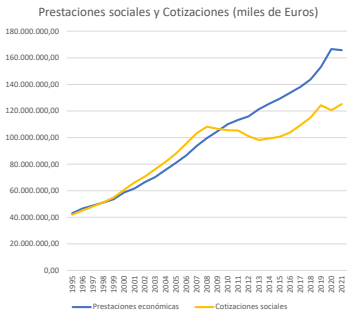
UAB Universitat Autònoma de Barcelona | Author: Oriol Eixarch Mejías | Thesis supervisor: Àlex Sanz Fernández | Faculty of Business and Economics

Situation and sustainability of the Spanish Pension System in 2050

1. Introduction

- Pensions account for a major income source of a significant part of the population.
- Three main implications: social, economic and moral effects.
- In Spain, since 2010, social contributions are outweighed by social expenses.
- The causes are, mainly demographic factors and the very design of the system.
- Does not seem feasible in the long-term.



2. Objectives

- Analyze the structure and the current situation of the Spanish pension system.
- Provide an estimation of both the expenditure and revenue level in 2050 if the system remains unchanged.
- Determine the most significant factors affecting both expenditure and revenue levels.
- Elucidate how factors affecting both expenditure and revenue are expected to change in 2050.
- Determine the variables affecting these factors in turn.
- Provide some policy recommendations in order to face the expected situation.

3. Methodology

	Equation 1: Expected Expenses	Equation 2: Expected revenues
Variable Y	• Expenses	• Revenues
Variables X	• Number of pensioners • Average pension • Life expectancy • Average effective retirement age	• NAWRU • Contributors • Firms • Average wage
Variables Z	• Total population. • Dependency Ratio • Mortality ratio • GDP growth. • Average contribution rate (general regime) • Average income per consumption unit • Replacement Rate • Health Public Expenditure • Net average income per person • Working life	• Demand Expectations • Foreign direct investment • Total population • Activity rate • Average population age • Fertility rate • GDP growth • Early school leaving • Competitive Index (score) • Logistics Index (score) • Household's consumption • Productivity per worker per hour • % full-time workers • % of population with tertiary education

1. Estimation of variables Z taking time (1 year unit) as regressor using linear regression models. Forecast of variables Z obtained for 2050.

$$\hat{y} = \beta_0 + \beta_1 * x_1 + \cdots + \beta_n * x_n + \varepsilon$$

2. Estimations of variables X using variables Z as regressors conducted through ARIMA models.

$$y't = I + \alpha_1 y'_{t-1} + \cdots + \alpha_p y'_{t-p} + \beta_0 + \beta_n * x_n + e_t + \theta_1 e_{t-1} + \cdots + \theta_q e_{t-q}$$

3. Forecast of variables X using known Z values.
4. Estimations of variables Y using variables X as regressors conducted using ARIMA models.
5. Forecast of variables Y using known X values.

4. Results

E1: Expenses | N° Retirees

pensionbenefits	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
retirees	36.975	4.08	9.06	0	28.979	44.97	***
Constant	-82603178	21243482	-3.89	0	-1.242e+08	-40966719	***
Mean dependent var		100917820.225	SD dependent var			31683496.550	
Number of obs		26	Chi-square			82.142	
Prob > chi2		0.000	Akaike crit. (AIC)			924.215	

*** p<.01, ** p<.05, * p<.1

E1: Expenses | Average Pension

pensionbenefits	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
averagepension	163570.91	16375.322	9.99	0	131475.86	195665.95	***
Constant	-8976730.4	9308852.8	-0.96	.335	-27221747	9268285.9	
L	.857	.16	5.36	0	.543	1.17	***
Mean dependent var		100917820.225	SD dependent var			31683496.550	
Number of obs		26	Chi-square			99.957	
Prob > chi2		0.000	Akaike crit. (AIC)			877.290	

*** p<.01, ** p<.05, * p<.1

E1: Expenses | Effective Retirement Age

D.pensionbenefits	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
D	11814660	1969465.3	6.00	0	7954579.2	15674741	***
Constant	5964105.4	1363740.4	4.37	0	3291223.3	8636987.4	***
L	.64	.142	4.52	0	.362	.918	***
L	.732	.158	4.62	0	.422	1.043	***
Mean dependent var		5806343.841	SD dependent var			2812681.891	
Number of obs		15	Chi-square			123.111	
Prob > chi2		0.000	Akaike crit. (AIC)			477.962	

*** p<.01, ** p<.05, * p<.1

E1: Expenses | Life Expectancy

pensionbenefits	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
lifeexpectancy	16171866	875346.74	18.47	0	14456218	17887514	***
Constant	-1.212e+09	70856794	-17.10	0	-1.350e+09	-1.073e+09	***
Mean dependent var		98248019.906	SD dependent var			29199748.078	
Number of obs		25	Chi-square			341.319	
Prob > chi2		0.000	Akaike crit. (AIC)			865.158	

*** p<.01, ** p<.05, * p<.1

E2: Revenues | N° contributors, Avg Wage

Revenues	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
contributors	10.777	1.307	8.25	0	8.216	13.338	***
averagewage	10561.063	2085.178	5.06	0	6474.189	14647.937	***
Constant	-3.819e+08	60893040	-6.27	0	-5.012e+08	-2.625e+08	***
Mean dependent var		95910136.427	SD dependent var			16874716.374	
Number of obs		20	Chi-square			94.962	
Prob > chi2		0.000	Akaike crit. (AIC)			692.850	

*** p<.01, ** p<.05, * p<.1

E2: Revenues | NAWRU

Revenues	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
nawru	-4645365	1390163	-3.34	.001	-7370034.4	-1920695.7	***
Constant	1.616e+08	30176364	5.36	0	1.025e+08	2.208e+08	***
L	1.694	.151	11.20	0	1.398	1.991	***
L2	-.712	.151	-4.70	0	-1.008	-.415	***
Mean dependent var		89078465.798	SD dependent var			25631741.580	
Number of obs		27	Chi-square			4879.146	
Prob > chi2		0.001	Akaike crit. (AIC)			894.731	

*** p<.01, ** p<.05, * p<.1

E2: Revenues | N° contributors

Revenues	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
contributors	6.713	1.681	3.99	0	3.419	10.007	***
Constant	-23968828	36477806	-0.66	.511	-95464013	47526357	
L	.978	.012	81.76	0	.955	1.002	***
Mean dependent var		95168621.403	SD dependent var			19135335.665	
Number of obs		22	Chi-square			7415.327	
Prob > chi2		0.000	Akaike crit. (AIC)			736.323	

*** p<.01, ** p<.05, * p<.1

E2: Revenues | N° firms

Revenues	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
numberoffirms	61.742	10.266	6.01	0	41.622	81.862	***
Constant	-96289640	32381316	-2.97	.003	-1.598e+08	-32823427	***
L	.821	.237	3.47	.001	.357	1.285	***
Mean dependent var		95168621.403	SD dependent var			19135335.665	
Number of obs		22	Chi-square			248.810	
Prob > chi2		0.000	Akaike crit. (AIC)			723.307	

*** p<.01, ** p<.05, * p<.1

E2: Revenues | Avg Wage

Revenues	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
averagewage	10471.133	2898.562	3.61	0	4790.055	16152.21	***
Constant	-1.918e+08	81385360	-2.36	.018	-3.513e+08	-32243069	**
Mean dependent var		95910136.427	SD dependent var			16874716.374	
Number of obs		20	Chi-square			13.050	
Prob > chi2		0.000	Akaike crit. (AIC)			720.801	

*** p<.01, ** p<.05, * p<.1

5. Forecasts

Expected Expenses: [84,514,669,000 €; 796,231,489,000 €]. Mean: 354,747,105,000 €.

Expected Revenues: [32,286,715,000 €; 456,786,702,000 €]. Mean: 167,597,808,000 €.

- According to the computations; in 2050, the system will experience a deficit of 187,149,297,000 euros, and if no changes or modifications in the current system are conducted.
- In 2021 the deficit is estimated to be of 42,197,429,000 euros; in 2050 the deficit will be almost four times and a half greater, a 443.5% greater as a matter of fact.

6. Conclusion and policy recommendations

A deficit is expected for 2050, expenses are to significantly outweigh revenues in the Spanish pension system. Measures will have to be conducted to correct said imbalance.

- Stiffening pension eligibility criteria (based on gross wage).
- Increasing the minimum age at which retirement is available minding (physically demanding jobs).
- Unemployment reduction focused measures in order to reduce the unemployment related benefits and increasing the number of contributors.
- Policies allowing and easing the creation, development and settlement of firms are key to increasing revenues (simplifying bureaucratic procedures, public accounts transparency…)