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Abstract

One of the instruments used to combat poverty among the elderly is the minimum pension. In Spain, the government sets a minimum pension each year. This instrument also has a positive effect on the redistribution of income between regions. This paper helps to understand both redistributive effects. Our results show that the resource flows received by each region are different. Pensions in regions with low per capita income need more supplements than those in regions with high per capita income. In short, the positive effect of the minimum pension on the income distribution of the retired population is associated with an improvement in the benefit level of pensioners in poor regions above the national average.

Key Words: Minimum Pension, Social Security, Spain, Regional Income Distribution

JEL codes: D30, H55, R10

1. Introduction

Public pension systems are useful instruments for reducing both income inequality among the elderly population and their poverty rates (Jacques et al., 2021; Been et al., 2017; Weller, 2004). The rate of success with which these two objectives are achieved depends on the institutional design of the system (Jang, 2019; Le Garrec, 2012; Li, et al., 2020; Gustman and Steinmeier, 2001; Ebbinghaus, 2021). The literature (Korpi and Palme, 1998) distinguishes between systems aimed at combating poverty (target systems) and systems that cover the entire population (universalism). The latter, in turn, may have the objective of guaranteeing an identical income (flat rate) to the entire retired population or of establishing the benefit as a result of the contributions made during the years of working life (contributions systems).

When pension beneficiaries have different characteristics (life expectancy, gender, working lives, etc.) and are, moreover, distributed asymmetrically across regions within the country, the contributions systems can also induce regional income redistributions. Empirical research on these regional effects is limited and has focused exclusively on the study of externalities induced by institutional design (Bonasia and De Siano, 2016; Bruckmeier and Schwengler, 2010).

The regional effect of these pension systems, however, is not necessarily an outcome of the institutional configuration of these systems alone. Public authorities can adopt discretionary decisions affecting the benefits that can also induce regional income transfers. One of the most representative examples of this type of decision is provided by minimum pensions. The objective of this type of benefit is to contribute to reducing income inequality among the elderly population, and empirical evidence has shown that

this instrument is effective in achieving this objective (Li et al., 2020). However, the regional dimension of this social policy is an issue that has not yet been explored by empirical research. Our work aims precisely to fill this gap.

More specifically, our working hypothesis can be formulated as follows. The minimum pension, the amount of which is determined each year by the government in a discretionary manner, is an instrument that *also* contributes to the redistribution of income between regions. And the results we present confirm this hypothesis: Spanish regions with a per capita income lower than the Spanish average (Andalusia, Extremadura, Galicia, Canary Islands, Valencia, Castilla-La Mancha, Murcia) benefit more from this benefit than regions with a higher income (Basque Country, Madrid, Navarre, Catalonia, Balearic Islands).

In most developed countries (including Spain), pension systems are currently undergoing intense reforms. The ultimate aim is to contain the rate of growth of expenditure by affecting the variables that determine pensions. One of the consequences of these reforms may be a decrease in the economic welfare of future generations of pensioners, as well as an increase in the number of people receiving the minimum pension (Peinado and Serrano, 2014). In the coming years, therefore, it is to be expected that there will be an increase in the public resources allocated to the payment of minimum pensions. We consider that having as much information as possible on the redistributive effects generated by this type of benefit could be important to ensure the efficiency of the resources allocated to this social policy.

The paper is structured as follows. In the next section, the literature review is presented, and the objective of our research is defined. Next, we briefly explain the Spanish pension

system. Then we develop the methodology and present the results. Finally, we present the main conclusions reached.

2. Theoretical framework

2.1. Literature Review

The main objective of pension systems is to provide an income to people who leave the labour market after reaching retirement age. In public systems where benefits are the result of contributions made during the working life, the benefit reproduces the wage inequalities that exist during the working years. However, if these systems have been effective in reducing income inequality among this population group, it is due to the possibilities they offer to introduce compensatory mechanisms (minimum and maximum pensions, flexible eligibility requirements, links between benefit amount and average lifetime earnings, etc.) that mitigate past wage inequalities.

Thus, in these systems, how can we identify regional income transfers? Research has explored different channels. The first is related to differences in dependency ratios (the ratio of the population over 65 to the population of working age) that may exist between a country's regions. The second is associated with changes in regional productive specialization that may occur over time, and the last is related to regional differences in life expectancy. However, before explaining these channels, it is worth mentioning briefly that private retirement savings systems can also induce regional income transfers.

In private pension schemes, the financial system channels these regional transfers (Corpataux et al., 2009; Bakhareva et al., 2015; Burger, 2014). Workers accumulate savings for their retirement. The financial system transfers these resources between

regions to finance investment projects. If the rates of return to these projects are lower in rich regions than in poor regions, then capital flows will move from the former to the latter. Let us say that this channel responds to the same logic that drives international financial flows from rich countries to poor countries. With the added advantage, in the case of developed countries, that the institutional framework is the same within the country for all regions. In this case, the regional income transfers induced by the pension system would have positive effects for the entire population of the recipient regions, and not exclusively for the retired population group. However, there is no guarantee that these inter-regional income transfers will occur, as they are dependent on the yield differentials appreciated by investors.

Internal migration of the retired population also contributes to the transfer of resources between regions, exerting a final effect on the region's income similar the one outlined above. Thus, Nelson (2005), for the USA, shows how non-metropolitan areas are centers of attraction for the retired population of metropolitan areas, and how this internal migration produces a spatial redistribution of income. The retired population is the bearer of the non-wage income they obtain both from the public pension system and from private savings channeled through pension funds. These incomes "travel" with individuals, so that in metropolitan areas there is a decrease in income equivalent to the increase in non-metropolitan areas. Newbold (2008) for Canada reports similar results for the period 1996-2001.

Contributory public pension systems, as a general rule, use the pay-as-you-go financial model. Each year, workers' contributions finance that year's pension expenditure. The dependency ratio is therefore a key variable in ensuring the financial sustainability of

these systems. In fact, the pension reforms currently underway in most developed countries stem precisely from population ageing and the resulting increase in dependency ratios (EC, 2021).

The population within a country is (or can be) asymmetrically distributed across regions according to age. As a result, regions may have different dependency ratios. In some regions, this ratio may be very high and the revenue from contributions may be insufficient to cover pension expenditure, either because of low productivity (which is the ultimate determinant of contributions) or because of an insufficient number of contributors. The result, in short, is a financial imbalance that needs to be addressed in order to guarantee the promised benefits. In centralised systems based on the principle of a "single treasury" (as in Spain), the financial imbalances of some regions are offset by the surpluses of others[1]. Interregional income transfers take place within the pension system itself and do not respond to a discretionary decision by the administration. This is precisely the result found by Bonasia and De Siano (2016), who study the Italian case. A worsening of the old-age dependency ratio and a decline in fertility and employment rates have led to a negative trend, particularly for the regions of southern Italy, which are characterised by early retirement and an increase in emigration. “Thus the analysis suggests that a decentralized pension policy would not be a Pareto-efficient solution, as it could favour northern over southern regions” (p.127)

However, even when dependency ratios differ little, pension expenditure in a region may exceed the resources of that region’s pension system due to changes in productive specialisation. For example, there are regions that in the past had strong economic

[1] See García Díez (2023) for a comprehensive analysis of the regional imbalances of the Spanish social security system, as well as the determinants of the balance in each of the regions.

growth rates accompanied by high wages but have not been able to sustain these growth rates. Thus, in these regions, current pensions are high because they correspond to the wages of the past. However, incomes may be insufficient when the rate of employment and/or wage growth has slowed down. In this case, the more dynamic regions also transfer resources to finance the pensions of lagging or less economically dynamic regions. Bruckmeier and Schwengler (2010) report the eastern regions of Germany as an example of this phenomenon[2].

Income transfers through these two channels, while they may have an overall positive effect on the income of the recipient regions, have only the pensioners in these regions as beneficiaries. If pensions were to depend exclusively on the contributions of workers in each region, spending in poor regions would have to be adjusted to ensure the financial sustainability of the system. In other words, we would see a clear income inequality between the retired population in the same country depending on the region of residence.

Different life expectancies of people are another channel of transfer investigated. When pension systems are not only contributory but also defined-benefit[3], one source of income transfer is through differences in life expectancy. In this type of system, individuals receive the pension until their death, so that people with longer life expectancies receive the benefit for a longer period than those with shorter life

[2] As will be shown below, the Autonomous Communities of Asturias and Cantabria are a clear example of what we have just pointed out.

[3] The "notional accounts" systems are pay-as-you-go systems, but with defined-contribution. In this institutional modality of the pension system, the type of transfer that we will now discuss does not exist. Pensioners are entitled to receive a fixed income. This income is the sum of the contributions made and the imputed return on these contributions.

expectancies. In other words, assuming identical contributions, individuals achieve different internal rates of return on their contributions depending on their life expectancy. Differences in mortality rates are often associated with differences in education (Cutler and Lleras-Muney, 2010) or income (Deaton and Paxton, 1998; Cutler et al., 2006). Then, people with higher levels of education, and who have higher wage incomes, have longer life expectancy and therefore have higher internal rates of return (Olivera, 2019; Haan et al., 2020).

This channel of income transfer also has a spatial reflection. Differences in income between regions are associated, among other factors, with differences in human capital endowments. The regions with the highest incomes are those with the most skilled and productive labour force. It can therefore be inferred that there is a strong relationship between regional income levels and regional life expectancies. People living in rich regions will have a longer life expectancy than people living in poor regions. As the internal rates of return are longer among pensioners in the former than the latter, the regional income transfers that take place are negative. This result was reached in research that studied the cases of Italy (Casseli et al., 2003) and Spain (Gómez Sala et al., 2012).

2.2. Research objective.

The research we have reviewed shows the existence of non-discretionary regional income transfers. However, pension systems also contain benefits of a discretionary nature that can induce regional income redistributions. The guarantee of a minimum pension is likely to be one of the most significant of these benefits. The main objective of establishing a minimum pension is to provide all pensioners with access to a minimum

level of economic welfare, regardless of the region in which these retirees live. The empirical research has proven that a minimum pension is an effective option to reduce income inequality between elderly people (Li et al., 2020; Polo Andrés and Viejo Rubio, 2011). The effect of this benefit on regional income distribution, however, has not been explored by empirical research. Our work aims precisely to fill this gap.

The institutional design of this benefit matters for the purpose of our research. In systems where this benefit is universal, the regional effect may be different from that observed in countries where this benefit is coupled with the contributory pension. In the former, the regional dimension depends exclusively on the number of retired persons living in each region, since the benefit is the same for all individuals. In this case, the regional redistributive effects of this benefit would be associated exclusively with asymmetrical distributions of the receiving population between regions. In the latter, however, in addition to the protected population, it is also relevant to investigate the benefits obtained from the contributory benefit, since the transfer of individual income arises as a result of the difference between this benefit and the minimum pension established by the administration.

The institutional design of the minimum pension in the Spanish social security system corresponds to this second model. Each year, the government sets a minimum pension at its discretion. Through a budget line known as “complement to minimum”, the government supplements the pensions of all pensioners who do not reach this minimum with their contributory pension. Therefore, the complement that each pensioner receives until reaching the minimum pension differs according to his or her working life.

How can the spatial dimension be incorporated into this minimum pension model? Each region receives financial resources through the minimum complements depending, on the one hand, on the number of beneficiaries living in each of them and, on the other hand, on the working lives of the beneficiaries of these complements, since it is these lives that determine the amount of the complement received by each pensioner for a given minimum pension. It is this second variable that is relevant for the study of the regional redistribution of income that can be achieved through this benefit.

The following example may help us to understand more clearly what we are trying to point out. Let us assume two regions (A and B). In region A we have 10 pensioners who receive an average amount of complement to reach the minimum pension equal to 400 and in region B we have 20 pensioners who receive an average amount equal to 200. In both cases the income transfers received by the two regions is equal to 4,000. If we were to look only at the absolute value of the transfer, we would say that there is no regional redistribution of income. However, if we look at the average magnitude, it is clear that such redistribution is taking place. Region A receives more proportional benefits from the social security system than region B.

Our working hypothesis can then be summarized as follows. The income transfers received by each region through the minimum complements is a direct function of the characteristics of the contributory pensions in each region, which in turn depend on the personal characteristics of the individuals in each region. Regions with lower contributory pensions are more likely to receive higher minimum complements than regions with higher contributory pensions. In other words, the average amount of the transfer received in the former will be higher than that observed in the latter. Moreover,

if it is observed that the regions with the lowest income are those where the average amount is higher, then we can affirm that the minimum pension has a positive regional income redistribution effect.

3. The Spanish's Pension System

3.1. The pension formula

The Spanish pension system covers different risks such as retirement, widowhood, disability and orphanhood. All these benefits have the same origin: the wages received by the worker during his or her working life. After the reform in 2011, only the wages of the last 25 years are taken into account to calculate what is known as the *regulatory base* (*RB*). This base is the maximum pension that a worker can receive given the wages on which he/she has paid social security contributions.

The *effective pension (* P_i^0), i.e. the final amount received by each pensioner, is obtained by applying a coefficient (ζ) to the regulatory base as expressed in (1). The coefficient differs according to the benefit. In the case of retirement pensions, the coefficient applied depends on the number of years of contributions of which the worker can provide proof. When the worker has paid contributions for at least 15 years[4], he/she receives 50% of the regulatory base, and when he has paid contributions for 37 years, he/she receives the full base. In the case of widowers' pensions the standard coefficient is 52% and in the case of orphans' benefits it is 20%.

$$P_i^0 = \zeta_i RB_i \qquad (1)$$

[4] The minimum number of years of contributions required to qualify for a pension is 15

The amount of the initial pension is updated annually (I_t) according to the Consumer Price Index or a related index[5].Therefore, the benefit received (P_i^T) by a pensioner who has been retired for *T* years is equal to the product of the accumulated updates from the first year (*t=1*) to the current year (*T*) multiplied by the effective pension as expressed in (2)

$$P_i^T = \prod_{t=1}^{T}(1 + I_t)P_i^0 \tag{2}$$

Finally, the system has a maximum and a minimum pension that are set annually at the government's discretion. It is the latter that is of interest to us here. When the amount of the contributory benefit that pensioners receive (regardless of the nature of the benefit) is lower than the minimum pension ($P^T m$), then their pensions are supplemented with public transfers until the minimum pension is reached. Formally,

$$P_i^T = \begin{cases} \prod_{t=1}^{T}(1 + I_t)P_i^0 & if \prod_{t=1}^{T}(1 + I_t)P_i^0 \geq P^T m \\ P^T m & if \prod_{t=1}^{T}(1 + I_t)P_i^0 < P^T m \end{cases} \tag{3}$$

3.2. The Minimum Pension

The Spanish social protection system offers two types of minimum income specifically aimed at the population over 65 years of age. On the one hand, non-contributory

[5] Before 2011, the index used was the CPI. After the 2013 reform, a new indicator was established that made the update dependent on the financial health of the system, although a minimum increase of 0.25 per cent was guaranteed. In December 2018, this reform was blocked, and in the latest reform the government reverted to the CPI.

pensions, which are accessed when people have no other income resources and, in addition, do not have the necessary years of contributions to qualify for a contributory pension. This pension was introduced in 1990 and is managed by the regional governments. The second is the minimum pension, which, as mentioned above, is obtained by adding to the contributory pension the necessary public transfers until the amount of the minimum pension is reached. This benefit was introduced in 1994 and is managed by the social security administration[6]. Both benefits are means-tested.

Between 2015 and 2021, on average, 24% of all contributory pensions in the social security system receive "minimum complements". This amounts to an average of 2,400,000 pensions per year during this period. On the other hand, women receive 65% of all minimum pensions. Retirement and widowhood pensions account for 92% of the resources allocated to these benefits (see Table 1). The total cost of minimum supplements is equivalent to 0.6% of the GDP on average, as it was over the period in question. Since 2012, these complements have been financed by the general tax system. Previously, part of it was also financed by contributions.

INSERT TABLE 1

As far as the regional distribution of these minimum pensions is concerned, Table 2 shows the share of supplemented pensions as a proportion of total pensions in the different regions and for Spain as a whole in three different years. Between 2015 and

[6] Each year the government sets the income thresholds, as well as the composition of the pensioner's household compatible with the receipt of the minimum complements. In the case of retirement pensions the minimum pension differs if the pensioner has a dependent wife or husband and in the case of widow's or widower's pensions if the pensioner has dependent children. From 2027, the amount of the minimum pension will be linked to the poverty threshold. However, from 1 January 2024, the catching-up process will begin, closing the current gap between the poverty threshold and the minimum pension progressively until 2027. (Royal Decree-Law 2/2023)

2021, this share decreases in all regions (by 7 points in the case of Extremadura and Castille-La Mancha) an in Spain as a whole, from 26.5 to 22.5 per cent. However, regional differences remain. To illustrate these differences, Figures 1 to 3 show three regressions (one for each year) relating the percentage of contributory pensions with minimum supplements in each region to the GDP per capita of each Spanish region. The regression line has a negative slope, i.e. as GDP pc increases, this percentage decreases.

INSERT TABLE 2

INSERT FIGURES 1, 2 AND 3

The comparatively higher proportion of minimum pensions in regions with the lowest GDP per capita suggests the existence of regional wage differentials that are persistent over time. Wage differentials between regions may be due to differences in regional productive specialization, differences in human capital endowments and/or physical capital, which are reflected in differences in productivity (Lopez-Bazo and Montellón, 2012). However, it has also been pointed out (Motellón et al, 2011) that identical workers doing similar jobs in the same firms, but in different regions, earn different wages. Higher in regions with higher per capital income and lower in regions with lower per capita income. In other words, human capital is remunerated differently across regions.

It should be stressed that pensions reflect the regional wage differentials that existed when today's pensioners were active workers. The correlation then shown in the graph seems to indicate that these differences persist over time. However, the regions of

Asturias and Cantabria are an exception to this rule[7]. In these two regions, minimum pensions have a lower relative weight than would correspond to them in terms of per capita GDP. These two regions have been in economic decline for many years, with a heavy loss of industrial and mining workers, which has had a negative impact on their per capita income. However, today's pensioners are the former workers in these sectors, who once received high wages and now enjoy high pensions.

Table 3 shows the average pension and the average retirement and widowhood pension provided by the social security system in each region for the years 2015, 2018 and 2021 are shown. In the case of Asturias, the values of these two indicators are well above the national average. The same is true for the region of Cantabria, although in this case the values are slightly lower than in Asturias. The regions with the highest proportion of supplemented pensions are precisely those with the lowest average pension and the lowest average retirement pension.

INSERT TABLE 3

4. Data and Methodology

4.1. Data

We use the 2015 Continuous Survey of Working Lives (CSVL). This survey, compiled and published by the Spanish Social Security Administration, provides information on the level of pensions, the personal and occupational characteristics of pensioners and the region in which they live. The information is collected randomly and without any

[7] In 2021 the Balearic region also appears as an outlaying region. However, this position responds more to the fall in per capita GDP that occurred in that year than to a change of nature similar to the one we have just discussed for Asturias and Cantabria.

stratification. Each year a series of statistical analyses are carried out to ensure that the sample is representative (in terms of gender, age, region and nationality) of the reference population.

In the Spanish system, affiliation is compulsory and is carried out through the so-called social security regimes. Currently, the two main regimes are the regime for salaried workers (general regime) and the regime for self-employed workers. As described in the previous section, the requirements for accessing pensions are similar for both regimes. The main difference between them are the rules governing the contributions to the system.

In the case of salaried workers, the employer is required to pay contributions for the entire wage received by the worker (if the wage is less than or equal to the maximum wage set by the administration each year). In the case of self-employed workers[8], however, they decide the amount for which they contribute to the system between a minimum and a maximum threshold determined by the administration. These workers tend to pay contributions close to the lower threshold, which results in pensions that are lower than those of the general regime. The corollary of this behavior is that the proportion of minimum pensions among this type of worker is much higher than that observed among workers in the general regime. Approximately 14 points more on average between 2015 and 2021. Table 4 shows the ratios for 2015.

INSERT TABLE 4

[8] In January 2023, a new contribution system was introduced for self-employed workers in which the net income obtained is taken into account.

Table 5 shows the average (2015-2021) of the resources allocated to the different contribution schemes to finance these supplements. As can be seen, in some regions (La Rioja, Galicia, Castille and León, Cantabria, Asturias and Aragón) the resources allocated to the scheme for self-employed workers are significantly higher than the national average. The reason for these differences is the disappearance of the special scheme for agricultural workers. In 2008, self-employed agricultural workers were integrated into the self-employed scheme. The dominant type of agricultural worker in these regions was the self-employed, as opposed to the employees (mainly in regions such as Andalusia and Extremadura), who were integrated into the general scheme in 2011.

INSERT TABLE 5

From the pensioners listed in the CSVL, we selected all beneficiaries of a retirement or widow's pension who were included in the base in the reference year (2015). However, the status of beneficiary could have been acquired at any time before 2015. The sample includes both pensioners receiving minimum supplements and those receiving only the contributory pension to which they are entitled. Moreover, the individuals in the sample may belong to any of the social security schemes, including those that no longer exist. The collective is therefore very heterogeneous, as individuals may have entered the system with different eligibility criteria, at different ages or with very different working careers. We have dropped observations that did not have complete records. In the end, we have a representative sample of 178,444 people.

4.2. Methodology

The method we use to test for the existence of regional transfers consists of estimating a *representative pension* for each of the Spanish regions, as well as for Spain as a whole.

This pension is estimated with and without the complements necessary to finance minimum pensions, and by comparing both pensions, we observe which regions receive more or less complement.

The pension we estimate is the result of the working lives behind the retirement and widowhood pensions found in the database[9]. It is not, therefore, a representative pension of either the retirement pensions or the widow's or widower's pensions in each region. It is the representative pension obtained when both benefits are considered. If we have proceeded in this way, it is because most of the complemented pensions correspond to these two benefits and, therefore, most of the financial resources that the regions receive to complement contributory pensions are earmarked for these two benefits.

This pension is then determined, first, by the calculation method used in Spain to determine the level of the pension, to which we have already referred and, second, by the particular mix of pensions that may exist in each region. The mix referred to may differ from region to region due, for example, to regional differences in employment depending on the sector (more agricultural employment in some regions than in others, for example). It may also be affected by the difference that may exist in each region in

[9] Implicitly, our working hypothesis assumes that the region (Autonomous Community) in which the pensioner resides is also the region in which the pensioner has spent most of his or her working life. Therefore, internal migrations of the retired population (if intense) could affect the results obtained. The information provided by the MCVL identifies the pensioner with the province where the benefit is administered. However, a pensioner may reside in another region. In this case, the MCVL provides the field "place of residence" in order to recognize the separation between the province that administers the benefit and the province in which he/she resides. However, this is only done when the pensioner notifies the change of address. The reliability of this field is therefore low. The data on residence changes (between autonomous communities) of the population over 65 years old that appear in the recent Statistics on Migrations and Residence Changes (INE, 2023) allow us to infer that it is not very likely that they will affect the results achieved. On average for the years 2021 and 2022, these changes affected 47,000 people, which represents 0.005 of the total number of retirement and widowhood pensions for the year 2022.

the relative weight between workers under the general regime and those under the self-employed, or by the different relative weight of high and low pensions in each region, etc.

In the rest of the paper we will distinguish two group of regions. On the one hand, “High income regions (H)” composed by those regions in which GDPpc was higher than GDPpc in Spain in the year 2015 and, on the other hand, “Low-income regions (L)” formed by the regions showing a GDPpc lower than Spanish GDPpc in 2015. The first set contains the following regions: Aragón, Balearic Islands, Basque Country, Catalonia, La Rioja, Madrid and Navarre while, the second group of regions is formed by Andalusia, Asturias, C. Valenciana, Canary Islands, Cantabria, Castille and León, Castille-La Mancha, Extremadura, Galicia and Murcia (see last column in table 7).

Our working hypothesis, then, is as follows. In lower income regions (L), wages are lower than in higher income regions (H), and therefore so will their pensions. In the first set of regions, it is reasonable to assume that the representative pension will be lower than that observed in the second set of regions. If this part of the hypothesis is correct, it is also possible to infer that the representative pension in lower income regions receives more supplements than the representative pension in higher income regions.

We proceed in different steps. First, we estimate a model (with and without minimum complements) to capture the relative influence of the different variables used to calculate the pension. For this first step we run a cross-sectional regression for the year 2015. Second, with the coefficients of the model we estimate the representative pension for each region and for Spain as a whole and, finally, we compare the results obtained when we omit and consider the minimum complements.

The model we estimate without complements (specification I) is shown in expression (4)

$$P_{ir} = \alpha + X'_{ir}\beta + H'_r\delta_r + \nu_{ir} \quad (4)$$

Where P_{ir} is the logarithm of the pension received by pensioner *i* in region *r*; X_{ir} is a matrix containing the variables that determine the amount of the contributory pension. These variables are: the logarithm of the "*regulatory base*", the *coefficient* applied to the regulatory base[10], and the "*pension age*"[11]. The H'_r term is a vector to control for the regions. Finally, v_{ir} is the remaining error term.

Next, we specify the same model (specification II), but now including the minimum complements, according to expression (5)

$$P^c_{ir} = \alpha^c + X'_{ir}\beta^c + H'_r\delta^c_r + \nu^c_{ir} \quad (5)$$

Where P^c_{ir} is the logarithm of the pension received by pensioner *i* in region *r including* the complements to minimum, and where X_{ir} and H'_r *are* the same matrix and vector to control for the different regions, respectively, and v^c_{ir} the remaining error term.

Then we calculate, using the results of specification (4), the value of the expected representative pension in each region when the minimum complement is not included (EP_r) as in expression (6). As well as the expected representative pension for the country according to expression (7)

$$EP_r = E\left(P_{ir}|X_{ir,}\delta_r\right) \quad (6)$$

$$EP = E\left(P_i \ |X_i \ \right) \quad (7)$$

[10] Widowhood pensions are incorporated with a fixed coefficient of 17 years, which is equivalent to the coefficient (0.52) applied to the regulatory base to obtain the amount paid.

[11] The variable "pension age" is the amount of the pension that corresponds to the updates produced by price variations between the time of retirement and the reference year (2015).

Similarly, we calculate the value of the expected "representative pension" in each region when the complements are included (EP^c_r) as in expression (8). As well as the expected pension for the country as whole according to expression (9)

$$EP_r^c = E(P_{ir}^c | X_{ir}^c, \delta_r^c) \quad (8)$$

$$EP^c = E(P_i^c | X_i^c) \quad (9)$$

Finally, we measure the effect of the complements in each region *r* (GEC_r) as the difference between the expected representative pension in each region when the complement is included and when it is not included, as well as the effect of the complement (*GEC*) in the whole country according to expression (10) and (11).

$$GEC_r = EP_r^c - EP_r \quad (10)$$

$$GEC = EP^c - EP \quad (11)$$

5. Results

Table 6 shows the results achieved with the two specifications of the model. The first two columns show the results without complements (specification I) and the third and fourth with complements (specification II).

INSERT TABLE 6

As can be seen, the variable that most strongly determines the amount of the pension is the *regulatory base* which (let us remember) includes the wages for which the worker contributes to the system. The coefficient of this variable, in the first specification (which is the one that best captures the contributory nature of the system) is equal to 0.657. The *coefficient* variable also has a positive influence, but not as decisive as the

Regulatory Base, its value is 0.021. These results confirm that contributory systems tend to reproduce the wage inequalities that existed when current pensioners were active workers. The role of these systems, therefore, to reduce inequalities among the elderly population remains limited.

However, the minimum pension guarantee smooths the effect that individual's working lives have on pensions, which encourages income redistribution among this population group. The third column shows how the value of the coefficient of the *regulatory base* decreases (0.477) when the minimum complements are incorporated. The value of the *Coefficient* variable also decreases (0.013). The coefficient of the variable capturing the effect of the actualization of pensions (*Pension Age*) is similar in both specifications.

Columns II and IV show the results when we control for regions. Asturias is the region we have selected as the reference because it is the one with the highest retirement pensions. As can be seen, the coefficients for the variables *Regulatory base* and *Coefficient* are not significantly different from those of the first specification. This result was predictable given that the formula for calculating the pension is identical in every region.

On the other hand, all regions have significant and negative coefficients. Lower income regions (Castille-La Mancha, Murcia, Galicia, Extremadura, Canary Islands or Andalusia) have the highest coefficients. The coefficients of higher income regions (Madrid, Navarre, Basque Country) are significantly lower. The regional differences we observe, given that we are controlling for the labour characteristics of pensioners, can only respond to a different mix of pensions. *L* regions have a mix with a higher proportion of low pensions than *H* regions.

When we add the complements to the minimum, we observe similar changes to those already indicated above. The values of all the coefficients decrease, which indicates that the effects of the variables that determine the amount of the contributory pension smooth out.

Table 7 shows more clearly the regional effect of these complements. As may be seen in the last column, which is the value of per capita GDP in each region for the year 2015, the lowest income region is Extremadura, and the highest income region is Madrid

INSERT TABLE 7

As can be seen in the first column, the lowest representative pensions (without complements) are found, as expected, in the lowest income regions. All regions with a GDP per capita lower than that of Spain have a representative pension that is also lower than that of Spain (8,067 euros). Galicia has the lowest pension (6,045 euros). Extremadura (6,260 euros) and Murcia (6,624 euros) are also among the regions with the lowest pensions. There are two exceptions, which we have already mentioned. We refer to the regions of Asturias and Cantabria. In these two regions, with lower GDP per capita than that of Spanish, their corresponding representative pensions are higher than for Spain, especially in Asturias (10,566 euros). The reasons already provided to explain the causes of the low share of complemented pensions in these two regions also explain the exceptionality observed now.

The highest income regions have a higher representative pension than the Spanish one. The Basque Country is the region with the highest pension (11,034 euros), followed by Madrid (9,690). The exception is the Balearic Islands region. This region has a higher GDP

per capita than the Spanish average but has a lower representative pension (6,684 euros)[12].

The second column shows the representative pension when we incorporate the minimum complements, and the third column shows the amount by which pensions increase in each region. As can be seen, pensions increase in all regions, although with different intensities in each of them. In Spain, the increase in the reference year is equal to 538 euros, which is equivalent to an increase of 7%. In *L* regions, the increase is significantly higher. Thus, in the region of Extremadura the pension increases by 1,132 euros, i.e. 110 percent more than in Spain. In the regions of Galicia and Castille-La Mancha the pension increases (in absolute values) by 830 euros, which is 54 percent higher than in Spain. In the region of Andalusia, the pension increases by 781 euros (45 percent more than in Spain).

In regions with GDP per capita above the Spanish average, the increases are less than 538 euros. Pensions in the regions of Madrid and the Basque Country receive the lowest supplements (79 and 220 euros, respectively). In these two regions, the increase is 59% and 85% lower (respectively) than in Spain.

In addition to smoothing the effect of past wage differentials on pensions -thus improving the distribution of income among the retired population- minimum

[12] It is not easy to find an explanation for this exceptionality. In this region, tourism is a very relevant activity, and in this sector of activity, salaries are not very high. On the other hand, this type of activity has a strong seasonal component, which leads to recurrent unemployment for workers in the sector during the winter season. In any case, these arguments allow us to approximate an explanation for the pension, but not so much to understand the gap between income and pension. The reverse process to that observed in Asturias could also be occurring in this region, i.e. the region's economy is changing its growth pattern, but we do not see it yet in pensions because a significant number of new workers have not yet reached retirement age.

complements also contribute to narrowing the income gap (at least of the income obtained through the pension system) between the retired population in different regions.

The representative pension (without complements) in the region of Extremadura is 22% lower than in Spain. However, when supplements are considered, this ratio decreases by 8 points to represent 86% of Spanish average. Similar changes occur in the rest of the regions that benefit most from these supplements. In the regions of Andalusia and Castille-La Mancha, for example, this same ratio decreases by 4 percentage points and in Galicia by 5 points.

In the higher income regions, on the other hand, the opposite effect occurs. The gap between their representative pension and that of Spain narrows slightly. Thus, in the Basque Country, this pension (without supplements) is equivalent to 137% of the Spanish pension, and when supplements were included, it falls to 129%. The region of Madrid improves slightly, and those of Catalonia and Navarre show a similar behaviour to that of the Basque Country. The regions of Asturias and Cantabria, for the reasons already known, are the only two regions that worsen their relative position by having a GDP per capita below the Spanish average.

The narrowing of regional differences also occurs when comparing the regions at the extremes of the income scale. The highest representative pension is in the Basque Country and the second lowest in the region of Extremadura. If we compare these two extremes, we see that the pension (without supplements) of the latter was 57% of the pension of the Basque Country. When supplements are taken into account, the gap decreases in 10 points (to represent 67% value of that in the Basque Country). In the

case of the Andalusia, the values (compared to that of the Basque Country) are 62% and 69% respectively.

In short, the results obtained confirm our working hypothesis. The amount of the representative pension (without minimum supplements) provided by the system is lower in lower income regions than in higher income regions. The objective of ensuring that all pensioners receive a minimum pension, regardless of their region of residence, implies a transfer of resources from the central government to the regions. The flows of resources that each region receives, however, are different, as the need to complement contributory pensions is different in each region. Pensions in *L* regions need more supplements than pensions in *H* regions.

Therefore, the guarantee of a minimum pension under Spanish law leads, on the one hand, to an improvement in the distribution of income among the retired population and, on the other hand, to regional income transfers that help to narrow the income gap between pensioners in different regions.

6. Discussion

The main objective of the minimum pension is to ensure that all pensioners have access to a minimum level of economic welfare, regardless of the beneficiary's region of residence. This welfare could be associated with a certain basket of goods and services, and the amount of the pension could be adjusted based on an estimate of the value of this basket, for which we would also need a reference price index. However, neither the

basket nor the corresponding price index is available, so it is impossible to know whether the minimum amounts set each year serve the purpose for which they are set[13].

This does not mean, however, that it is not possible to approximate some assessment, albeit indirect, of the impact of this benefit on the economic welfare of its recipients. In line with the objective of this paper, we present below two proposals to test whether these effects are symmetric across regions or, on the contrary, whether there are differences between them.

The first method of capturing the differential effect of the minimum pension in each region is simply to deflate the estimated representative pensions. Assuming (implicitly) that the hypothetical 'basket' of goods and services associated with the minimum pension is identical for the representative pensioner in each region, regional differences in the cost of living can lead to asymmetries in economic welfare across regions. In regions with higher price indices, the purchasing power of the minimum pension will be lower than in regions with lower indices.

To assess the differences in welfare between regions, we have estimated the "excess pension" that each region receives above the average for Spain, considering regional price differences[14]. In those regions where the value is higher (lower) than the Spanish average, the redistributive effect of the complements will be higher (lower) than in the country (as a whole).

We can calculate the deflated gross effect of complement in each region *r* ($dGEC_r$) as in the expression (12)

[13] As mentioned above, from 2027 the pension amount will be linked to the poverty threshold.
[14] We use the Regional CPI drawn from INE (2024) for the reference

$$dGECr = \frac{GEC_r}{CPI_r}\ 100 \tag{12}$$

The difference for each region *r* (*DGE$_r$*) between the effect of the complement in each region (*GEC$_r$*) and the average effect of the complement for Spain (*GEC$_{spain}$*), as in expression (13)

$$DGE_r\ =\ GEC_r\ -GEC_{spain} \tag{13}$$

and the deflated value of the difference for each region r (*dDGE$_r$*) between the deflated value of the effect of the complement in each region (*dGEC$_r$*) and the deflated value of the average effect of the complement for Spain (*dGEC$_{spain}$*), as in expression (14)

$$dDGE_r\ =\ dGEC_r\ -dGEC_{spain} \tag{14}$$

The second method, using the GDP per capita of the region as a reference threshold, is to determine the relative position of the representative pensioner in each region. The smaller the difference between the estimated minimum pension and the regional income threshold, the greater the redistributive effect of the minimum pension. In this case, we measure the variation (in percentage points) of the distance between the representative regional pension (with and without supplements) and the regional GDP per capita. The larger the correction to the national average, the greater the redistributive effect of these supplements.

The distance between the representative pension without complements ($REDIP_r$) and the regional GDP per capita is measured according to expression (15). Expression (16) shows the same distance but now taking into account the minimum complements ($REDIP^c_r$). Finally, expression (17) is used to capture the variations in the distances we are interested in measuring.

$$REDIP_r = \frac{EP_r - GDP_r}{GDP_r} 100 \quad (15)$$

$$REDIP_r^c = \frac{EP_r^c - GDP_r}{GDP_r} 100 \quad (16)$$

$$REM_r = REDIP_r^c - REDIP_r \quad (17)$$

Table 8 shows the results obtained with the first method. The first column contains the same data as in the third column of Table 7, and the second column shows the differences of each region with respect to the Spanish average. The other two columns show these values adjusted for regional prices in 2015.

INSERT TABLE 8

When comparing the data, the first observation is that taking prices into account increases the overall impact of the minimum complements. For the whole of Spain, the value increases by 38 euro, from 538 to 576. On the other hand, the increase occurs in all regions, although with different intensity in each of them. To understand this first result, it is worth remembering that in the reference year of our analysis (2015), pensions increased their purchasing power, as they were revalued by 0.25%, while prices ended the year with a growth rate of zero. Let's now look at regional differences.

Looking at the data in columns 2 and 4, it is easy to see that the regions with a positive sign in the first column continue to have a positive sign when we deflate the pension. And the same goes for the regions with a negative sign. In other words, taking prices into account does not affect the classification of regions that we had obtained. On the other hand, it is also observed that the differences (with respect to the Spanish average) increase in the two groups of regions, indicating a different relative impact in terms of welfare in the two groups.

The region of Extremadura increases its gap to 634 euros, as do, albeit with less intensity the same is true for the regions of Galicia (+316), Castile-La Mancha (+314), Andalusia (+258), Valencia (+203) and the Canary Islands (+146). This increase can be interpreted as a relative improvement in the purchasing power of the representative pension in these regions higher than that observed for Spain as a whole.

There are also changes in the other group, but in the opposite direction. In Madrid, for example, the gap with the average decreases in 341 euro, with a similar change in Catalonia (-185) and the Basque Country (-491). Their distance from the average means that the impact of the minimum wage complement, once prices are considered, has a smaller relative effect (albeit a positive one) than in Spain as a whole.

Taking into account the price differences between regions seems to indicate that minimum complements have a greater positive impact in lower income regions than in higher income regions.

Table 9 shows the results that were obtained with the other indicator. As can be seen, the representative pension estimated for Spain as a whole (without complements) is

65.3 points lower than GDP per capita. If the complements are included, the gap is reduced by 2.3 points, to 63 points less.

INSERT TABLE 9

If we look at the third row, we can see that the variations are not identical in the different regions. It is in the region of Extremadura that the correction is most pronounced. The gap is reduced by almost 7 points, leaving the representative pensioner at a distance of 55 points away the GDP per capita of the region. It is followed by the regions of Castile-La Mancha (4.6 points), Andalusia (4.5 points) and Galicia (4 points). On the other hand, it is the regions with the highest income where the correction for distance is below the average: the Basque Country (0.3), Madrid (0.7), Catalonia (1.3) and the Balearic Islands (1.7).

In short, in regions with a lower GDP per capita, the relative position of the representative pensioner (if we include the minimum supplements) is more favorable than in regions with a high GDP per capita.

The results obtained with these two methods point in the same direction: the minimum pension has a larger positive effect on the economic well-being of our representative pensioner in low-income regions than in high-income regions.

7. Conclusions

Contributory pension systems, in which the pension received depends on the contributions made by the worker during his or her working life, are not designed to reduce income inequality among the retired population. In these systems, pensions tend to reproduce the wage differentials that exist during the years in which entitlement to

the benefit is generated. However, these systems can be adapted to smooth the wage differentials and thus contribute to improving the distribution of income among this group of the population. Among the instruments used to achieve this objective is the minimum pension guarantee.

In the Spanish pension system, the minimum pension is coupled to the contributory pension in the following way. When a worker attains retirement age, and the contributory pension he/she has generated is lower than the amount of the minimum pension, then the government supplements the contributory pension by the difference between the two pensions. The minimum pension is set by the government each year on a discretionary basis. This benefit is limited exclusively to workers who have contributed to the system.

The results achieved in this paper show the following. First, the minimum pension does indeed reduce the effect of initial wage differentials and thus improves the distribution of income among the elderly population. Second, the contributory pensions in lower income regions are lower than those in higher income regions and, therefore, it is the pensions in these regions that need higher complements to reach the minimum pension. Third, regional differences in pensions decrease when we consider the minimum complements.

All in all, our results show the existence of regional income redistributions, as the positive effect of the minimum pension on the income distribution among the retired population is mainly associated with an improvement in the benefit level of pensioners in lower income regions.

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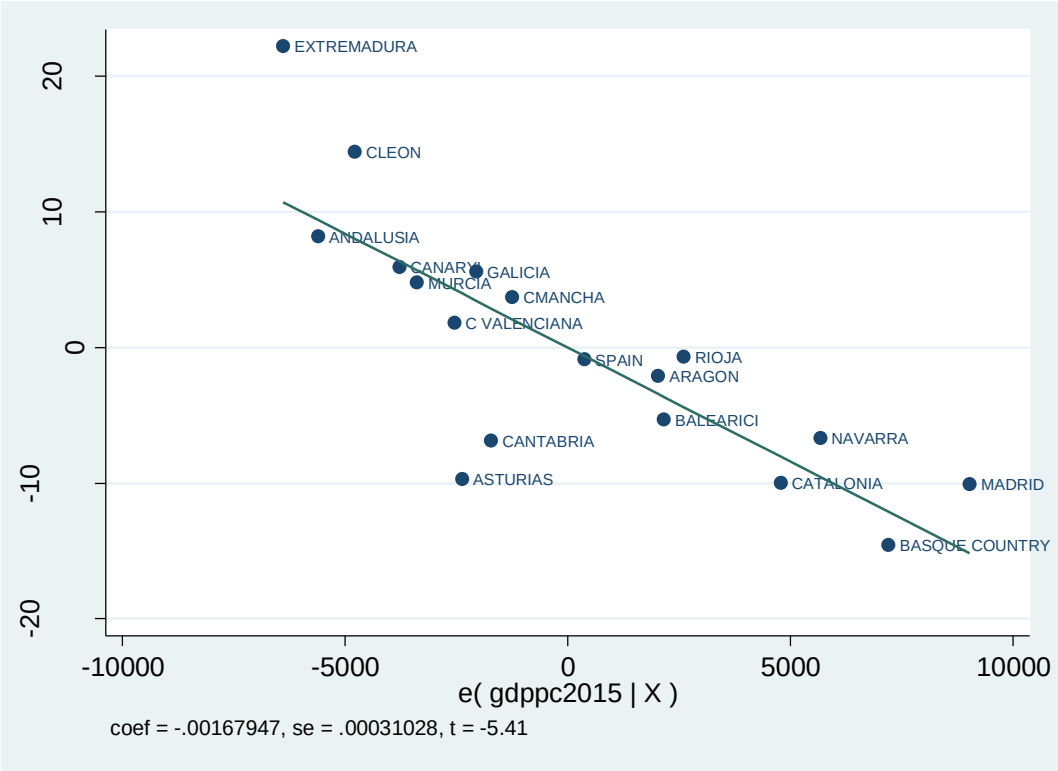
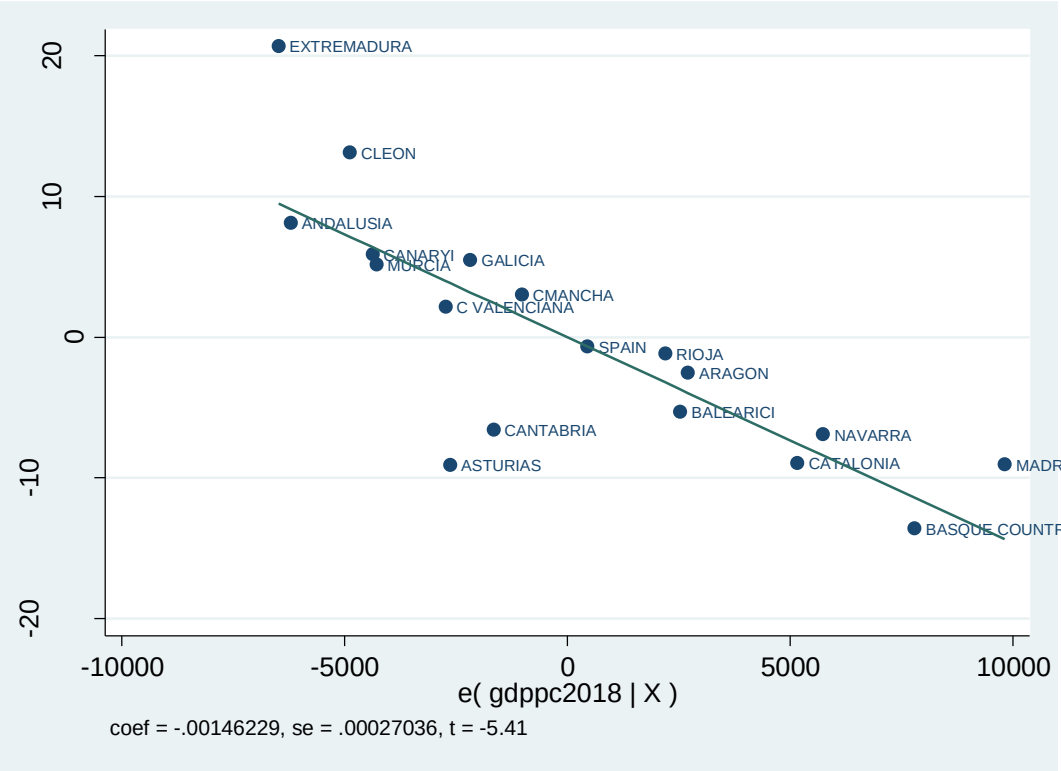
Figure 1: The relationship Between Minimum Pensions and Regional GDP in the year 2015.



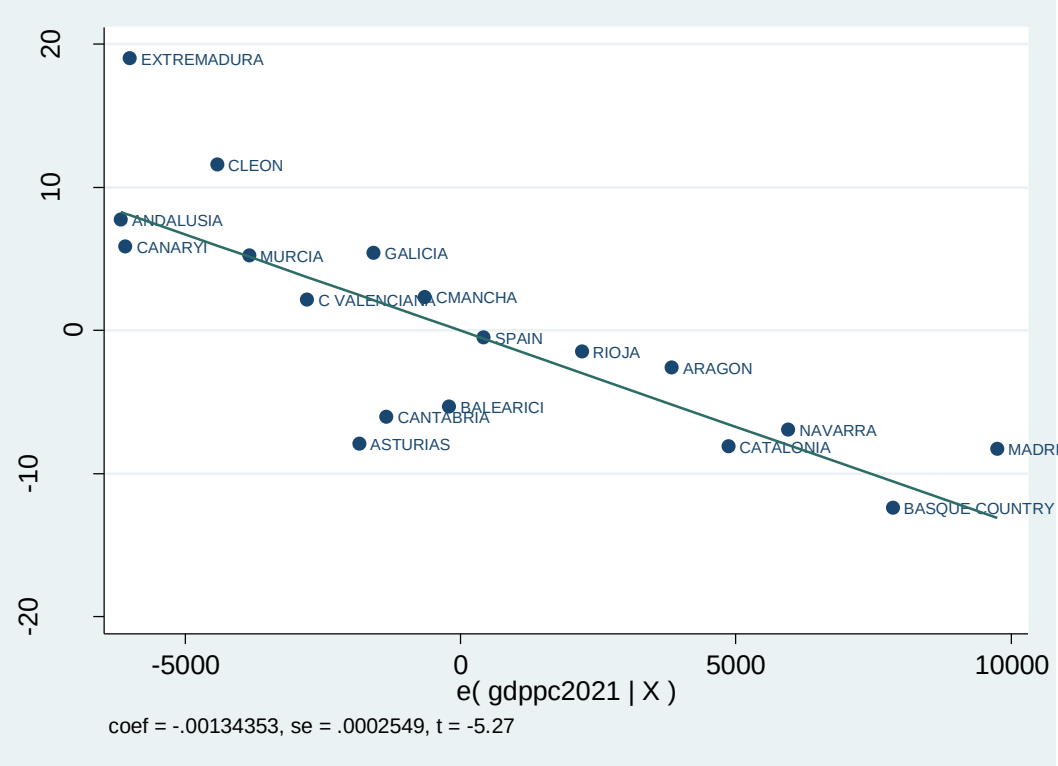
Source: Estimates output (simple regression). Dependent variable (Y-axis): Percentage of total pensions complemented with minimum complement. Independent variable (X-axis): Regional GDPpc. Data source: MCVL 2015 and INE Database.

Figure 2: The relationship Between Minimum Pensions and Regional GDP in the year 2018.



Source: Estimates output (simple regression). Dependent variable (Y-axis): Percentage of total pensions complemented with minimum complement. Independent variable (X-axis): Regional GDPpc. Data source: MCVL 2018 and INE Database.

Figure 3: The relationship Between Minimum Pensions and Regional GDP in the year 2021.



Source: Estimates output (simple regression). Dependent variable (Y-axis): Percentage of total pensions complemented with minimum complement. Independent variable (X-axis): Regional GDPpc. Data source: MCVL 2021 and INE Database.

Table 1. Distribution of Financial Resources Allocated to the Payment of Minimum Pensions by Region and Type of Pension. (Averages for the period 2015-2021).

Region	Retirement	Widowhood	Others
Andalusia	53,1	36,4	10,5
Aragón	57,1	37,1	5,8
Asturias	58,7	31,9	9,4
Balearic Islands	63,8	29,7	6,5
Canary Islands	48,6	41,3	10,1
Cantabria	59,4	31,5	9,1
Castille and León	53,4	39,7	6,9
Castille-La Mancha	48,7	44,2	7,1
Catalonia	68,1	25,2	6,7
C. Valenciana	58,8	33,4	7,8
Extremadura	49,1	42,3	8,6
Galicia	65,5	27	7,5
Madrid	61,6	32	6,4
Murcia	54,7	36	9,3
Navarre	61,3	32,8	5,9
Basque Country	65,8	27,2	7
La Rioja	60,8	33,9	5,3
Spain	57,5	34,5	8

Source: Own elaboration from MISSM.

Table 2. Percentage of Total Pensions complemented with Minimum by Regions and Gender for the years 2015, 2018 and 2021.

	2015			2018			2021		
Region	**Men**	**Women**	**All**	**Men**	**Women**	**All**	**Men**	**Women**	**All**
Andalusia	28,18	42,61	35,55	25,84	40,29	33,23	23,53	37,41	30,71
Aragón	18,03	32,68	25,29	15,19	29,94	22,59	13,06	27,35	20,36
Asturias	10,49	24,66	17,66	9,26	22,66	16,04	8,66	21,24	15,07
Balearic Islands	15,53	27,75	22,1	13,51	25,3	19,85	11,76	22,62	17,65
Canary Islands	27,18	39,81	33,32	25,07	37,17	31,03	23,12	34,5	28,82
Cantabria	13,92	26,69	20,47	12,31	24,49	18,56	11,08	22,41	16,92
Castille and León	24,69	38,09	31,12	21,43	35,36	28,15	18,56	32,34	25,3
Castille-La Mancha	34,55	51,3	41,83	30,56	47,94	38,26	26,71	43,93	34,54
Catalonia	10,91	22,81	17,43	9,75	21,46	16,2	8,72	19,81	14,88
C. Valenciana	22,13	35,86	29,23	19,92	34,11	27,3	17,79	31,75	25,12
Extremadura	43,97	56,03	49,63	39,65	52,61	45,79	35,82	48,66	41,99
Galicia	25,38	39,63	33,01	22,48	37,66	30,61	20,16	35,43	28,39
Madrid	10,04	24,1	17,3	9,1	22,48	16,09	8,21	20,36	14,69
Murcia	24,97	39,21	32,17	22,59	37,8	30,31	20,38	35,67	28,2
Navarre	12,68	29,05	20,72	10,42	26,1	18,24	8,71	23,15	16,02
Basque Country	6,73	18,74	12,82	5,89	16,97	11,57	5,32	15,47	10,59
La Rioja	20,33	33,14	26,74	17,12	30,74	23,99	14,53	28,22	21,51
Spain	19,83	32,81	26,49	17,75	30,78	24,48	15,93	28,47	22,48

Source: Own elaboration from MISSM.

Table 3. Average Pension by Type of Pension for the years 2015, 2018 and 2021.

	2015			2018			2021		
Region	**All**	**Retirement**	**Widowhood**	**All**	**Retirement**	**Widowhood**	**All**	**Retirement**	**Widowhood**
Andalusia	805,67	932,7	597,36	879,44	999,23	637,02	916,06	1079,75	688,51
Aragón	937,15	1071,65	657,60	1026,95	1160,79	711,04	1055,84	1254,79	781,20
Asturias	1056,07	1257,95	699,47	1103,93	1342,81	767,50	1136,17	1435,81	848,73
Balearic Islands	823,22	945,28	573,65	874,56	1020,81	615,87	926,49	1105,03	669,19
Canary Islands	828,36	978,79	614,14	884,95	1036,34	652,04	939,98	1108,66	701,93
Cantabria	935,96	1090,88	646,18	998,64	1179,13	705,87	1039,15	1273,57	779,39
Castille and León	877,14	1005,82	622,37	953,43	1089,59	671,72	992,08	1186,78	736,13
Castille-La Mancha	827,24	951,59	632,38	874,52	1022,67	674,76	913,49	1110,93	732,56
Catalonia	926,32	1046,06	638,71	1043,72	1127,38	689,47	1089,85	1219,81	754,32
C. Valenciana	823,73	939,30	601,34	903,13	1012,54	643,47	944,78	1095,19	697,34
Extremadura	747,16	853,75	601,13	795,89	915,86	633,91	841,78	994,32	679,03
Galicia	754,34	855,66	535,71	857,28	927,78	576,48	902,46	1011,91	627,06
Madrid	1057,56	1221,88	718,18	1036,79	1302,55	775,90	1077,83	1392,68	851,33
Murcia	786,85	909,83	582,88	853,43	980,96	625,69	899,30	1067,82	680,97
Navarre	1023,14	1164,69	682,74	1130,43	1256,30	743,91	1169,89	1350,42	818,82
Basque Country	1107,98	1274,72	752,24	1223,53	1368,11	821,04	1276,51	1467,84	904,55
La Rioja	865,87	970,44	622,96	962,51	1055,07	671,07	1018,41	1146,71	731,53
Spain	894,04	1030,63	632,97	953,84	1108,59	681,23	994,28	1196,68	743,01

Source: Own elaboration from MISSM.

Table 4. Ratio between Minimum Pensions and Total Pensions by Regime for the Year 2015.

Region	General	Self-Employed
Andalusia	35,7	42,6
Aragón	21,5	41,4
Asturias	14,5	34,2
Balearic Islands	19,6	32,7
Canary Islands	31,8	46,5
Cantabria	15,6	37,1
Castille and León	25,5	47,7
Castille-La Mancha	38,3	57,2
Catalonia	16,7	26,7
C. Valenciana	29,5	38,0
Extremadura	48,9	58,2
Galicia	26,5	46,5
Madrid	16,0	32,2
Murcia	31,8	41,4
Navarre	17,5	36,0
Basque Country	11,3	24,4
La Rioja	23,0	42,9
Spain	24,8	39,5

Source: Own elaboration from MISSM

Table 5. Distribution of Financial Resources Allocated to the Payment of Minimum Pensions by Region and Regime. (Averages for the period 2015-2021).

Region	General	Self-Employed	Others
Andalusia	76,64	20,67	2,69
Aragón	56,48	41,96	1,56
Asturias	47,02	45,86	7,12
Balearic Islands	58,41	39,59	2
Canary Islands	69,42	26,84	3,74
Cantabria	50,07	45,87	4,06
Castille and León	48,4	49,3	2,3
Castille-La Mancha	62,1	36,4	1,5
Catalonia	69,9	28,8	1,3
C. Valenciana	74	24,38	1,62
Extremadura	70,1	28,6	1,3
Galicia	43,2	49,5	7,3
Madrid	72,6	26,2	1,2
Murcia	70,3	27,8	1,9
Navarre	59,7	39,2	1,1
Basque Country	63,8	32,8	3,4
La Rioja	54,5	43,9	1,6
Spain	65,6	31,8	2,6

Source: Own elaboration from MISSM

Table 6. Output estimates. Dependent Variable: log(P_{ir}). Sample-N: 176.936 individuals.

Variables	***SPECIFICATION I*** ***Without Complement***		***SPECIFICATION II*** ***With Complement***	
	I	II	III	IV
Regul. Base	0.657***	0.647***	0.477***	0.469***
Coefficient	0.021***	0.021***	0.013***	0.001***
Pension Age	0.003***	0.002***	0.002***	0.002***
Cons	1.555***	1.736***	3.170***	3.237***
Region				
Andalusia		-0.138***		-0.115***
Aragon		-0.103***		-0.078***
Asturias				
Balearic Islands		-0.149***		-0.158***
Canary Islands		-0.160***		-0.139***
Cantabria		-0.063***		-0.055***
Castille and Leon		-0.099***		-0.085***
Castille-La Mancha		-0.146***		-0.114***
Catalonia		-0.091***		-0.079***
Valencia		-0.155***		-0.125***
Extremadura		-0.177***		-0.155***
Galicia		-0.189***		-0.126***
Madrid		-0.047***		0.038***
Murcia		-0.123***		-0.109***
Navarre		-0.093***		-0.057***
Basque Country		-0.030***		-0.009
La Rioja		-0.156***		-0.126***
R^2		0.72		0.61

*,**,*** significant at 1%, 5% and 10% respectively

Table 7. Estimates of the Expected Value of the Pension by Region

Region	EP_r	EP^c_r	GEC_r	*GDPr*
Andalusia	6839	7619	780	17249
Aragón	8647	9175	528	24889
Asturias	10566	10610	44	20487
Balearic Islands	6684	7111	427	25024
Basque Country	11034	11113	79	30064
C. Valenciana	7232	7962	730	20316
Canary Islands	6648	7327	679	19079
Cantabria	8541	8897	356	21140
Castille and León	7905	8434	529	21617
Castille-La Mancha	6974	7804	830	18081
Catalonia	8849	9212	363	27647
Extremadura	6260	7392	1132	16472
Galicia	6045	6876	831	20806
La Rioja	7913	8551	638	25467
Madrid	9690	9910	220	31894
Murcia	6624	7272	648	19473
Navarre	8919	9331	412	28532
Spain	8067	8605	538	23230

with Complement (EP^c_r), without Complement (EP_r), General Effect of the Complement (GEC_r) (in euros) and Regional GDP per capita (*GDPr*) in 2015.

Table 8. Estimates of the Redistributive Impact of the Complement to Minimum in each Region.

Region	GEC_r	GECr-GECspain	$dGEC_r$	dGECr-dGECspain
Andalusia	780	242	834	258
Aragón	528	-10	565	-11
Asturias	44	-494	47	-529
Balearic Islands	427	-111	457	-118
Basque Country	79	-459	85	-491
C. Valenciana	730	192	779	203
Canary Islands	679	141	722	146
Cantabria	356	-182	381	-195
Castille and León	529	-9	568	-8
Castille-La Mancha	830	292	890	314
Catalonia	363	-175	391	-185
Extremadura	1132	594	1210	634
Galicia	831	293	892	316
La Rioja	638	100	682	106
Madrid	220	-318	235	-341
Murcia	648	110	687	111
Navarre	412	-126	443	-133
Spain	538	0	576	0

Gross Effect of the Complement in each region *r* (GEC_r) and Relative Difference (DGE_r) between Gross Effect of the Complement in each region *r* (GEC_r) and Gross Effect of the Complement in *Spain* (GEC_{Spain}). Deflated Gross Effect of the Complement in each region *r* ($dGEC_r$), Relative Difference ($dDEC_r$) between deflated Gross Effect of the Complement in each region *r* ($dGEC_r$) and deflated Gross Effect of the Complement in *Spain* ($dGEC_{Spain}$).

Table 9. Estimates of the Redistributive Impact of the Complement to Minimum in each Region:

Region	$REDIP_r$	$REDIP^c_r$	REM_r	$GDPr$
Andalusia	-60,4	-55,8	4,5	17249
Aragón	-65,3	-63,1	2,1	24889
Asturias	-48,4	-48,2	0,2	20487
Balearic Islands	-73,3	-71,6	1,7	25024
Basque Country	-63,3	-63,0	0,3	30064
C. Valenciana	-64,4	-60,8	3,6	20316
Canary Islands	-65,2	-61,6	3,6	19079
Cantabria	-59,6	-57,9	1,7	21140
Castille and León	-63,4	-61,0	2,4	21617
Castille-La Mancha	-61,4	-56,8	4,6	18081
Catalonia	-68,0	-66,7	1,3	27647
Extremadura	-62,0	-55,1	6,9	16472
Galicia	-70,9	-67,0	4,0	20806
La Rioja	-68,9	-66,4	2,5	25467
Madrid	-69,6	-68,9	0,7	31894
Murcia	-66,0	-62,7	3,3	19473
Navarre	-68,7	-67,3	1,4	28532
Spain	-65,3	-63,0	2,3	23230

Relative Distance to Regional GDP without complement ($REDIP_r$), with complement ($REDIP^c_r$) and Effect of the Complemet to Minimum (REM_r). Regional GDP per capita (GDP_r) in 2015.