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## Financial Sustainability of Pension Systems in the European Union

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**Abstract:**

*Increases in life expectancy together with the decreases in fertility rates are predicted to make financing of public pension systems hard in an environment which some Eurozone member countries have had serious problems in their public finance, in the coming 50 years. European Union member countries, which have very different pension systems, have made pension reforms for sustainability of their pension systems such as increasing retirement age gradually, linking retirement age or benefits with changes in life expectancy, increasing the share of occupational and personal pensions in pension systems by taking into account the ageing and the negative effects of global financial crisis and the ongoing Eurozone sovereign debt crisis on public finance. This paper examines the pension systems in the European Union and evaluates the financial sustainability of pension systems in consideration of pension expenditures, ageing and the Eurozone sovereign debt crisis. Findings demonstrated that recent pension reforms by some European Union countries have mitigated the financial burden of pension systems, but further measures should be taken for the financial sustainability of pension systems.*

**Key Words:** Pension Systems, Ageing, Old-Age Dependency Ratio, Retirement Policies

**JEL Classification :** G20, H55, J11, J32

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## **1. Introduction**

Improvements in health and welfare have increased life expectancy in the world. Increasing life expectancy together with low fertility rates (in other words population ageing) is one of the greatest challenges that countries are facing now and in the future. Public pension spending increased 6.4% in the OECD (Organisation for Economic Co-operation and Development) between 1980-2007 in parallel with growing retired population (Adema, *et al.*, 2011, p.3). Public spending on pensions and other retirement benefits in OECD countries grew on average 17.5% faster than national income between 1990 and 2005 (OECD, 2009, p.2). It will become harder for the governments to sustain fiscal sustainability of public pension systems in the long term.

Life expectancy at birth for males is projected to increase by about 8 years over the projection period, from 76.7 in 2010 to 84.6 in 2060. Life expectancy at birth is projected to increase by 6.5 years for females, from 82.5 in 2010 to 89.1 in 2060 in the EU (European Union). On the other hand the total fertility rate is projected to rise from 1.59 in 2010 to 1.64 by 2030 and further to 1.71 by 2060. The EU population is projected to increase (from 502 million in 2010) up to 2040 by almost 5%, when it will peak (at 526 million). Thereafter, a steady decline occurs and the population shrinks by nearly 2% by 2060. Nonetheless, according to the projections, the population in 2060 will be slightly higher than in 2010, at 517 million. The age structure of the EU population is projected to change dramatically during projection period. It is projected that the population aged 15-64 will drop by 14%, and the population aged 65 and above will almost double, rising from 87.5 million in 2010 to 152.6 million in 2060 in the EU. Consequently the demographic old-age dependency ratio (people aged 65 or above relative to those aged 15-64) is projected to increase from 26% to 52.5% in the EU as a whole over the projection period (European Commission, 2012a, pp.24-27).

The purpose of this study is firstly to present the public pension systems briefly and then evaluate the financial sustainability of public pension systems in consideration of pension expenditures, ageing and the Eurozone sovereign debt crisis.

## **2. Structures of Pension Systems in the EU Member Countries**

Pension systems in EU-27 differ from each other in a lot of ways such as general and financial structures, pension schemes, eligibility requirements, and conditions of normal and early retirements, historical past, income sources, economic development levels and demographic structures of member countries. However pension systems of many EU member countries rests on three pillars which are called as public pensions, funded occupational pensions and personal pension plans. The share of these pillars within the overall architecture varies from country to country. Classifications of mandatory parts of the pension systems of EU member countries in accordance with OECD are given in Table 1. EU countries generally use multiple programs which are designed to ensure pensioners achieve some absolute, minimum standard of living. Similarly the mandatory second-tier, savings components of pension systems are different across EU countries. Defined benefit (DB) plans are provided by the public sector in 12 EU countries and by the private sector in the Netherlands. Defined-contribution (DC) plans are compulsory in 6 EU countries. In Denmark and Sweden, there are quasi-mandatory, occupational DC schemes in addition to smaller compulsory plans. The notional-accounts schemes (sometimes call defined-contribution plans (NDC)) used by 3 countries (Italy, Poland and Sweden) and points schemes used by 4 countries (Estonia, France, Germany and Slovak Republic).

### **[TABLE 1]**

When the pension schemes in EU member countries are analyzed, it is seen that public pensions dominate the pension system mostly, occupational pension schemes are mandatory only in Austria, Netherlands; mandatory for public sector employees in Ireland, Malta, Spain; mandatory for only for selected professions in Portugal, Slovenia and quasi mandatory in Denmark, Sweden and it does not exist in 8 countries. Mandatory private pension schemes exist in 6 countries from a determined date. (See Table 2).

### **[TABLE 2]**

The size and development of public pension expenditure also depend on the generosity of the pensions systems. The pensionable earnings reference, the valorization rule and the indexation rule are the important determiners of pension expenditure. 15 EU member countries take full career earnings as a reference in

determining pension entitlements. This leads – ceteris paribus – to lower pension expenditures in comparison to countries that calculate pension benefits with a pensionable earnings reference that is restricted to a specific amount of best earnings years or only years at a rather mature stage of the career. 9 member countries valorize pension contributions in relation to wage developments; other countries apply a mix of wages and prices. 5 countries apply a price indexation rule, 15 countries apply an indexation mix of wages (or comparable variables) and prices or a mix of GDP growth and prices (European Commission, 2012a, p.91).

### [TABLE 3]

### **3. Financial Sustainability of Pension Systems in the European Union Member Countries**

Life expectancy at normal retirement age has been increasing and projections show that increases in life expectancy will continue in the future. While people look forward to a few years of life in retirement at the times of first public pension systems, life expectancy at age 65 averaged nearly 17 years for men and 21 years for women in OECD countries and the probability that a newborn boy survives until age 65 is over 80%; the figure is over 90% for a girl (OECD, 2011, p.82). Therefore it is becoming harder for countries to sustain their public pension systems mostly financed by PAYG (Pay-As-You-Go) basis, day by day. The sustainability of any public pension system depends on mainly the demographic evolution, the country's economy and the specifics of pension system (Thalassinos and Pociovalisteanu, 2009).

#### **3.1 Developments in the Demographic Structure of the European Union**

Population ageing emerges as the result of decline in the fertility rate and increase in the life expectancy. Total fertility rates have declined sharply from 2.5 in 1960s to 1.4 in 2000 in the EU member countries and then it began to increase and reached 1.59 in 2010. The AWG (Ageing Working Group) projections for 2010-2060 period show that the recent increase in fertility rates continue, but very slowly, and it will reach to 1.7 in 2060. The fertility rate is projected to increase in nearly all member countries, with the exception of Ireland, France, Sweden and the United Kingdom where it decreases, and in Belgium, Denmark and Finland it is projected to remain stable between 2010 and 2060. Although the fertility rates are changing between

2.07 (Ireland) and 1.31 (Latvia) among EU member countries, it will stay below the natural replacement level of 2.1 in the long run in EU-27.

**[CHART 1]**

**[TABLE 4]**

Life expectancy at older ages is especially important for the financing of retirement-income systems. In EU-27 member countries, men aged 65 could expect to live an additional 16.7 years between 2002 and 2010, which is forecast to increase to 22.4 years by 2010-60. Women aged 65 could expect to live 20.2 more years between 2002 and 2010, which is forecast to increase 25.6 years by 2010-60. There is a 5 year variation for men (France-18.5; Latvia and Lithuania-13.5) and a 5.7 year variation (France-22.7; Bulgaria-17) for women among EU-27 member countries in life expectancy at older ages in 2010, but life expectancy at 65 of men and women are expected to converge between 2010 and 2060 among EU member countries.

**[CHART 2]**

**[TABLE 5&6]**

When changes in fertility rate, life expectancy at 65 (men and women) are analyzed together, it draws attention that increases in life expectancy both men and women are more than the increases in fertility rates. This also verifies that rate of 65 and over aged people in total population will continue to rise in the future. In other words the demographic structure of the EU population will be expected to change dramatically. The proportion of children (aged 0-14) in total population is projected to decline from 15.6% to 14.3% with a 8.3% decrease, the proportion of working people (15-64) in total population is projected to decline from 67% to 56.2 with a 16.1% decrease. On the other hand the proportion of elderly people in total population is projected to increase from 17.4% to 29.5% with a 69.5% increase.

**[CHART 3&4]**

The old-age dependency ratio, which is ratio between the total number of aged 65 and over and the number of persons of working age (from 15 to 64), is an important indicator of ageing. The old-age dependency ratio in EU-27 has been in an upward movement, the AWG projections show that the upward movement continues in the future, substantial increases in the ratio in question will be seen especially between

2015 and 2040 and then increases will continue but a moderate way. The EU-27 old-age dependency ratio is projected to double to 52.5% between 2010 and 2060, meaning that the EU will move from having four persons of working age for every elderly citizen to only two and the economic cost of supporting pensioners will rise in a considerable amount and also the working population that actively contributes to GDP will decrease considerably.

#### [CHART 5]

### **3.2 Financing of Retirement-Income Systems in Consideration of Economic Outlook of the European Union**

EU has been faced with the most severe crisis since the Treaty of Rome in 1958. The sovereign debt crisis emerged firstly in Greece in October 2009 and then became a Eurozone crisis by spreading Ireland, Portugal, Italy and Spain in a short time. EU countries in debt crisis have unsustainable sovereign debt burden, public debt level to GDP in Greece, Ireland, Spain, Portugal and Italy respectively increased to 15.6%, 14%, 11.2% and 10.2%, 5.4% in 2009. Although EU and member countries in crisis have struggled and taken strict measures to recover from the ongoing crisis as of 2009, the seriousness of the crisis in question has been continuing and it does not seem possible to recover from crisis in the short term and also the negative effects of crisis over EU economies will continue in the long run.

#### [CHART 6]

Public pension expenditure in EU-27, whose some members are in sovereign debt crisis, reached 13.07% of GDP in 2009. There are considerable variations in ratio of public pension expenditure to GDP among EU member countries. This rate is 16.03% in Italy, 15.06 % in Austria, 14.51% in France; on the other hand 7.31% in Ireland, 8.44 in Latvia. The AWG gross public pension expenditure projections in consideration of potential GDP growth rates show that increases in public pension expenditure are more than growth rate assumptions especially between 2025 and 2045. The expectation of increase in old age dependency ratio and life expectancy in the same period verified this. But the projections show that there will be a 14.2% increase in gross public pension expenditure of EU-27 as a percent of GDP and it will reach to 12.9% of GDP. Therefore the European Commission projections reveal

that the recent pension reforms in majority of EU member countries have limited the increases in public pension expenditure in the future.

**[TABLE 7]**

**[CHART 7]**

The AWG projections about the gross public pensions expenditure show that there will be significant increases in gross public pensions increases of some member countries such as a 103.1% increase in Luxembourg, a 65.3% increase in Slovakia, a 63.5% increase in Slovenia, a 52.8% increase in Malta, a 52.2 increase in Netherlands, a 50.9% increase in Belgium between 2010 and 2060. On the other hand it is projected that there will be decreases in Denmark, Estonia, Italy, Latvia, Poland, and relatively small increase in France, Greece, Portugal and Sweden.

**[CHART 8]**

The pension benefit ratio, which is the average pension as a share of the average wage, is projected to decrease about 19% in EU-27 between 2010 and 2060. It is expected that there will be declines in varying amounts in all EU-27 countries except Cyprus during partly due to recent pension reforms by 2010. The decreasing benefit ratio is one of the factors that has limited the increases in public pension expenditure of some EU member countries such as Greece, Portugal, and Sweden.

**[CHART 9]**

The effects of demographic trends on finance of growing public pension expenditure depend on the financing method of the pension systems. Most public pension systems of the EU member countries have been financed by PAYG basis, whereby current contribution revenues are used for the payments of current pensions. Therefore their financing will be affected negatively when the number of pensioners rises in relation to the number of workers. By contrast, funded pension schemes are affected only indirectly. But the last financial crises have led a loss of confidence against funded pension systems in people. EU member countries should balance the weights of three pillars in their pension systems in order to reduce the potential risk in their pension systems, which they will be exposed to.

#### **4. Main Reforms in the Pension Systems in the European Union**

Social policy is a national matter in EU and therefore its control is in the hands of member countries. But the EU affect the member countries' social policies by the Maastricht and Stability and Growth Pact criteria, EU's Social Charter, various summit conferences, reports and papers indirectly. The European Commission recommended the following points for the sustainability of pensions, health care and social benefits in order to secure the full implementation of the Stability and Growth Pact. The following reforms were proposed to necessary to ensure the sustainability and adequacy of pensions:

- link the retirement age with increases in life expectancy,
- restrict access to early retirement schemes and other early exit pathways,
- support longer working lives by providing better access to life-long learning, adapting work places to a more diverse workforce, developing employment opportunities for older workers and supporting active and healthy ageing,
- equalize the pensionable age between men and women and,
- support the development of complementary retirement savings to enhance retirement incomes (European Commission, 2012b, p.9).

In this context the EU member countries have made reforms in their pension systems inevitably to limit the fiscal burden of pension systems arisen from the changing demographics in consideration of negative effects of financial crises in recent years. But the required reforms vary from country to country due to the differences in pension systems and demographic trends.

Many EU member countries (such as Czech Republic, Greece, Spain, Italy) have increased the retirement age gradually or linked it with changes in life expectancy in order to mitigate the impact of increases in life expectancy in context of recent pension reforms. And also they have tightened qualifying conditions for early retirement. In this context some member countries have incorporated sustainability factor and/or reduction coefficients into their pension systems. This new approach enables these countries to change the size of the pension benefit depending on expected demographic changes such as the life expectancy at the time of retirement.



**[TABLE 8]**

The share of occupational and private schemes in total pension provision has increased in many EU member countries. Participation in second- and third pillar schemes has been encouraged or even made mandatory to decrease the financial burden of ageing populations in public pension schemes. Bulgaria, Estonia, Latvia, Lithuania (quasi-mandatory), Poland, Romania, Slovakia and Sweden have made the participation in private pension schemes mandatory. Hungary, Lithuania, Romania, Poland, Latvia, Estonia and Sweden have provided projections on expenditure developments in private mandatory schemes. Comparable to second pillar occupational schemes, the relevance of private mandatory pensions is very low at the moment, but increasing in the future.

**5. Conclusion and Policy Recommendations**

The demographic ageing, in other words a radical change in demographic structure of EU-27 is expected as a result of a small increase in fertility rate, which will stay below the natural replacement level of 2.1, relative to life expectancy in the long run. The ageing EU population poses a structural challenge for their long-term financial sustainability in especially EU members in sovereign debt crisis. However there is a high degree of heterogeneity in pension systems, demographic structures and economic outlooks of EU-27 member countries. As a result of this heterogeneity, the possible effects of ageing on member countries vary from country to country among EU-27 member countries.

EU-27 member countries have made pension reforms in order to mitigate the potential negative effects of their changing demographic structures over their pension systems in consideration of EU projections and recommendations about sustainability of pension systems. The AWG projections show that recent pension reforms by some EU member countries such as Czech Republic, Greece, Italy and Spain have contributed to sustainability of pension systems by limiting the increase in the future pension expenditure. The main reforms by EU member countries:

- encouraging more people to work more and longer so as to obtain similar entitlements as before,

\* increasing retirement age or linking it to gains in life expectancy, thus stabilizing the balance between working years and years in retirement.

\* rewarding later and penalizing earlier retirement,

\* equalization of pensionable ages between men and women,

- \* moving from benefits based on earnings in best years towards entitlement based on working career average earnings,
- \* changing the pension indexation rules,
- \* modifying the qualifying conditions and benefit formula,
- shifting from DB to DC schemes or establishing mandatory funded pillars or in other words transition from single pension system to multi-tiered systems (European Commission, 2010, p.5)

Although the recent pension reforms by some EU member countries are expected to limit the additional fiscal burden in the future arisen from the ageing challenge, it may not be enough for the sustainability of pension systems. EU member countries should the following reforms in order to overcome the problems against the expected radical changes in their demographic structures.

- diversifying risk by establishing a three pillar (public mandatory old-age pension, occupational pensions and private savings) structure in order to sustain pension system financially against possible problems in one of the pillars,
- changing the eligibility conditions for retirement in order to increase the rate of older people in working force and reduce the early retirements.

## References

- Adema, W., Fron, P. and Ladaique, M. (2011), "Is the European welfare state really more expensive?: Indicators on social spending, 1980-2012; and a Manual to the OECD Social Expenditure Database (SOCX)", OECD Social, *Employment and Migration Working Papers*, No. 124, OECD Publishing.
- European Commission (2012), "The 2012 Ageing report: Economic and budgetary projections for the 27 EU member states (2010-2060) ", *European Economy* 2|2012 (provisional version), Brussels.
- European Commission (2012), "White Paper - An agenda for adequate, safe and sustainable pensions", COM (2012) 55 Final, Brussels.
- European Commission (2010), "Green paper - Towards adequate, sustainable and safe European pension systems", COM (2010) 365 Final. Brussels.
- European Commission (2007), "Pensions schemes and projection models in EU-25 member states", *European Economy Occasional Papers*, Number 35.Brussels.
- Poteraj, J. (2008), "Pension systems in 27 EU Countries".
- OECD (2011), "Pensions at a glance 2011: Retirement-income systems in OECD and G20 countries", OECD Publishing, Paris.

OECD (2009), “Pensions at a Glance: Current trends and policy topics in retirement-income provision in OECD countries”.

Statistical Office of the European Communities – Eurostat (2012), “Population-Demography”.

Statistical Office of the European Communities – Eurostat (2012), “Population-Projections”.

Statistical Office of the European Communities – Eurostat (2012), “Government statistics-Government deficit and debt”.

Statistical Office of the European Communities – Eurostat (2012), “Social protection statistics-Social protection expenditure”.

Thalassinos, I.E. and Pociovalisteanu, D.M. (2009), “The Structural Funds and the Economic and Social Cohesion Process,” *Annals-Economic Sciences Series*, Vol.1(5), 313-330.

### **TABLES**

**Table 1: Structure of retirement-income provision in selected EU countries**

Country	Public Pension System			Type of Public Pension System	Type of Private Pension System
	Resource tested	Basic	Minimum		
Austria				DB	
Belgium	✓	✓		DB	
Czech Republic		✓	✓	DB	
Denmark	✓	✓			DC
Estonia		✓		Points	DC
Finland			✓	DB	
France			✓	DB+points	
Germany	✓			Points	
Greece			✓	NDC	
Hungary	✓	✓		DB	DC
Ireland		✓			
Italy	✓			NDC	
Luxembourg	✓	✓	✓	DB	
Netherlands		✓			DB
Poland			✓	NDC	DC
Portugal			✓	DB	
Slovak Republic			✓	Points	DC
Slovenia			✓	DB	

Country	Public Pension System			Type of Public Pension System	Type of Private Pension System
	Resource tested	Basic	Minimum		
Spain			✓	DB	
Sweden			✓	NDC	DC
United Kingdom	✓	✓	✓	DB	

Source: OECD, 2011, p.107

**Table 2: Pension schemes in the EU member countries**

Country	Public Pensions					Occupational Pension Schemes	Private Pension Schemes	
	Minimum Pension Social Allowance	Old Age Pensions	Early Retirement Pensions	Disability Pensions	Survivors' Pensions		Mandatory Pension Schemes	Voluntary Pension Schemes
Austria	MT-SA	ER	ER	ER	ER	M	X	V
Belgium	MT-SA	ER	ER	ER (private) FR (self-employed)	ER	V	X	V
Bulgaria	MT-AS (as of 2013; before social pension)	ER	ER (until 2015)	ER	ER	V	M young (1960) M (prof)	V
Cyprus	MT&ER	ER	ER	ER	ER	M-pub; V-priv	X	X
Czech Republic	FR	ER	ER	ER	ER	X	X	V
Denmark	FR&MT suppl.	FR&MT suppl.	V	FR	FR	quasi M	X	V
Estonia	FR	FR+ suppl. (before 1999); ER (after)	ER	FR+ suppl. (before 1999); ER (after)	FR+ suppl. (before 1999); ER (after)	X	M - young (1983)	V-old
France	ER/ MT-SA	ER	ER	ER	ER-MT	V	X	V
Finland	MT	ER	ER	ER	ER	V	X	V
Germany	MT-SA	ER	ER	ER	ER	V	X	V
Greece	MT-FR	ER	ER	ER	ER	X	X	V
Hungary	MT-SA	ER	ER	ER	ER	X	V	V

Country	Public Pensions					Occupational Pension Schemes	Private Pension Schemes	
	Minimum Pension Social Allowance	Old Age Pensions	Early Retirement Pensions	Disability Pensions	Survivors' Pensions		Mandatory Pension Schemes	Voluntary Pension Schemes
Ireland	MT-FR&SA	FR	MT-FR & SA	SA: MT-FR; Contributory: ER	SA: MT-FR; Contributory: ER	M-pub; V-priv	X	V
Italy	MT & SA	ER	ER	ER	ER	V	X	V
Latvia	MT-SA	ER	ER	ER	ER	X	M - young (1971); V-old	V
Lithuania	SA	ER	ER	SA or ER	SA or ER	X	V	V
Luxembourg	MT-SA	ER	ER	ER	ER	V	X	V
Malta	MT-SA	FR & ER	X	FR & ER	FR & ER	M-pub (before 1979)	X	V
Netherlands	SA	FR	X	ER	FR	M	X	V
Poland	MT	ER	ER	ER	ER	V	M - young (1969+)/ V-old	V
Portugal	MT-SA	ER	ER	ER	ER	M-prof; V-others	X	V
Romania	SA	ER	ER	ER	ER	X	M	V
Slovakia	MT-SA	ER	ER	ER	ER	X	M/V new	V
Slovenia	MT-SA	ER	ER	ER	ER	M-prof; V-others	X	V
Spain	MT	ER-priv; FRw-pub	ER-priv; FRw-pub	ER-priv; FRw-pub	ER-priv; FRw-pub	M-pub; V-priv	X	V
Sweden	MT	ER	ER	ER	ER	quasi-M	M	V
United Kingdom	FR& MT-SA	ER-V	X	ER (HC)	ER	V	X	V

ER: Earnings Related,  
 FRw: Flat Rate by Wage categories expenditure  
 M: Mandatory participation in the scheme

New: New labor market entrants

Other: Other than selected professions

Prof: Only for selected professions

SA: Social Allowance/Assistance scheme

FR: Flat Rate,  
 HC: Partly covered by health care

MT: Means Tested

Old: Only for people other than young

Private: Private sector employees

Public: Public sector employees

V: Voluntary participation in the

X: Does not exist  
 year X and after

Young(X): Only for people born in

Source: European Commission, 2012a, p.90.

**Table 3: Pension schemes in the EU member countries**

Country	Pensionable Earnings Reference	General Valorization Variables	General Indexation Variables	Normal Retirement Age (Years) for Public Pension System*
Austria	2010: 22 best years; (40 best years as of 2028)	Wages	Prices	Men: 65 Women: 60 (It will be increased to 65 between 2024 and 2033.)
Belgium	Full career	Prices	Prices and living standard	Men and Women: 65
Bulgaria	Full career	Wages	Prices and wages	Men: 63 Women: 60 (4 months increase per year until reaching 65 years (men) in 2017 and 63 years (women) in 2020 as of 2012.)
Cyprus	Full career	Wages	Wages and prices	Men and Women: 65

Country	Pensionable Earnings Reference	General Valorization Variables	General Indexation Variables	Normal Retirement Age (Years) for Public Pension System*
Czech Republic	Full career	Wages	Prices and wages	Men: 62 and 2 months Women: 60 and 8 months (or less according to the number of children reared. (It has been gradually increasing until age 65 (men and women) in 2030)
Denmark	Years of residence.	Not applicable	Wages	Men and Women: 65 (It will be increased gradually to age 67 in the period 2019-2022)
Estonia	Full career	Social taxes	Prices and social taxes	Men:63 Women: 59,5 (It will reach 63 from 2016.)
Finland	Full career	Prices and wages	Prices and wages	Men and Women: 63-68
France	25 best years (CNAV)	Prices	Prices	Men and Women: 60-65
Germany	Full career	Wages	Wages	Men and Women: 65
Greece	Full career	Yearly decree	Prices and GDP (max 100% prices)	Men: 65 Women: 62 (It will increase 1 year per year until 65 in 2014)

Country	Pensionable Earnings Reference	General Valorization Variables	General Indexation Variables	Normal Retirement Age (Years) for Public Pension System*
Hungary	Full career	Wages	Prices and wages	Men and Women: 62
Ireland	Career average contributions	Not applicable	No rule	Men and Women : 65 (contributory pension) Men and Women : 66 (non-contributory pension)
Italy	Full career	GDP	Prices	Men: 65 Women: 60
Latvia	Full career	Contribution wage sum index	Prices as of 2014	Men and Women: 62
Lithuania	5 best from the period 1984-1993 and 25 best years after 1994	Yearly discretionary decision	Yearly discretionary decision	Men: 62.5 Women: 60
Luxembourg	Full career	Prices and wages	Prices and wages	Men and Women: 65 (general scheme)
Malta	10 best of last 40 years (for people born as of 1962)	Cost of living	Prices and wages	Men: 61 Women: 60
Netherlands	Years of residence	Not applicable	Wages	Men and Women: 65
Poland	Full career	NDC 1st: Wages, NDC 2nd: GDP	Prices and wages	Men: 65 Women: 60



Country	Pensionable Earnings Reference	General Valorization Variables	General Indexation Variables	Normal Retirement Age (Years) for Public Pension System*
Portugal	Full career (as of 2042, max 40); Weighted average between full career and 10 best out of last 15 (before 2042)	Prices (and wages 2002-2011)	Prices and GDP	Men and Women: 65
Romania	Full career	Prices (and wages until 2030)	Prices (and wages until 2030)	Men: 64 Women: 60
Slovak Republic	Full career as of 1984	Wages	Prices and wages	Men: 62 Women: 53-57 (be 62 in 2015)
Slovenia	Best consecutive 18 years	Wages	Wages	Men: 63 Women: 61
Spain	Last 25 years (as of 2022)	Wages (with maximum value closer to prices)	Prices	Men and Women: 65
Sweden	Wages	Wages	Wages	Men and Women: 61
United Kingdom	Years of insurance contributions	Prices, wages and GDP	Prices, wages and GDP	Men: 65 Women: 60 (be 65 in 2020)

\* Normal retirement age is defined here as the age at which people can first draw full benefits.

Source: European Commission, 2012a, p.92.

European Commission, 2007, pp.18-28.

Poteraj, 2008, pp.77-420.

**Table 4: Projections of fertility rate in the EU-27**

Country	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
EU-27	1.59	1.61	1.62	1.63	1.64	1.65	1.66	1.67	1.68	1.70	1.71
Austria	1.39	1.41	1.43	1.44	1.46	1.48	1.49	1.51	1.52	1.54	1.56
Belgium	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
Bulgaria	1.56	1.57	1.58	1.59	1.60	1.61	1.63	1.64	1.65	1.66	1.67
Cyprus	1.50	1.51	1.52	1.54	1.55	1.56	1.57	1.59	1.60	1.61	1.62
Czech Republic	1.49	1.51	1.52	1.53	1.55	1.56	1.57	1.58	1.60	1.61	1.62
Denmark	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
Estonia	1.62	1.63	1.64	1.65	1.66	1.66	1.67	1.68	1.69	1.70	1.70
Finland	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
France	2.00	1.99	1.99	1.98	1.98	1.97	1.97	1.96	1.96	1.95	1.95
Germany	1.36	1.38	1.40	1.41	1.43	1.45	1.47	1.48	1.50	1.52	1.54
Greece	1.52	1.54	1.55	1.56	1.57	1.58	1.59	1.61	1.62	1.63	1.64
Hungary	1.32	1.34	1.36	1.38	1.40	1.42	1.44	1.46	1.47	1.49	1.51
Ireland	2.07	2.06	2.05	2.04	2.04	2.03	2.02	2.01	2.00	2.00	1.99
Italy	1.42	1.44	1.45	1.47	1.48	1.50	1.51	1.53	1.54	1.56	1.57
Latvia	1.31	1.33	1.35	1.37	1.39	1.41	1.43	1.45	1.47	1.49	1.51
Lithuania	1.55	1.56	1.57	1.58	1.59	1.60	1.62	1.62	1.63	1.65	1.66
Luxembourg	1.59	1.60	1.61	1.62	1.63	1.64	1.65	1.65	1.66	1.67	1.68
Malta	1.44	1.45	1.47	1.48	1.50	1.51	1.53	1.54	1.56	1.57	1.59
Netherlands	1.79	1.79	1.79	1.80	1.80	1.80	1.80	1.81	1.82	1.81	1.81
Poland	1.40	1.42	1.43	1.45	1.46	1.48	1.50	1.51	1.53	1.54	1.56
Portugal	1.32	1.34	1.36	1.38	1.40	1.42	1.44	1.45	1.47	1.49	1.51
Romania	1.38	1.39	1.41	1.43	1.45	1.46	1.48	1.50	1.51	1.53	1.55
Slovakia	1.41	1.43	1.44	1.46	1.48	1.49	1.51	1.52	1.54	1.55	1.57
Slovenia	1.54	1.55	1.56	1.57	1.58	1.59	1.60	1.61	1.63	1.64	1.65
Spain	1.40	1.42	1.43	1.45	1.46	1.48	1.50	1.51	1.53	1.54	1.56
Sweden	1.94	1.93	1.93	1.93	1.92	1.92	1.92	1.91	1.91	1.91	1.90
United Kingdom	1.94	1.94	1.93	1.92	1.93	1.92	1.92	1.92	1.91	1.91	1.91

Source: European Commission, 2012a, p.294

**Table 5: Projections of life expectancy at 65 in the EU-27 (Males)**

Country	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
EU-27	17.2	17.8	18.3	18.9	19.4	19.9	20.4	21.0	21.4	21.9	22.4
Austria	17.6	18.1	18.6	19.1	19.6	20.1	20.6	21.1	21.5	22.0	22.4
Belgium	17.4	17.9	18.4	18.9	19.4	19.9	20.4	20.9	21.4	21.8	22.3
Bulgaria	13.8	14.5	15.3	15.9	16.6	17.3	18.0	18.7	19.3	19.9	20.7
Cyprus	17.8	18.3	18.8	19.3	19.8	20.2	20.7	21.2	21.6	22.1	22.5
Czech Republic	15.3	15.9	16.5	17.1	17.7	18.4	18.9	19.5	20.1	20.7	21.2
Denmark	16.8	17.4	17.9	18.5	19.0	19.5	20.0	20.6	21.1	21.5	22.0
Estonia	14.1	14.8	15.5	16.2	16.9	17.6	18.2	19.0	19.7	20.3	20.9
Finland	17.3	17.8	18.3	18.9	19.4	19.9	20.4	20.9	21.4	21.8	22.3
France	18.5	19.0	19.5	19.9	20.4	20.8	21.3	21.7	22.1	22.6	23.0
Germany	17.4	17.9	18.5	19.0	19.5	20.0	20.5	21.0	21.5	21.9	22.4
Greece	17.9	1.8	18.9	19.4	19.9	20.4	20.8	21.3	21.7	22.2	22.6
Hungary	14.0	14.8	15.5	16.2	16.9	17.7	18.3	19.0	19.7	20.3	20.9
Ireland	16.8	17.4	18.0	18.5	19.1	19.6	20.1	20.7	21.2	21.7	22.2
Italy	18.1	18.6	19.1	19.6	20.1	20.6	21.0	21.5	22.0	22.4	22.8
Latvia	13.5	14.2	15.0	15.7	16.5	17.2	17.9	18.6	19.3	20.0	20.6
Lithuania	13.5	14.3	15.0	15.7	16.4	17.1	17.8	18.5	19.1	19.8	20.4
Luxembourg	17.3	17.9	18.4	18.9	19.5	20.0	20.5	21.0	21.4	21.9	22.4
Malta	17.0	17.6	18.1	18.7	19.2	19.7	20.3	20.8	21.3	21.8	22.2
Netherlands	17.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0	21.4	21.9	22.3
Poland	14.8	15.5	16.2	16.9	17.5	18.2	18.8	19.4	20.0	20.6	21.2
Portugal	17.1	17.6	18.1	18.7	19.2	19.7	20.2	20.7	21.1	21.6	22.1
Romania	14.1	14.8	15.5	16.2	16.9	17.6	18.3	18.9	19.6	20.2	20.8
Slovakia	14.1	14.8	15.5	16.2	16.9	17.6	18.2	18.9	19.5	20.2	20.8
Slovenia	16.4	17.0	17.6	18.1	18.7	19.2	19.8	20.3	20.8	21.4	21.9
Spain	18.2	18.7	19.2	19.7	20.2	20.7	21.1	21.6	22.0	22.5	22.9
Sweden	18.2	18.7	19.2	19.6	20.1	20.5	21.0	21.4	21.8	22.3	22.7
United Kingdom	18.0	18.5	19.0	19.5	20.0	20.5	21.0	21.4	21.9	22.3	22.8

Source: European Commission, 2012a, p.295

**Table 6: Projections of life expectancy at 65 in EU-27 (Females)**

Country	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
EU-27	20.7	21.2	21.8	22.3	22.8	23.3	23.8	24.3	24.7	25.2	25.6
Austria	20.9	21.4	21.9	22.4	22.9	23.3	23.8	24.3	24.7	25.1	25.6
Belgium	20.9	21.4	21.9	22.4	22.9	23.4	23.9	24.3	24.8	25.2	25.7
Bulgaria	17.0	17.7	18.4	19.1	19.7	20.4	21.1	21.7	22.4	23.0	23.6
Cyprus	20.0	20.6	21.1	21.7	22.2	22.7	23.3	23.8	24.3	24.8	25.3
Czech Republic	18.7	19.3	19.9	20.5	21.1	21.7	22.3	22.8	23.4	23.9	24.5
Denmark	19.5	20.2	20.8	21.4	21.9	22.5	23.1	23.6	24.1	24.6	25.1
Estonia	19.1	19.7	20.4	21.0	21.6	22.2	22.7	23.3	23.8	24.4	24.9
Finland	21.3	21.8	22.2	22.7	23.2	23.6	24.1	24.5	25.0	25.4	25.8
France	22.7	23.1	23.6	24.0	24.4	24.8	25.2	25.5	25.9	26.3	26.6
Germany	20.6	21.1	21.6	22.1	22.6	23.1	23.6	24.1	24.5	25.0	25.4
Greece	20.2	20.7	21.1	21.6	22.0	22.5	22.9	23.3	23.8	24.2	24.6
Hungary	18.1	18.8	19.5	20.2	20.9	21.5	22.2	22.8	23.4	24.0	24.6
Ireland	20.0	20.6	21.2	21.8	22.4	22.9	23.5	24.0	24.6	25.0	25.5
Italy	21.7	22.2	22.7	23.1	23.6	24.0	24.5	24.9	25.3	25.7	26.1
Latvia	18.1	18.8	19.5	20.1	20.8	21.4	22.1	22.7	23.3	23.9	24.4
Lithuania	18.4	19.0	19.6	20.2	20.8	21.4	22.0	22.6	23.1	23.7	24.2
Luxembourg	21.1	21.7	22.2	22.8	23.3	23.8	24.3	24.7	25.2	25.6	26.1
Malta	20.2	20.7	21.3	21.8	22.4	22.9	23.4	23.9	24.4	24.9	25.4
Netherlands	20.9	21.4	21.9	22.4	22.9	23.4	23.8	24.3	24.8	25.2	25.6
Poland	19.1	19.7	20.3	20.9	21.5	22.1	22.7	23.2	23.8	24.3	24.8
Portugal	20.4	20.9	21.4	21.9	22.4	22.8	23.3	23.8	24.2	24.7	25.1
Romania	17.2	17.9	18.6	19.3	20.0	20.6	21.3	22.0	22.6	23.2	23.8
Slovakia	18.0	18.6	19.3	19.9	20.6	21.2	21.9	22.5	23.1	23.7	24.3
Slovenia	20.2	20.8	21.3	21.9	22.4	22.9	23.4	23.9	24.4	24.8	25.3
Spain	22.1	22.6	23.0	23.4	23.9	24.3	24.7	25.1	25.5	25.9	26.3
Sweden	21.1	21.6	22.1	22.6	23.1	23.5	24.0	24.5	24.9	25.3	25.7
United Kingdom	20.7	21.2	21.8	22.3	22.8	23.3	23.8	24.3	24.8	25.3	25.7

Source: European Commission, 2012a, p.296

**Table 7. Public pension expenditures to GDP in the EU-27 Countries (% of GDP)**

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
EU-27	NA	NA	NA	NA	NA	12.15	11.96	11.41	12.05	13.07
Austria	14.24	14.42	14.50	14.64	14.41	14.17	13.97	13.77	14.02	15.06
Belgium	10.98	11.09	11.24	11.32	11.17	11.16	11.04	10.70	11.32	12.14
Bulgaria	NA	NA	NA	NA	NA	7.57	7.25	6.85	7.02	8.80
Cyprus	5.71	5.76	6.41	6.73	6.58	6.71	6.71	6.61	6.79	7.36
Czech Republic	8.22	8.21	8.41	8.34	7.95	8.03	8.01	7.94	8.16	9.12
Denmark	10.49	10.63	10.75	11.14	11.04	10.99	10.68	10.71	11.08	12.06
Estonia	6.61	5.93	5.88	5.88	5.99	5.89	5.91	5.77	7.02	9.06
Finland	10.55	10.63	10.94	11.26	11.17	11.18	11.10	10.75	10.80	12.57
France	12.96	12.95	13.03	13.12	13.16	13.30	13.29	13.32	13.67	14.51
Germany	13.06	13.17	13.34	13.57	13.44	13.37	12.92	12.39	12.32	13.14
Greece	11.13	11.87	11.76	11.54	11.70	12.20	12.12	12.32	12.74	13.45
Hungary	8.70	8.73	8.91	9.24	9.33	9.80	10.03	10.53	11.01	11.19
Ireland	3.57	3.69	4.63	4.84	4.88	4.89	5.01	5.16	6.00	7.31
Italy	14.40	14.35	14.59	14.70	14.63	14.71	14.63	14.61	14.96	16.03
Latvia	9.58	8.67	8.31	7.54	6.87	6.38	6.16	5.31	6.03	8.44
Lithuania	7.75	7.23	6.93	6.73	6.65	6.49	6.30	6.59	7.39	9.59
Luxembourg	9.40	9.81	10.02	10.11	9.89	9.57	8.64	8.24	8.30	9.45
Malta	7.88	8.72	8.52	8.72	9.00	9.16	9.22	9.05	9.12	9.68
Netherlands	12.52	12.44	12.75	12.79	12.79	12.54	12.29	12.07	12.01	12.83
Poland	12.60	13.60	13.74	13.84	13.27	12.68	12.55	11.59	11.61	12.38
Portugal	10.09	10.47	10.94	11.42	11.95	12.34	12.63	12.60	13.20	14.12
Romania	6.11	6.20	6.72	5.99	6.16	6.19	6.02	6.45	7.61	9.41
Slovakia	7.46	7.38	7.40	7.32	7.40	7.48	7.34	7.25	7.15	8.44
Slovenia	11.01	11.12	11.27	10.75	10.50	10.33	10.26	9.75	9.63	10.89
Spain	9.64	9.36	9.30	9.18	9.13	9.06	8.95	9.01	9.26	10.10
Sweden	11.27	11.28	11.51	12.20	12.15	12.23	11.79	11.58	11.81	12.92
United Kingdom	11.93	11.51	10.79	10.65	10.57	10.76	10.73	8.49	11.35	12.53

NA: Not Available

Source: Eurostat, (Online), [http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=spr\\_exp\\_pens&lang=en](http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=spr_exp_pens&lang=en)

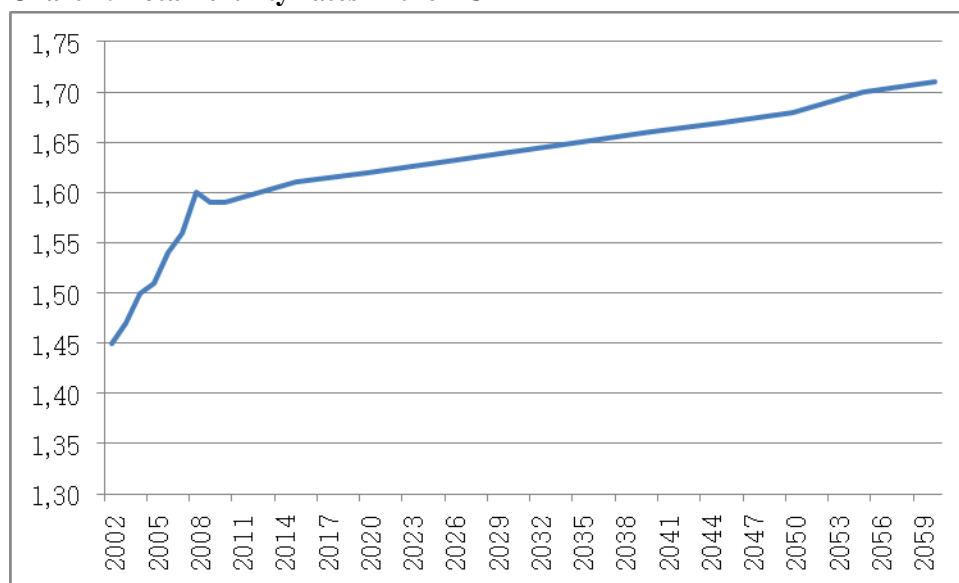
**Table 8: Sustainability factors and links to life expectancy in the EU-27**

Country	Sustainability Factor	Retirement Age Linked to Life Expectancy
Czech Republic		X
Denmark		X
Finland	X	
France	X	
Germany	X	
Greece		X
Italy	X	X
Latvia	X	
Netherlands		X
Poland	X	
Portugal	X	
Spain	X	X
Sweden	X	

Source: European Commission, 2012a, pp.92-95.

## CHARTS

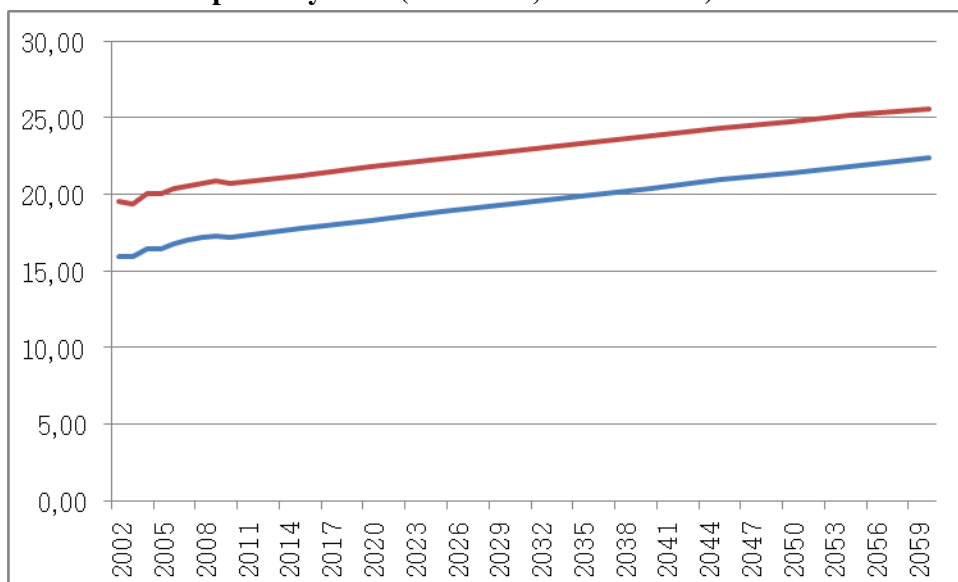
**Chart 1: Total fertility rates in the EU-27**



Source: Eurostat, (online)

<http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tsdde220&plugin=1> and European Commission, 2012, p.294.

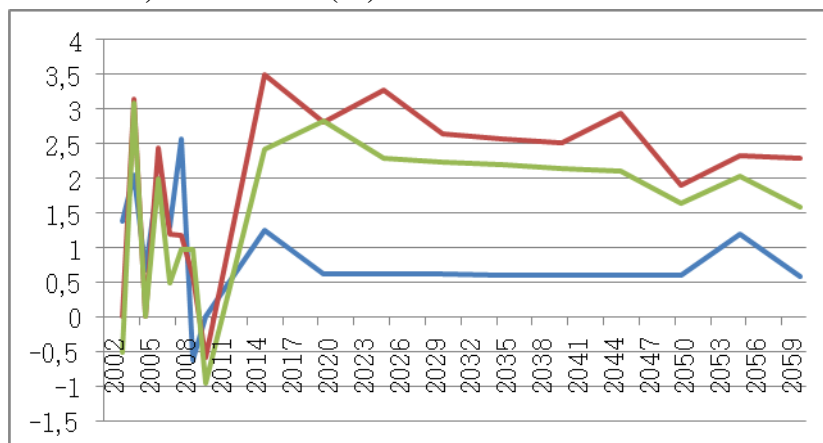
**Chart 2: Life Expectancy at 65 (Men-Blue, Women-Red)**



Source: Eurostat, (online)

<http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tps00025&plugin=1> and European Commission, 2012a, pp.295-296.

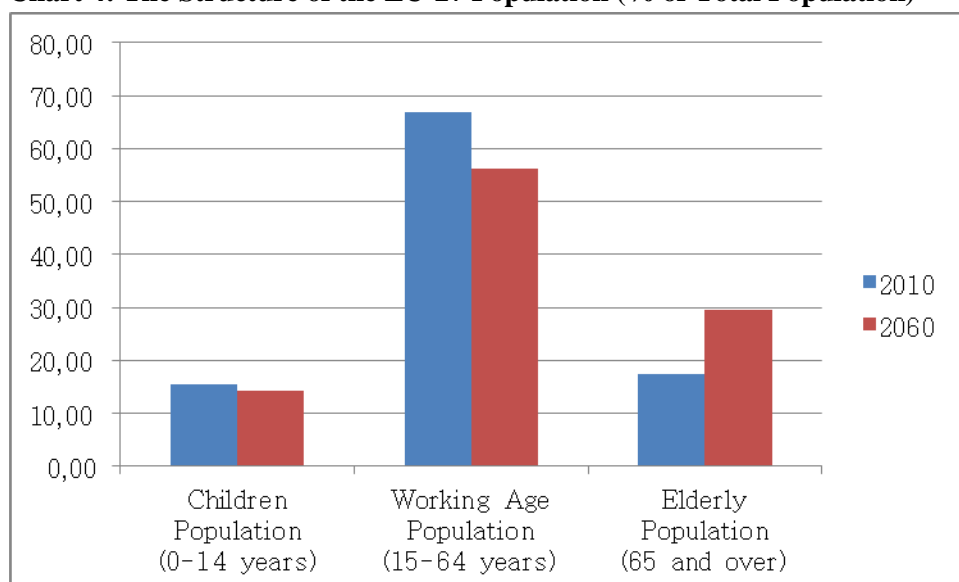
**Chart 3: Change in Fertility Rate, Life Expectancy at 65 (Men and Women) in the EU-27 (%)**



— Change in Fertility Rate —/— Change in Life Expectancy at 65 (Men/Women)

Source: European Commission, 2012a, pp.294-296

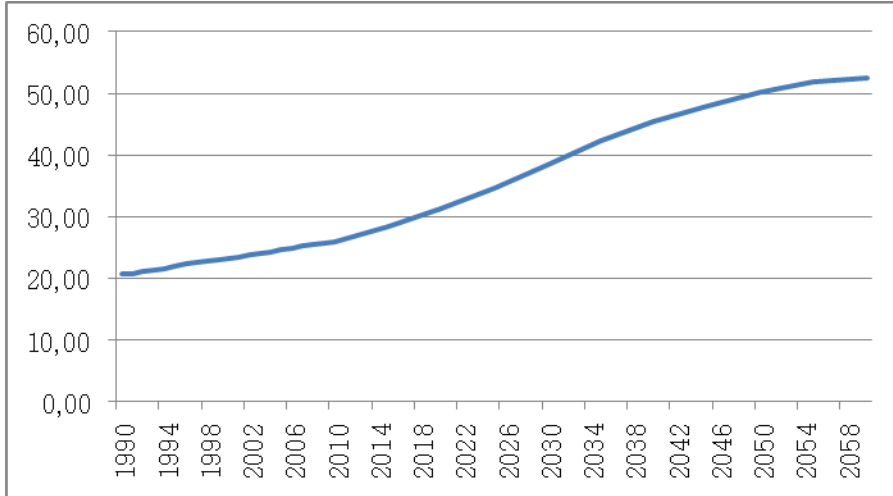
**Chart 4: The Structure of the EU-27 Population (% of Total Population)**



Source: European Commission, 2012, pp.298-299



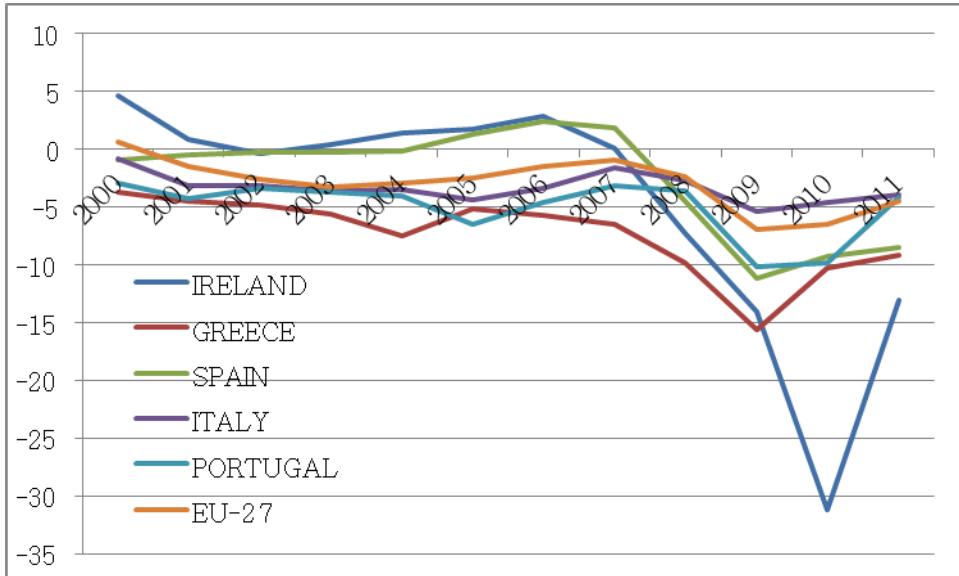
**Chart 5: Old Age Dependency Ratio in the EU-27**



Source: Eurostat, (Online)

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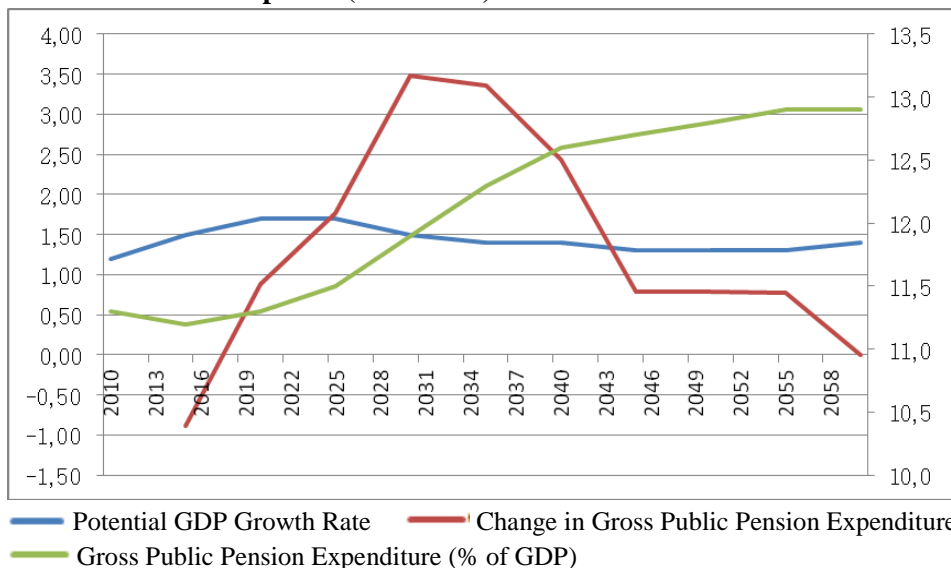
**Chart 6: Sovereign Debt Rates of Selected Countries in Eurozone (% of GDP)**



Source: Eurostat, (Online),

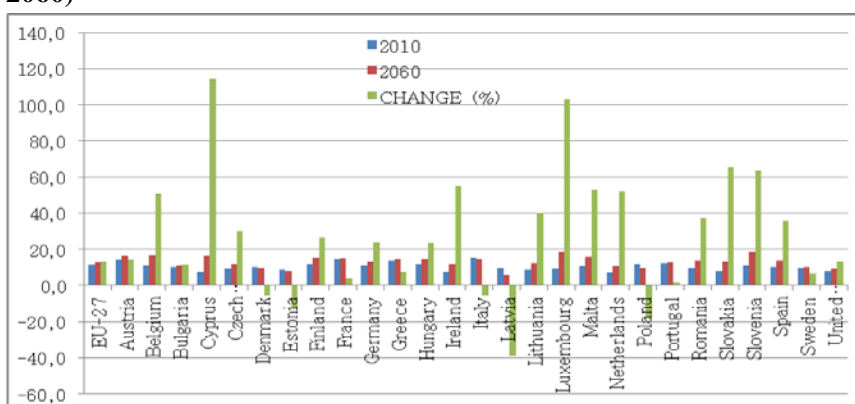
<http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tec00127&plugin=1>

**Chart 7: Public Pension Expenditure Projections under the Potential GDP Growth Rate Assumptions (2010-2060)**



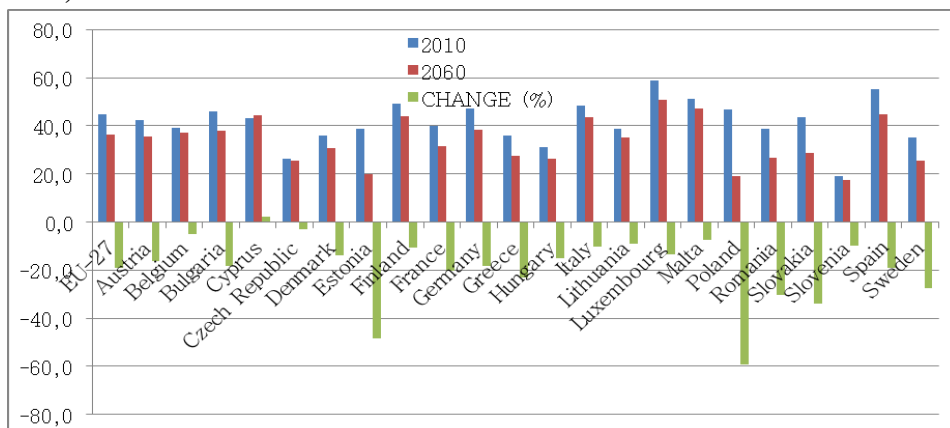
Source: European Commission, 2012a, p.328

**Chart 8: Change in Estimated Public Pension Expenditure in the EU-27 (2010-2060)**



Source: European Commission, 2012a, p.328

**Chart 9: Change in Benefit Ratio in Selected EU Member Countries (2010-2060)**



Source: European Commission, 2012a, p.335.

