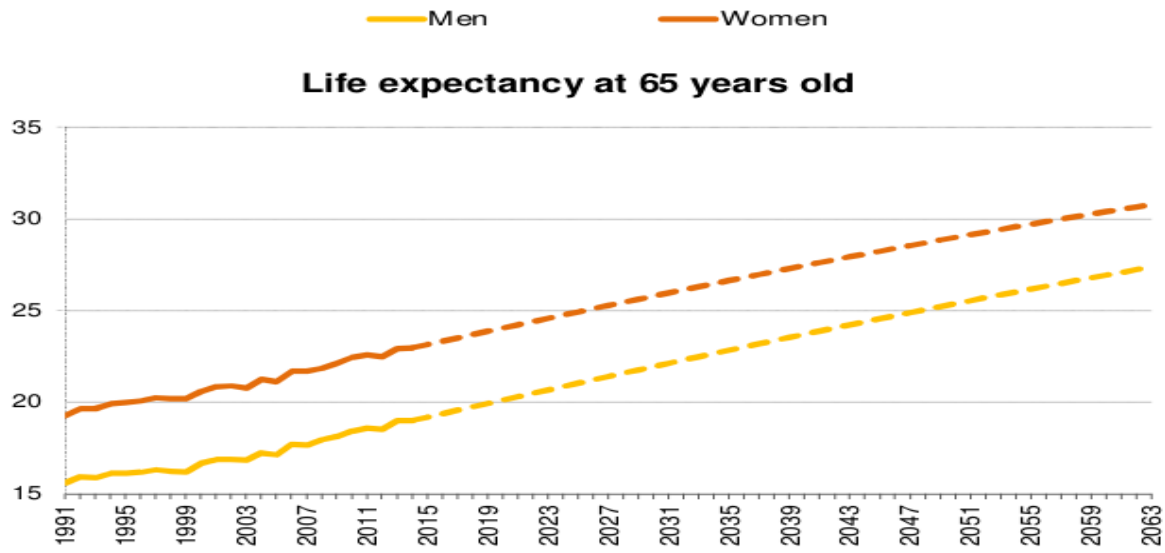
3. PROBLEMS

3.1. Causes of the imbalance in the Spanish pension system: evolution of revenues and expenses

Rise in expenditures and fall in revenues are related with two main structural problems of great importance: the progressive aging of population and the change that is occurring in the dependency ratio, defined as the ratio of the retired people to the the active population (Ayuso, 2014).

The aging of population has become one of the main problems for the sustainability of the pension system. This is because of an improvement in the population life expectancy (INE, 2015). On **Table VII**, life expectancy at 65 years old clearly shows an upward trend. Thus, life expectancy of a 65 years old would exceed 90 years in 2025, while for men would almost reach 82 years old. Both of them have an increase of 5 and 4 years respectively as compared with values from 2000. If the current trend continues in 2063 the life expectancy for women would be 95 years and for men 91 years[2].

Table VII. Source: INE

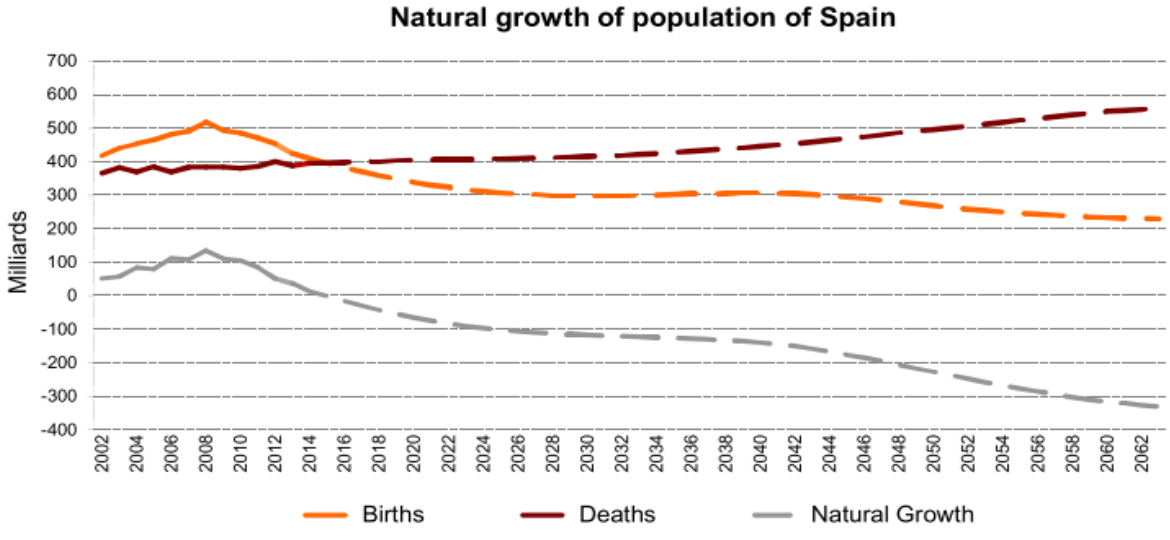


2. When we talk about life expectancy of people of a certain age in a given year, we make reference to the average number of years of life that they are expected to live.

An increase in life expectancy would mean that a very large population known as the baby-boomer generation will reach the age of retirement in the following decades. Baby-boomers, which were born between the late fifties and the first half of the seventies of the 20th century, are helping to grow the weight of the population over 65 years up to 17% and it is expected to reach 37% in 2052. This would mean that one of every three individuals would have more than 65 years old. The INSS forecast data says also that the number of pensions would rise in absolute terms from the current 9 million to 15 million in 2052 (CEFS, 2013). Even with a modest public retirement provision, pensions are already representing a huge expenditure for the public finances.

As well as longevity increases steady, the aging effect is intensified by a decline in the birth rate (**Table VIII**). Following the trend initiated in 2010, the number of births in Spain would decrease in the next years. In 2030, the annual birth would be down to 300,000, 33.3% less than in the present. A slightly declining trend in fertility is expected to maintain this projection. Furthermore, the average number of children per woman would be 1.24 in 2030 with a slightly drop afterwards, as compared with the current 1.27.

Table VIII. Source: INE



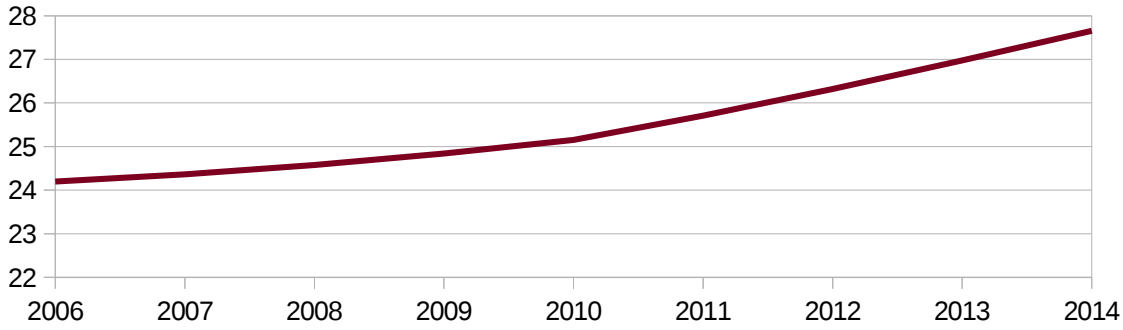
The second problem that is behind the imbalance of the Spanish pension system is related to the economic crisis, which fueled the current high unemployment in the country. A high job destruction is putting in jeopardy the necessary sustainability of the pension system, because

it affects the number of contributors and the amount of revenues that comes from the contributions. The slow economic growth of the past decade has also worsened the problem. The Spanish PAYGO system is facing slow economic growth as a serious concern of its sustainability, for it diminishes the resources of the pension system.

The combination of the aging of population and high unemployment produces a change in the dependency ratio (Duval, 2003). As data shows us clearly in **Table IX**, the dependency ratio is expected to rise almost 4 points up to 28% in 2014 (BE, 2009). A higher old-age dependency ratio, which is defined as the ratio of population over 65 years to the population of working age, would mean that the pension system cannot be sustainable over the next years.

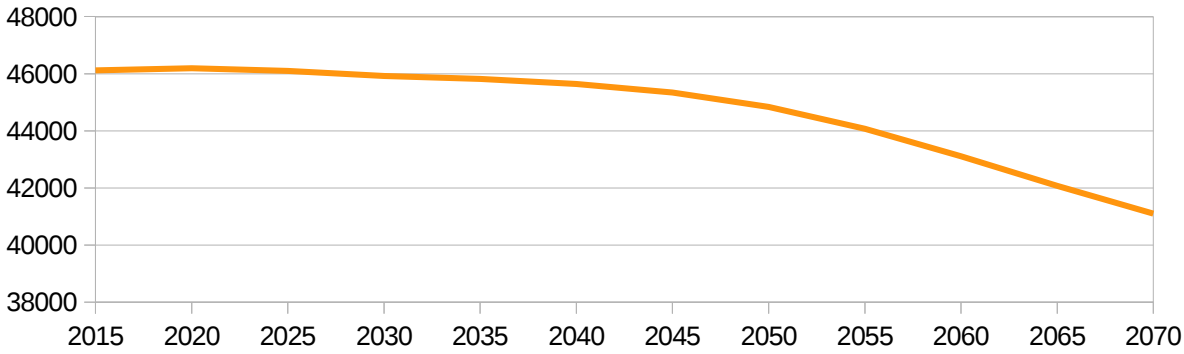
Table IX: Age dependency ratio, old (% of working-age population)

Source: World Bank



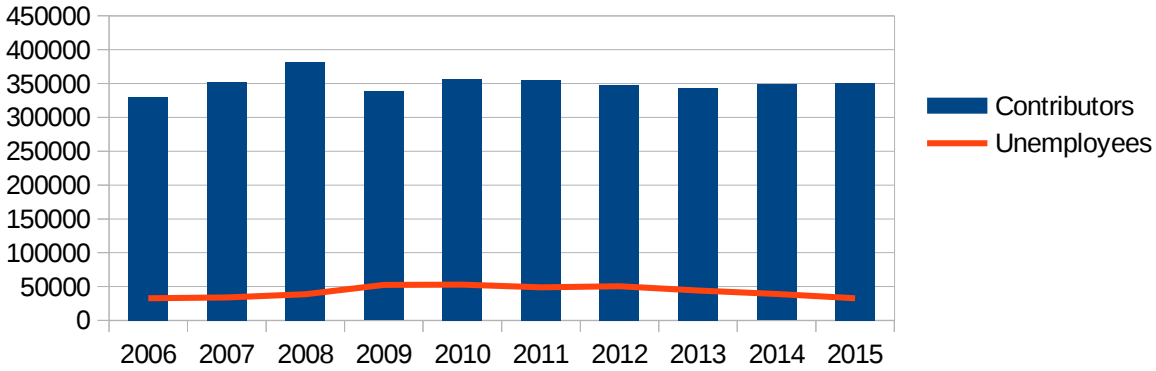
A solution for this demographic problem would be the inflow of immigrants, but according to the latest population forecast of INE in **Table X** there would be a decrease in population close to 12% during the period of 2025 to 2070, which would represent a fall of about 5 million people. This result would occur as a consequence of high-job destruction and the aging of the population.

Table X: Population projections in Spain (2015-2070).
Source: INE



In the short term, pension system revenues and expenditures depend on the business cycle. Revenues from contributions will grow in times of economic growth and fall substantially in depressive phases, as we may observe in **Table XI**. On the other side, pensions will rise if old-age population is expected to increase. Following this pattern, in table XII it is shown how the system is going to be unsustainable if the fall in resources and the rise in pensions are maintaining its trend.

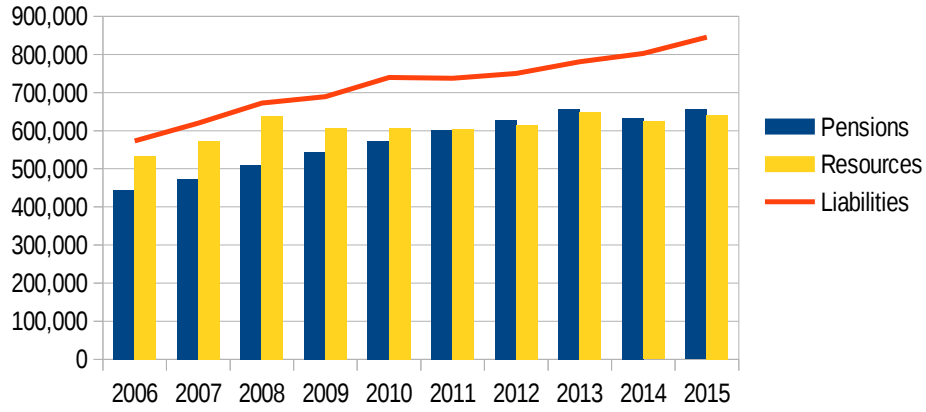
Table XI: number of contributors and level of unemployment
Source: INE



Is the PAYG pension system sustainable by itself? With an increase of retirees due to the baby-boom generation, a 27% unemployment and lower levels of GDP, all of these factors are affecting the sustainability of the pension system. For example, the European Comission (EC) clearly says that the pension system is not sustainable by its own methods and that some actions should have to be addressed many years ago, despite the fact that the country would

not have faced an economic crisis (CEFS, 2013).

Table XII: Comparison of pensions towards the public resources and liabilities. Source: INE



3.2. Problems in EU pension systems

During the last years, organizations like the EC and the OECD are recommending reforms that would lead to more financially sustainable PAYG pensions and also for stable and adequate incomes in old age. These reforms want to redesign the pension system in order to help to soften the effects of the economic cycle and to incorporate the structural trends of the revenues and the expenditures in such periods like an economic slow growth. Problems in European countries are more or less similar as in Spain: aging of the population characterized by a sluggish economic growth and the increasing in government debt.

The aging population has a negative effect into PAYG financing schemes as we have seen, since a decrease in the number of working-age people is not sustainable any longer if elderly population is increasing. As data shows, the share of individuals aged 65 and above will increase from 8% of the total world population in 2015 to almost 18% by 2050.

The evolution of dependency ratios depends on mortality, fertility rates and migrations. OECD countries have seen prolonged increases in life expectancy, which most analysts project to continue in the future, with an increasing number of pensioners (OECD, 2013). There have also been substantial declines in fertility, which, of course, will eventually reduce

the number of workers entering the labour market. A fall in fertility rates below the replacement level implies shrinking generations. In the future, however, there is a great deal of uncertainty over how fertility rates will evolve.

Finally, the economic crisis and lower economic growth with large government debt levels in many OECD countries have added further tensions. High unemployment and record-low interest and inflation rates persist. Government gross financial liabilities have increased from 55% of GDP in 2007 to 88% in 2014 on average across OECD countries, and public pension expenditure represents on average 18% of total public spending (OECD, 2013). It is not remarkable that pension reforms has been part of the strategy followed by theses countries in favor of consolidating public finances and cut debt ratios by acting on the spending side.

B) STRATEGIES AND REFORMS

Over the last years there has been multiple reforms in the area of pensions. Governments have been either changing some key parameters of PAYG systems by improving them, or proceeding to look for extra resources by giving a larger role to DB-funded and DC plans.

Key parameters that can be changed are the increase of the retirement age, the rise of contribution and taxes, removing wage callings or the adjustment of pensions to consumer price index (CPI). However, some problems arise in every strategy and likewise the context of every country may make this reforms even worst. In Spain some key parameters have been changed, introducing sustainability factors and changing the way benefits are accrued. Another strategy is changing the plan of the pension, i.e. from PAYG plans to DB-funded or DC plans, in order to diversify the source of fundings.

4. STRATEGIES

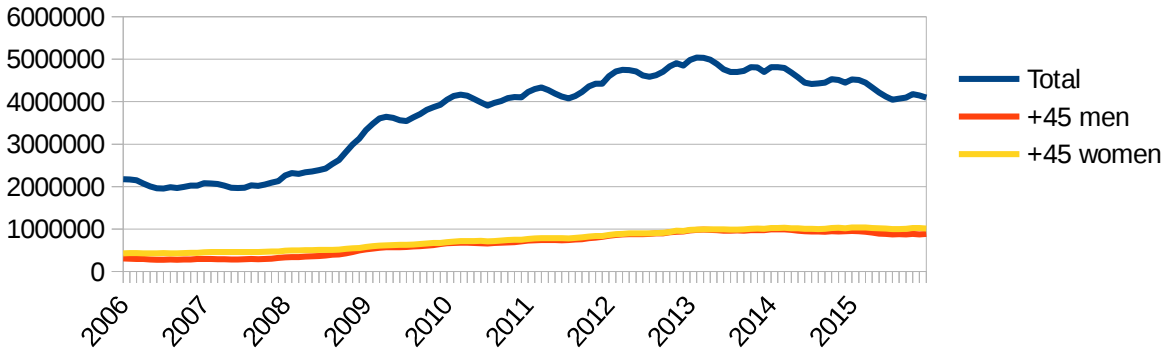
4.1. Changing key parameters

Measures that can rely on changing some of the PAYG parameters are one of the reforms that many countries are trying to implement into their pension systems. Some of the examples are increasing retirement age, discouraging early retirement or changing the way benefits are calculated. Improving PAYG systems by this way could help alleviate the expenditures on retirement pensions in the future.

The first measure to be discussed is the increase in retirement age. Currently, the legal retirement age is 65 years in many countries, but the actual age is somehow below than 65 because of the existence of early retirement. In this sense, any measure that it is directed to discourage the early retirement cases may also boost the extension of working life over 65 years. The aim is simply discouraging the laying off of workers prior to the retirement age by raising the pensionable age and increasing incentives to work longer. This has been one of the main objectives for some economies, moving this key parameter beyond the mark of 65 years.

This measure may have positive effects on the financial viability system from two perspectives: increasing the active population that can potentially contribute (particularly important, given the demographic prospects) and reducing the expenditure on pensions. (BE, 2009). Yet, working longer is not an option for everybody, either because of job strain or declining health, no matter how high the pension age is set. Moreover, older workers who are laid off the labour market usually enter into early-retirement programs. In order to strengthen their employability, they usually need to acquire new skills, but long-term unemployment rates in the group of more-than-45 years old is still high, as we may observe in **Table XIII**.

Table XIII: unemployment
Source: INE



There's no need to keep early retirement systems if employment difficulties faced by elderly are dealt by protection programs to help them to remain on the labour market longer. In this case, it has to be met by a higher demand of this type of labour, that is employers who are willing to employ older persons. Programs like lifelong learning to upgrade skills will therefore become essential to retain older workers in the labour market and encouraging older workers not to leave the labour market and increasing the effective retirement age. Modern economies could have found better ways of retaining older workers in the labor market for longer without cutting benefit entitlements, i.e. without raising pensionable age.

The finances of pension systems may also be improved by raising contribution rates or reducing pension benefits. An example of adjusting PAYGO on this way is proposed by Richard Musgrave (Blackburn, 2006), who argued that one of the possible ways to reduce public debt is to keep the same overall relationship between average income and pensioner income. This can be done by a raise in contributions while at the same time reducing pension benefits. UK has rightly applied this principle to the share of pensions in GDP, estimating that pension income from all sources should achieve 13% to 14% of GDP by 2050 in order to maintain pensioners' relative income (Blackburn, 2006). Without regard to Musgrave's formula, fixing the financial challenges of PAYG pension systems is only one part of the equation. The other part relates to social sustainability and whether pensions will be acceptable in its adequacy to provide good living conditions for older people in the future(OECD, 2013). Furthermore, raising contributions would lead to distort the labour

market.

Another measure proposed is removing wage ceilings (maximum and minimum contribution bases) on which contribution rates apply (BE, 2009). Since the minimum wage limits are small in amount, the net revenue effect would be positive. This measure would also increase the growth rate of contributions, which would depend strictly on the growth of nominal wages, which is not the case for all income scales today due to the existence of these limits, which are updated according to expected inflation (usually below the growth of nominal wages). The removal of contribution limits would turn the tax into a proportional tax and would remove its regressive character, so that distortions generated on the labor market would be reduced.

Usually, a ceiling is set on the earnings used both to calculate contribution liability and pension benefits. Most pension systems include only part of the earnings up to a ceiling in order to calculate pension benefits. This covered ceiling on the earnings is very important for reducing the costs of the pension system. The logic behind such ceilings is that if higher-income workers want to reach a higher replacement rate, they can save individually. Without ceilings or also a high one would allow high-income earners to receive a high replacement rate and no need to take voluntary private pensions (OECD, 2005). However, some doubts rise on this argument. Maximum contribution bases are introduced to reduce the taxation on wage earnings and as a way to reduce firms' costs.

Finally, the last key parameter to be discussed is the indexation or an strict adjustment of pensions with the consumer price index (CPI) (OECD, 2005). This policy aims to adjust pension benefits with the CPI, so that the purchasing power of pensions is preserved. Currently, all pensions are reevaluated with the inflation forecast and being automatically revised, if the CPI is observed higher than expected. The option is to consider also an automatic review of pensions in the event that the CPI observed would have been lower than programmed, as well as taking a price index reference constructed from a representative basket that fits better to power purchasing of retired people. However, this key parameter can also be applied in the other sense, i.e. removing the strict adjustment of pensions with CPI (BE, 2009). This is usually done in order to not to increase the deficit in the balance and so improving the financial viability of the pension system.

All these reforms exposed in this chapter can be made without modifying the current system. But a PAYGO system can be made a little more flexible by means of private funding mechanism. We will talk about this later on in the next section.

4.2. Extra funding

The idea that modern governments have been long taken some responsibility for providing for the needy has come to be viewed as one of its primary functions. However, the current crisis of pension provision has been intensified by the idea that financial markets are better mechanisms than the public provision. During the last decades in some countries, in order to prefund PAYG mechanism, surplus in revenues was used either to pay off a portion of the national debt, or to invest in public infrastructures (Blackburn, 2006). These forms of investment could generate future income which could be used to boost pension payments. After the WWII, some countries like France and Germany used pension funding to accumulate savings and increment national wealth.

After these year, it has been clear the urge of reforming the pension system. For improving the financial situation of the pension system, it has been suggested the advantages of supplementing payroll taxes with other taxes and contributions in order to maintain the adequacy of pension provision in the future, when baby-boomers will retire. Blackburn agrees with this idea of providing extra resources, recommending putting levies on capital instead of using regressive taxes, like VAT or other consumption taxes, which do not mitigate inequality and fail to make visible the contribution that an individual or company is making to the wider society. According to Blackburn, a levy on capital rather than income or consumption is the best solution for extra-funding resources, because it could be used to improve the employers' contribution, spread risk, broaden coverage, and help the maintenance of the pension system as well as more spending on health, education, R&D, and social infrastructure (Blackburn, 2006). Yet, taxes on consumption and labour incomes are still high, while capital levies are not that heavy. For Blackburn, it would be acceptable to prefund secondary pension provision, with the accent on capital levies that are difficult to evade.

Instead of deciding which taxes are going to fund pensions, the change of provision has

been put into discussion as a better solution for extra-funding resources. As we have seen previously, DB funded scheme and DC scheme are the main types provided by the private sector. On the last years, some countries have given a larger role to private-funded retirement provision to complement public PAYG. As OECD pointed out, this change in funding might represent in the future the main source of retirement financing, like it is happening in Australia and Chile (OECD, 2014). In some cases, the shift to private-funded provision is because governments want to achieve more redistribution, as the professional-based character of the contributions frequently leaves large numbers of women and minorities without full coverage in some countries where they lack minimum pensions. Nonetheless, Spain has a minimum pension income for those who are not into any professional employment category.

A similar to the DC pension system is what is called a notional defined-contribution (NDC), introduced by Sweden in the 1990s in order to restore financial sustainability[3]. The NDC model retains PAYG state financing but mimics a privately funded DC plan. Workers' contribution continue to pay for today's pensioners but they are also credited to notional accounts, which get a rate of return linked to earnings growth. Retirement income is based on the notional capital workers have accumulated, which is turned into annuities through a formula based on life expectancy at their retirement age (The Economist, 2013). As life expectancy for older people rises, the annuities become less generous. In this way pensions automatically respond to rising longevity. Broadly speaking, notional accounts forces the pension system to adjust when economic and demographic changes make it financially unstable by fixing the contribution rate through both lower benefits and increasing working age.

3 To look forward on this topic, Vidal-Meliá and Domínguez Fabián (2004) measured the effect that pension formula based on notional account would have had on the initial amount of retirement pension and on the system's IRR if they were introduced in Spain.

5. REFORMS

5.1. Spanish reforms: 2011 and 2013

The new law introduced in 2014 is a parametric reform, with some changes that affects the retirement age, the minimum number of years of contribution and years of contribution period taken into account in the calculation.

The retirement age for a full benefit has been increased from 65 years to 65 years and two months in 2014, with a necessary minimum years of contribution of 15 to qualify for a pension benefit. The legal retirement age will be 67 years for both men and women in 2027. However if an individual has 38.5 years of contributions retirement with full-pension benefits is possible from age 65.

Two policies have been introduced into the pension system: an Adjustment Pensions Index (IRP) applied from 2014 and a Sustainability Factor (FS) that will be introduced in 2019 (CEFS, 2013). IRP value is the result of applying the following formula:

$$IRP_{t+1} = \underbrace{g_{I,t+1}}_{\text{Crecimiento ingresos}} - \underbrace{g_{P,t+1}}_{\text{Crecimiento nº pensiones}} - \underbrace{g_{s,t+1}}_{\text{Efecto sustitución}} + \underbrace{\alpha \frac{I^*_{t+1} - G^*_{t+1}}{G^*_{t+1}}}_{\text{corrección del déficit}}$$

where:

IRP_{t+1}= Adjustment pension index in year t+1 (year in which the index is calculated).

$g_{I,t+1}$= Arithmetic moving average centered on t + 1, with eleven values of the rate of variation in the amount of INSS revenues. For example, from the 2010-2020 period.

$g_{P,t+1}$= Arithmetic moving average centered on t + 1, with eleven values of the rate of variation in the amount of INSS contributions. For example, from 2010 to 2020.

$g_{s,t+1}$= Arithmetic moving average centered on t + 1, with eleven values of the the variation in the average pension system in a year in the absence of revaluation in that year.

I^*_{t+1} = Geometric mean mobile, centered t + 1, with eleven values of the amount of INSS revenues.

G^*_{t+1} =Geometric mean mobile, centered t + 1, with eleven values of the amount of INSS expenses.

α = Parameter indicating the speed of adjustment of the imbalances in the system, It takes a value between 0.25 and 0.33. 2015, α = 0.25.

The new pension benefits will take into account the growth of the life expectancy of the new pensioners. Benefits are indexed to IRP and calculated according to different factors: number of contributory pensions (the base is equal to the past earnings over the last 17 years compared to 15 years previously). From 2022 the base will be calculated with the 25 annual and indexed earnings. There is also a ceiling or maximum benefit amounting to EUR 43,164 in 2014 (OECD, 2013). Benefits will also be calculated according to the balance between revenues and expenses. Lastly, pensions are not indexed to CPI. This measure prevents the system to increase its deficit.

The benefit accrues according to the following schedule. A 50% of the base when the minimum years of contribution is fulfilled. An extra 3% is accrued per year over the next 10 years, followed by 2% per year thereafter. The maximum accrual rate (100%) is reached after 35 years' contributions. The maximum replacement rate relative to final salary is about 88%, calculated on the standard assumptions for earnings growth and price inflation. Finally, there is a ceiling to earnings for contributions and benefit purposes of €30,899 or 191% of average earnings (OECD, 2013).

The measure aims to link the pension received to life expectancy. As part of the problem arises as a result of increased life expectancy, adjusting in a more or less automatically way the amount of pensions to those increments of life expectancy, it would favour the sustainability of the system (BE, 2009). Yet, policies shall not focus only on the financial problems of the pension systems, but also ensuring that pension systems provide adequate retirement incomes to all workers.

The Bank of Spain had considered in its review that it is necessary to evaluate and analyze

other reforms that might complement public resources tax system, as for instance the development of a funded system, which is known as second-tier or defined contribution (BE, 2009).

5.2. EU reforms

Some EU countries have implemented pension reforms between 2013 and 2015, a period characterized by slow economic growth and increasing government debt. The most important pension reforms aimed to solve the financial sustainability by limiting public pension expenditure without deteriorating retirement adequacy (OECD, 2013) (Pascuzzo, n.d.).

Facing with the problems of an aging population on public finances requires to maintain a consolidation of public finances, so that the maintenance of a reduced public debt ratio to GDP would absorb further possible increases in public spending. In this regard, the commitments to medium-term fiscal rules laid down in the Stability Pact at European level and in the budgetary stability laws at the national level remain the best guide to manage fiscal policy (BE, 2009).

One of the solutions that is said to be effective is immigration, but it does not offer an efficient solution to the problem of old-age dependency ratio, since migrant populations also experience lower birth-rate and increasing longevity(Blackburn, 2006). While an increase of migrants would contribute modestly to public finances, it may not solve at all the problem of financial sustainability[4].

But the most popular reform has been the increase in retirement age (OECD, 2013). The contribution base is enlarged while at the same time adequacy is preserved. However, there is a trade-off between improving financial sustainability and increasing pension adequacy. An increase (reduction) in pensions deteriorates (improve) financial balances.

Almost no country has employed direct nominal benefit cuts. Instead of cutting in absolute terms, benefits were often reduced by switching the indexation in a less favourable way. Also, according to OECD, many countries raised revenues by increasing taxes or

4 However, much more could be said on this topic, but it is not the purpose of this essay.

contribution rates in DB systems. Other countries have taken measures with regard to increase the coverage of voluntary private pension schemes or reducing the effective taxation of pensioners' income and also lowering management costs.

C) CROSS-COUNTRY COMPARISON: DENMARK AND SPAIN

There are several key questions in order to analyze a cross-country pension system, such as what is the country's target replacement rate, how strongly are pension entitlements linked to earnings when working and how pensions are provided (Whitehouse, 2007). Depending on the values of each of the key questions, the quality of pension systems varies highly. The Melbourne Mercer Global Pension Index (MMGPI) tries to examine pension systems over 20 countries that represent more than 55% of the world's population. One of the aims of this index is to compare the adequacy and sustainability of 20 different retirement income systems.

Denmark is one of the countries that has well performed in the index results of the last edition, with a value of 81.7 and being the highest score for 2015 (Pension & Keep, 2015). To provide a brief summary thus far, Danish pension system is based on a minimum pension income provided by the public sector and supplemented by earning-related pension benefits, a DC plan and also other mandatory occupational schemes. Danish Retirement age is set at 67 years.

Although Spain is not included in this index, MMGPI is a useful starting point to considering the Danish pension system as a comparison point with the Spanish one and try to ask whether the Danish pension system might be a good one for Spain. So in order to analyze both countries, we will study how broadly are the differences between its pension systems and including the OECD average pension system as a benchmark. This section will focus both on adequacy and sustainability performance.

a) Comparisons of Retirement Income Adequacy

The economic crisis and the population aging has put into pressure many pension systems across OECD countries. The increase in government debt levels in many countries has led to more pension reforms during the last years, even though the problem of financial sustainability is not new. However, concerns about income adequacy is growing in importance, in a context of less generous indexation of pension benefits and retirees being likely to outlive their accumulated resources.

An aspect to bear in mind in a contributory pension system regarding income adequacy is the intragenerational equity (Whitehouse, 2007) (Pascuzzo, n.d.), which is to be understood as a certain standard of living between all members of the same generation, independently of which sector were they employed and the guarantee of a minimum standard of living among older people, such as minimum pensions.

Two sets of indicators are used for analyzing social sustainability performance across countries: replacement rate and old-age income poverty rate. Replacement rate is the ratio of individual initial pension to individual pre-retirement earnings. With this measure, we are able to calculate the loss of purchasing power in retirement by means of the percentage of a worker's pre-retirement income that is paid out by a pension program upon retirement compared to the last salary. In other words, if a worker earns at the end of his working life $5000 and at retirement is assigned an initial pension of $4000, the replacement rate is 80%. Replacement rates are often measured either in gross or in net terms. Net replacement rate takes into account individual net pensions relative to individual net earnings, including personal income taxes and social security contributions paid by workers and pensioners throughout their career, under the assumption that workers earn the same percentage of lifetime average worker earnings. On the other side, old-age income poverty rate gives us an indicator of poverty rate across old-age people. Thus, this two indicators show us how effectively a pension system works providing retirement income to retirees[5].

5 Women have slightly different replacement rates.

Table XIV: Gross pension replacement rates by earnings

	Individual earnings, multiple of mean for men (women where different)			
	Pension age	0.5	1	1.5
Denmark	67	107.4	67.8	55.1
Spain	65	82.1	82.1	82.1
OECD34	***65.5***	***64.5***	***52.9***	***47.8***

Source: OECD pension models.

To begin with replacement rates, **Table XIV** shows that OECD countries have a gross replacement rate in average earnings around almost 53%. While Denmark has a value of 67.8%, Spain has the highest value with 82.1%. The differences across earning levels reflect some features about the structure of the pension system, such as minimum pension income, ceilings on earnings, the progressivity of the tax system and various tax measures that favor pension income. So one of the reasons of why Spain has such a large value is because its pension system tries to protect low-income workers (here defined as workers earning half of average worker earnings) from old-age poverty by providing higher replacement rates for them than for average worker earners. Thus, Spain provides generous pensions to full-career workers on average earnings. The same replacement rate is shown at low-average earnings. However, this value is lower than Denmark's, which has a replacement rate of more than 107%, meaning that retirement benefits are thus higher than their earnings in working ages. While Spain has the same replacement rates without regarding of the level of average earnings, Denmark has the highest value in the low-earning range and lower values in mid-high ranges. A possible explanation of this pattern is that Denmark has not only DB-PAYG plans, but also DC plans in the pension insurance market.

The pattern of replacement rates across both countries is also different on a net basis. Net replacement rates are generally higher than gross replacement rates (see **Table XV**). This shift of values compared with the gross replacement rates reflects the higher effective tax and contribution rates that people pay on their earnings than on their pensions in retirement. This is due to favourable treatment of pension income under social security contributions, as the personal tax system plays an important role in supporting pensioners (OECD, 2013). Additionally, average tax rates on retirement income are lower than on earnings, because of the progressivity of the personal income taxes and the difference in amount between pension entitlements and earnings, which are usually greater in amount.

Table XV: Net pension replacement rates by earnings

	Individual earnings, multiple of mean for men (women where different)			
	Pension age	0.5	1	1.5
Denmark	67	103.2	66.4	57.2
Spain	65	89.1	89.5	89.3
OECD34	***65.5***	***74.1***	***63.2***	***58.5***

Source: OECD pension models.

For low-average earners, the effect of taxes and contributions on net replacement rates is moderate, as they pay less in taxes and contributions. As we may see on **Table XV**, the pattern from gross replacement rates are the same in this table. High-income earners typically pay more than the other ranges. In many cases, low-earners have retirement incomes that are below the level of the standard reliefs in the personal income tax, such as allowances and credits, so that they are often unable to benefit fully from any additional concessions granted to pensions under their personal income tax. In the case of the Spanish pension system, redistributive programmes are not only granting a relatively high minimum income of around one third of economy-wide average earnings, but also has ceilings to pensionable earnings of around 160-185% of economy-wide average earnings that weaken the link between pay and pensions (OECD, 2005). Also, most tax systems give special treatment to pensions giving additional allowances

We have seen so far how replacement rates give us a first viewpoint of the pension performance, although it is not a comprehensive measure for furthering the pension system analysis. In this case, it is necessary to also include retirement ages, life expectancy and the indexation of pension benefits in order to determine how its value evolves over time and for how long the pension benefit is paid (Vidal-Meliá & Domínguez-Fabián, 2004). Thus, for example, countries can more easily afford a higher replacement rate if the retirement age is higher, for the benefit would be paid for a shorter period.

But another important indicator has to be considered in this cross-country adequacy comparison and this is the rate of poverty[6], where the poverty threshold is the proportion of

6 For international comparisons, the OECD treats poverty as a “relative” concept. The yardstick for poverty depends on the median household income in a particular country at a particular point in time. Here, the poverty threshold is set at 50% of median, equalized household disposable income. Thus, poverty is defined as an income below half the national median equalized household income.

retirees over 65s with incomes below 50% of the median equalized income[7]. **Table XVI** shows that on average in the OECD countries, 12.6% of individuals aged over 65 live in relative income poverty. Poverty rates are higher for older people than for the population as a whole, which averages 11.4%. Spain has a greater poverty ratio of 6.4, almost 4 points higher than Denmark, considering that living standards of the retired people across the world are generally lower than those of the working age population.

Table XVI: Income poverty rates by age

Percentage with incomes less than 50% of median household disposable income

	2012 or latest availbale			
	Older people (aged over 65)			Whole population
	All 65+	66-75	76+	
Denmark	4.6	2.7	7.4	5.4
Spain	6.7	6.4	7.1	14.0
OECD	**12.6**	**11.2**	**14.7**	**11.4**

Source: OECD Income Distribution Database

Poverty among the retired population between 66 and 75 years old is less frequent than those aged 75 and over. A possible explanation of this pattern is that real earnings have tended to grow over time, so that each successive cohort of retirees has higher benefits. This in turn leads to higher pensions income for each generation over time. This is the reason why indexation of pension benefits play an important role in protecting the income of the elderly over longer periods of time.

Retirement income is mainly a product of the past worklife. It depends on job and earning historical data and also on the pension rules in place at the time entitlements accrued. However, the labour market has given way to more flexible, but often more precarious jobs such as part-time work, fixed-term contracts and various forms of self-employment. This is the case of Spanish labour market. Many of today's workers face growing job insecurity and the need to continuously update their skills. Also working women in particular often use such employment contracts, as they seek to reconcile work and family life. In all case, such practices entail earnings losses and lower pensions. Likewise, Spanish high unemployment rate is another life-course risk that affect individuals and households that may also account for

7. The data shown are for disposable incomes (i.e. net of personal income tax and social security contributions). Note that another advantage is that old-age people are owners of their homes with almost no debt derived from mortgage loans.

losses of earnings. At a time of persistently high unemployment and less steady lifelong careers, all the reforms we reviewed may result in lower pension entitlements for a country like Spain. This is one of the main differences with Denmark economical context and also giving the fact that unemployment in Spain is expected to remain higher than in Denmark during the following years.

Income adequacy is falling due to some pension reforms. The proportion of people that may have a present value of pension income below the current poverty line is higher for people on low income, women, private sector workers and self-employed people. In France, younger generations may be more likely to have a present value of pension income below a current relative poverty threshold than their elders due to reforms in the public pension system leading to benefit cuts. In the United States also, younger generations may be at greater risk of having a present value of pension income below a current measure of poverty. This may be due to the rise in the official age of retirement and the shift from occupational DB plans to occupational DC plans (OECD, 2014). The risk of failing replacement rates are specially found in Chile (due to lower rates of return on pension assets), the United States (due to the shift of occupational provision from DB to DC plans), France, the Netherlands and Norway (due to reforms leading to benefit cuts). In the United Kingdom, the risk is similar across generations. Spain shall take note of all of these examples regarding to some future reforms. Although the Danish pension system has a different structure than the Spanish, it may be reasonable not to loose also the economical context of the country. Even DC schemes are not immune to the lowering of the economy's output potential which might be induced by demographic changes.

b) Comparisons of Fiscal Sustainability

Financial sustainability indicators are normally assessed via public expenditure on old-age and survivors' benefits as a percentage of GDP and the required primary balance indicator that translates government debt ratios into projections of the permanent budgetary adjustment needed to ensure sustainable finances.

The first indicator shows public expenditure for the aged including pension benefits and

"non-cash" benefits. Public pensions represent the single largest item of government expenditure for the aged. A lower level of spending relative to GDP indicates less reliance on the public purse.

Table XVII: Public expenditure on old-age and survivors benefits

	Public expenditure on cash benefits for old-age and survivors							
	Level (%of GDP)					Change	Level (% of total government spending)	
	1990	1995	2000	2005	2011	1990-2011	1990	2011
Denmark	5.1	6.2	5.3	5.4	6.2	*21.4%*	9.2	10.8
Spain	7.9	9.0	8.6	8.1	10.5	*32.4%*		22.9
OECD	**6.2**	**6.7**	**6.8**	**7.0**	**7.9**	***27.8%***		**17.5**

Source: OECD Social Expenditures Database (SOCX) ; OECD Main Economic Indicators Database.

On **Table XVII**, public expenditure on cash benefits for old-age and survivors in the OECD increased a 28% between 1990 and 2011. Public pensions represent the largest single item of social expenditure, accounting for 18% of total government spending on average. Denmark has lower levels compared with OECD (7.9% in 20111), with a 6.2% in 2011. The level of public expenditure on cash benefits for old-age measured in % of the total government spending is less than 11%. While this value is 17.5% for the OECD countries, Spain has the highest value, with almost 23%. It is clear after looking at this levels that the Spanish pension system represents a huge amount of the total government spending, more than Denmark and the average of the OECD countries.

The increase in the rate of contribution would have positive effects on the Spanish pension system, since it means higher revenues without increasing expenses on the other side, as the calculation of the amount of the pension does not depend on the type of contribution. However, an increase in contribution rates could have very negative consequences on employment, as it would cause a sharp increase in labor costs, if a parallel reduction of gross wages did not occur (BE, 2009). This measure may have a strong impact in the fragile Spanish labour market. But an adjustment of this type is difficult, especially when intensified by the change in dependency ratio due to the retirement of baby boomers and the high

unemployment situation of Spain.

Moreover, this situation can be worsened due to the demographic old-age dependency ratio of Spain (**Table XVIII**). The ageing of population has been one of the main driving forces behind the wave of pension reforms in recent years. The ratio is expected to increase by 15 points in 2075, keeping age thresholds constant. At the moment, there are 28 (27.3) individuals aged over 65 for every 100 persons of working age (ages 20 to 64) on average across all OECD countries. In 1950 the dependency ratio was equal to 14, and has increased to 28 in 2015. The demographic dependency ratio is expected to continue to increase and to reach 35 in 2025, 51 in 2050 and 55 by 2075. So there is a positive relationship between comparing public pension expenditure with the old age dependency ratio (OECD Social Expenditure Database).

Table XVIII: Table Demographic old-age dependency ratios: Historical and projected values, 1950-2075

	1950	1975	2000	2015	2025	2050	2075
Denmark	15.6	23.7	24.2	32.2	37.1	42.7	47.6
Spain	12.8	19.2	27.3	29.6	36.3	73.2	65.4
OECD (weigthed)	**13.9**	**18.7**	**21.9**	**27.3**	**34.1**	**48.5**	**54.5**

Source: OECD (2013)

The last financial sustainability indicator is the Required Primary Balance. It is sourced from Standard and Poor's (Standard and Poor's 2010B) and it translates government debt ratios into projections of the permanent budgetary adjustment that is needed to ensure the sustainability of public finances. More specifically, based on methodology published by the European Commission (Standard and Poor's 2010A), the sustainability gap indicates the difference between the current structural primary fiscal balance and that which would result in intertemporal budgetary balance over an infinite time horizon, measuring the fiscal adjustment required to bring public finances back to sustainable track. The sustainability gap for Denmark is 4.6%, while for Spain is more than twice with a value of 8.7% (Mrsnik, Beers, & Morozov, 2010). This means that Spain's primary balance must be greater than projected by 8.7% of GDP for each future year by increasing taxes or cutting expenditures 8.7% of GDP.

D) CONCLUSIONS: SOME HIGHLIGHTS

Drawing together the analysis above, Danish pension system performs well both in terms of providing income adequacy and fiscal sustainability. The results provide a general guide as to the relative performance of the various systems rather than being definitive. Even though we have used only few indicators, the inclusion of more indicators would improve the results and would consider alternative approaches and possible reform options.

The results for both countries features the trade off between the objectives of income adequacy and fiscal sustainability, since countries that perform well against one objective tend to perform badly against the other. The increase of the contribution rate would have a positive budgetary effect, but this comes at the expense of expenditures in working life that may contribute to financial hardship or changing expenditures such as education unless this measure is supported by other reforms. The idea is to identify measures and reforms that would improve the level of income adequacy without compromising fiscal sustainability.

First of all, the parametric reform of increasing the retirement age in Spain to 67 like Denmark could have a significant impact on adequacy levels and on retirement outcomes, with associated budgetary costs. However, this measure depends on the the ability of the aged to continue working. Even though contributions are essential to building future pension entitlements, increasing pension age alone will not suffice.

Encouraging other plans like DC like in Denmark eases the pressure on the public budget, manages longevity risk and improves retirement income adequacy. DC funds are more likely to perform well against both adequacy and sustainability criteria, and also they are less vulnerable to demographic changes, so it may be a good strategy in terms of risk in relation to the current system of distribution. However, the capitalization system is more sensitive to inflationary crisis and, as showed last year, to instabilities of the financial markets. In addition, the development of a second tier pension system is complex and requires prior detailed analysis of issues such as the period of time required for implantation, its voluntary or mandatory character, or the cost distribution associated with the change involving the implementation of this system between generations (BE, 2009). Also, new longer-term difficulties have emerged in the aftermath of the financial and economic crisis, such as low-

interest rate environment, which makes difficult to earn the returns necessary to achieve adequate pension levels in DC schemes if rates of return remain low.

Supplying a universal basic pension with a PAYGO funding method through payroll taxes has proved to be a highly cost-effective way of delivering retirement income (Blackburn, 2006). As Orszag and Stiglitz pointed out in their work, a well-run public pension system could deliver results that were as good as—or better than—those produced by a well-run private system. To put things forward, they mention how the advocates of privatization claimed that commercial competition would ensure that private pensions would be delivered at low cost. Yet the evidence showed that suppliers chasing pension contracts that were to last a lifetime had a motive to engage in exorbitant marketing expenditure. Furthermore, advocates of privatization generally accepted the need for public regulation. Paradoxically the advocates of pension 'privatization' sometimes find that the only way to do this is by allowing a huge role for the public sector. This will only come into being thanks either to massive subsidies (tax relief) or to the state compulsion required to oblige citizens to contribute to a supplied pension fund.

However, PAYGO system works best when age cohorts are of the same size, but it comes under strain when the ratio of workers to pensioners is unbalanced. A surplus will be accumulated when there are too many workers and too few pensioners. If the the numbers of pensioners rises sharply in relation to contributors, then the problem is either a shortfall in pensions or a steep and counterproductive rise in payroll taxes. In a current deflationary economic context, high payroll taxes aggravates the problem of weak demand. It is not demography, but high unemployment, low growth, and deflation that are the problems for PAYG system, and this is exactly the main situation in Spain, which Denmark does not have.

Could rising productivity generate rising contributions even from a stationary or diminishing labor force? Sustainability of public finances may be relieved if employment and productivity are improved. In this sense, the margin for improvement in our country requires structural reforms in many areas, such as labor and good and service markets, as well as education and training of workers.

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