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THE IMPACT OF PENSIONS ON EMPLOYMENT:

A COMPARATIVE ANALYSIS OF THE UK AND SPAIN

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RESUMEN

El objetivo de esta investigación es cuantificar y analizar para el Reino Unido y España la cantidad total de trabajo, directo e indirecto, que se necesita para producir la cesta de consumo que adquieren los jubilados con sus pensiones. Como consecuencia del cambio demográfico producido en la mayoría de los países desarrollados, se espera que la población de edad más avanzada continúe aumentando en el futuro, de manera que el gasto en pensiones adquirirá un mayor peso en la asignación del factor trabajo durante los próximos años. Utilizando metodología Input-Output y datos del consumo de bienes y servicios procedentes de la Encuesta de Presupuestos Familiares de Eurostat, primero calculamos el empleo necesario para satisfacer la demanda de los pensionistas y determinamos las principales causas de los cambios observados en el vector de trabajo total a través de un análisis shift-share. Posteriormente desarrollamos cuatro simulaciones para estimar el número de puestos de trabajo vinculados con las pensiones en 2030, cuando los modelos de pensiones del Reino Unido y España presenten mayores problemas de sostenibilidad al comenzar la jubilación de los baby-boomers.

En definitiva, este trabajo pretende ser una contribución al debate actual sobre la viabilidad de los sistemas de pensiones en la UE, donde se defiende una posición alternativa a la visión convencional, de manera que los ingresos asociados a las pensiones públicas no deberían ser considerados como una carga, sino más bien como una fuente de empleo cuando una economía opera por debajo del nivel de pleno empleo.

Palabras clave: Pensiones, Empleo, Análisis Input-Output, Envejecimiento, Consumo.

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ABSTRACT

The aim of this research is to measure and analyse for the UK and Spain the total amount of labour, directly and indirectly required to produce the basket of consumer goods purchased by retired people and funded with their pensions. As the result of the demographic transition observed in most of the developed countries, it is expected that the old-age population will continue to increase in the near future. Therefore, pension expenditure should become even more important in the allocation of labour between sectors in the coming years. Using input-output methodology and expenditure data on goods and services collected from the Household Budget Survey of Eurostat, we calculate the employment required to meet the consumption demands of pensioners. Once we have measured the labour input to produce the pensioners' consumption basket, a shift-share analysis is implemented to determine the main causes of the changes observed in the vector of total labour requirements. Finally, four simulations are undertaken to estimate how many jobs would depend on pensions in 2030 for both the UK and Spain, when the viability of most of the pension schemes will be under threat, as baby-boomers begin to retire.

To conclude, this research is a contribution to the ongoing debate that is taking place about the viability of the pension systems in the EU. Contrary to the conventional view, the income related to state pensions should not be considered as a burden, but as a source of job creation when an economy operates below full employment.

Keywords: Pensions, Employment, Input-Output analysis, Old-age, Consumption.

JEL-codes: H55, E24, D57, J14, E20.

1. INTRODUCTION

Longer life expectancy, together with lower fertility rates, lead to a progressive ageing of the population[2]. This demographic transition is a complex phenomenon, which in principle should be considered an advantage for most developed countries, as it is the outcome of a stabilization process of the population that brings additional benefits at both individual and social levels (e.g. lower child mortality rates and better quality of life for the elderly). However, these advances will come at the price of an increase in expenditure on medical and social care for the elderly, a greater pressure on the labour market and a likely imbalance in the budget for pension systems.

In this paper we focus on these last consequences associated with the ageing process. Our main objective is to measure and compare the amount of direct and indirect work required to produce the consumption basket purchased by old-age pensioners (henceforth, OAPs) in the UK and Spain. Given that the demographic projections point to an increase of the elderly in the near future, we aim to determine the impact that their final demand can have on production and employment for both countries. Using Input-Output methodology, we initially calculate the total labour required for the final demand of OAPs in 1995, 2000 and 2005. We next disaggregate the results by means of a shift-share analysis and use different scenarios to estimate the employment associated with the consumption of pensioners in 2030. This is when the pension system is more likely to be threatened because the baby-boomers will start retiring.

The main contribution of this work lies in the consideration of the state pension benefits as a source of job creation when an economy operates below full employment level, rather than as a financial burden. We implicitly adopt a Keynesian theoretical standpoint, where the amount of employment and economic activity is governed by aggregate demand, employment does not constrain economic growth and the endogeneity of money makes it possible to spend first, and then create the resources to pay back this debt. It is from that perspective that we consider the role that pension spending will play in determining the allocation of the labour endowment in the near future.

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[2] There is an extensive bibliography regarding the socio-economic consequences of the demographic transition, e.g. United Nations (2012), European Commission (2012) or Bloom and Canning (2004).

The structure of the paper is as follows. In the second section, we justify our theoretical viewpoint. In the third section, we explain the methodology used in this investigation, considering, first, the model to measure total labour requirements, then the definition of the shift-share analysis and finally the projection of different scenarios related to the labour requirements in the near future. In section four we give a summary of the data sources and the main empirical results. Section five concludes.

2. AGEING IN THE UK AND SPAIN

Longer life expectancies and falling birth rates lead to an ageing population. The conventional view is that this demographic change will be an increasing burden on the pension systems due to the increased number of pensioners compared with those in employment.

Currently, most developed countries are experiencing the last stage of the demographic transition. The data in Table 1 show that it is a widespread phenomenon that seriously affects countries such as Japan, Spain and Germany, less importantly France and the United Kingdom, while the United States and the emerging countries (China, Brazil and Mexico) are not yet at high risk.

TABLE 1: Old age dependency rate: Population aged above 64 as a percentage of the population aged between 20 and 64

	Germany	Brazil	China	Spain	France	Japan	Mexico	UK	USA
1995	22.66	7.96	9.07	22.47	23.22	20.95	7.29	24.50	19.38
2005	28.37	9.31	10.74	24.36	25.23	30.51	8.19	24.22	18.58
2015	32.29	11.59	13.21	27.90	29.32	43.98	10.05	27.99	21.96
2025	39.90	16.26	19.49	34.06	35.74	51.23	14.27	32.47	28.68
2035	52.98	22.93	29.60	46.66	41.92	59.20	21.46	38.50	32.77
2050	55.79	35.90	37.99	67.54	45.60	76.36	34.30	40.52	33.30

Source: Statistics OECD.

The Defined Benefit and Pay-as-you-go (DB-PAYG) pension schemes are the most usual pension systems to be found in the market economies[3]. These have been criticized for a long time with arguments such as those used by Feldstein (1974), where

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[3] PAYG occurs when that current contributions fund the payment of current pensions. In other words, it is a non-funded pension scheme. DB is when the stream of pension payments received by an OAP, once the first pension is determined according to past earnings, is not constrained by the amount of contributions made by this agent during his or her working life.

private funds are considered preferable to the PAYG systems as they result in a higher rate of accumulation and a higher level of production. In essence, Feldstein's criticism focused on the fact that the PAYG system led to lower rates of savings and, in addition, to a reduced labour supply, since individuals consume more and work less at present if they know they will get a state pension when they retire (in other words, there is a moral hazard problem).

From the early 1990s onwards, criticisms were oriented towards the problems of financial sustainability of the PAYG schemes as a consequence of population ageing. Declining fertility rates and increased life expectancy result in a new situation in which young workers would be forced to make substantial social contributions with the aim of balancing the Social Security budget. Otherwise, as indicated in Feldstein (2006), this would result in a budgetary deficit that would increase the public debt beyond a sustainable level.

Summing up, the demographic transition in the OECD countries means that public pension expenditure will grow in the future, as indicated in Table 2. Proposals to reform pension systems have result in a number of very different positions. These range from the radical change towards funded systems put forward in Feldstein (1974), to the introduction of certain parametric reforms in the existing DB-PAYG systems (delaying the retirement age, reducing benefits, etc.). Another proposal is the combination of funded and unfunded models suggested by the World Bank (1994)[4], where the management can be done by the private sector and financing is based on mandatory and voluntary contributions.

TABLE 2: Gross public pension expenditure (%GDP)

	Germany	Spain	France	Italy	UK	Norway	Austria
2010	10.8	10.1	14.6	15.3	7.7	9.3	14.1
2020	10.9	10.6	14.4	14.5	7	11.6	15.1
2040	21.7	12.3	15.2	15.6	8.2	13.7	16.5
2060	13.4	13.7	15.1	14.4	9.2	14.2	16.1

Source: European Commission, 2012. Table 2.5, p. 101.

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[4] In some countries (e.g. Italy, Sweden, amongst others), notional defined contribution accounts have been introduced since the 1990s. This is an unfunded pension scheme which takes into account financial-actuarial adjustment systems in order to make PAYG systems financially sustainable. See for instance Vidal-Meliá et al (2002), or Gronchi and Nisticò, (2008) for more detailed information.

A theoretical rationale underlying both the criticisms to DB-PAYG and the reform proposals mentioned above, is the assumption that economic systems naturally gravitate around full employment and that the level of activity is determined by the endowment of resources and their distribution, a given set of inter-temporal preferences, and a set of production techniques. Consequently, a DB-PAYG system is viewed as a burden which distorts the efficient allocation of resources which, presumably, should be attained according to the conventional neoclassical general equilibrium approach[5].

However, the Keynesian position holds that when the advanced market economies are constrained by the demand side, pensions in a DB-PAYG system are not a burden, but a source of additional demand. Indeed, as mentioned in Cesaratto (2002), pensioners' spending on consumer goods can bring into production resources which, otherwise, would have remained idle. According to this strand of thought, the limit to the sustainability of a pension system is conditioned by the situation of full employment. Figure 1 shows, at a rather simplified level, the post-Keynesian theory of how a DB-PAYG pension system should work.

FIGURE 1: Keynesian view of a DB-PAYG scheme when the rate of savings is nil
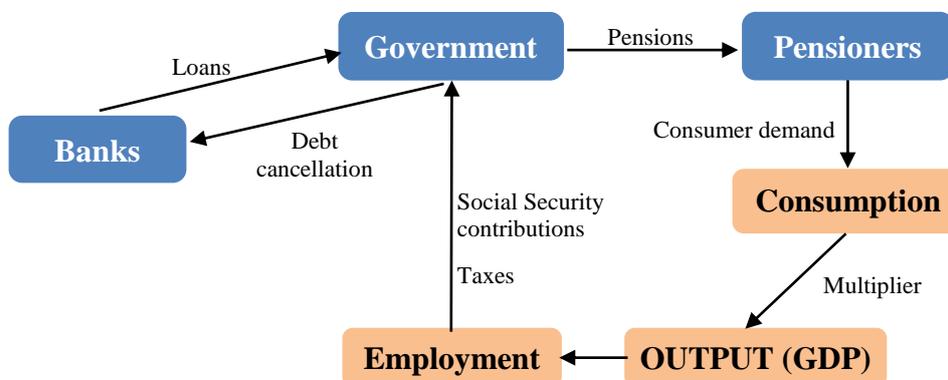
Source: Authors' elaboration.

Following the monetary cycle described in Lavoie (1992) and according to the concept of endogenous money in Moore (1988), banks create money ex nihilo by granting loans to finance the pensions that the government must pay to OAPs. Then, this income is spent on the consumption of goods and services, becoming the additional aggregate demand which, under the Keynesian principle of effective demand, will lead to a higher level of production through the multiplier. This increase in the level of

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[5] A good reference for this can be found in Goodfriend (2002).

production requires higher employment which, in turn, generates income for the government in the form of taxes and social contributions that shall be used to pay off the initial debt with the banks[6].

The neoclassical and Keynesian viewpoints have different implications in this respect that cannot be reconciled. The former highlights the burden of pensions, while the latter gives prominence to its role as a determinant of aggregate demand. Without ruling out the fact that an ageing population represents a serious challenge to modern societies, we believe that a measurement of the employment that will be needed in the future to meet the OAPs' demand will contribute to a better understanding of the problem. In our opinion, the Keynesian approach provides a better foundation for the analysis that we develop in this paper, as it establishes a relationship of causality which goes from pensions to employment.

To sum up, on the one hand, an ageing population could be considered as a burden on society, but, on the other hand, it also represents a major source of demand that will create new business opportunities. As mentioned in the introduction, this research estimates the number of jobs needed to produce goods that meet the OAPs' demand in the present and for the next 20 years. In this sense, the problem of how to finance the system has been deliberately left to one side, although this fact should not lead to the assumption that we underestimate the importance of this issue. Here we consider only "one side of the coin" as the financing of pensions and pensioners spending can be addressed independently.

Moreover, a consideration of the former is an interesting exercise, as it provides us with quantitative information about one of the most relevant aspects of ageing related to the economy.

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[6] In a closed economy, if the average rate of savings is nil, the government can always collect payroll taxes in an amount equal to pension benefits paid to retired people. If, alternatively, some agents save part of their income, the deficit of the social security makes it possible those savings and, simultaneously, it offsets the fall of aggregate demand caused by them. This view matches well with Lerner's notion of functional finance in Lerner (1943), Nell and Forstater (2003). See also Cesaratto, *op.cit.*

3. MEASURING EMPLOYMENT AND PENSIONERS' CONSUMPTION

This section describes the methodology to estimate the total amount of required jobs for the domestic production of goods and services that can be funded with OAPs' pensions in the UK and Spain. In this sense, it should be noted that we are not trying to compute the necessary employment to produce all the goods and services demanded by retirees (since they could, for example, use previous savings to finance present consumption). What this study calculates is the total labour requirements, and its sectoral distribution, associated with the domestic production of the consumption basket corresponding to the payment of pensions in each country.

This empirical exercise requires three types of data, two of which are included in the Symmetrical Input-Output Tables (henceforth, SIOT). The first one is the total domestic output required to obtain the OAPs' consumption basket and the second one is the amount of employment necessary for the production of these goods and services. The third source is Households Budget Survey (henceforth, HBS), which provides information about the composition of the goods and services purchased by workers and pensioners.

3.1. The theoretical model

The SIOT is based on the condition that total supply equals total demand such that:

$$X+M=A^d{\cdot}X+Y^d+A^m{\cdot}X+Y^m \tag{1}$$

where X is a (row) vector of total output domestically produced and M is also a vector of total imports. On the other side of the equality sign, we have intermediate inputs domestically produced, final demand met by domestic output (final demand includes final private and public consumption, investment and exports), imported intermediate inputs and final demand covered with imports. A^d and A^m account for matrices of technical coefficients.

In this case, we are interested in the total domestic production solely associated with the OAP demand. If we call this X^p, it follows that:

$$X^p = A^d \cdot X^p + d^d \cdot a_n \cdot X^p + c \qquad (2)$$

In the equation above, d^d is the vector accounting for the consumption basket of domestically produced goods and services which can be purchased with the average monetary wage corresponding to one unit of labour; a_n is the (row) vector of direct labour requirements, and c is the (row) vector of the consumer goods which pensions can buy.

Equation (2) above can be arranged to yield:

$$X^p = [I-(A^d+A^c)]^{-1} \cdot c \qquad A^c = d^d \cdot a_n \qquad (3)$$

Finally, the vector of total labour embodied in the production of OAP demand is given by the equation (4), where the symbols $<>$ denote a diagonal matrix:

$$L_T = a_n \cdot <X^p> = a_n \cdot [I-A^*]^{-1} \cdot <c> \quad \text{where} \quad A^* = A^d + d^d \cdot a_n \qquad (4)$$

The detailed meaning of the terms in the equation above is as follows.

a_n is a (1×20) vector of labour requirements directly needed to produce the amount of commodities included in one million units of the national currency for the UK (£s) and Spain (euros). In formal terms, this is defined in the literature as:

$$a_n = a_{nf} \cdot <p>^{-1} = L \cdot <X>^{-1} \cdot <p>^{-1} \qquad (5)$$

Here, a_{nf} is the vector of direct labour requirements per unit of output in physical terms, L is a (row) vector of direct sectoral employment (number of people employed in each industry), X accounts for a vector of total sectoral output, and p is the set of commodity prices. By and large, we do not have separate information on prices and quantities of output, but the value of sectoral output measured in millions of the national currencies. Therefore, a_n measures the labour directly required to produce one million of output for each industrial branch expressed in the national currency of the UK and Spain.

$[I\text{-}A^*]^{-1}$ is the usual Leontief inverse, where I is the identity matrix and $A^*{=}A^d{+}d^d{\cdot}a_n$ is the socio-technical matrix which has been defined above. The main purpose of introducing this matrix lies in the endogeneization of private consumption, as it is considered in Miller and Blair (2009). In this case, we try to incorporate the part of final consumption created by workers whose wages have been obtained via the domestic production of goods and services purchased by OAP. That is to say:

$$w = p\,(d^d{}_f + d^m{}_f) + s \tag{6}$$

where w is the money wage of a unit of labour, p is a (row) vector of prices, $d^d{}_f$ is a (column) vector which accounts for the physical quantities of domestically produced consumer goods in the wage basket, $d^m{}_f$ is a (column) vector of imported physical consumer goods in the wage basket, and s is the proportion of the money wage which is saved. As in the previous case, we do not have information on prices and quantities separately, but what we do have is the following:

$$A^* = <p>{\cdot}A^*{}_f <p>^{-1} \tag{7}$$

where:

$$A^*{}_f{=}A^d{}_f + A^c{}_f \tag{8}$$

$$A^c{}_f{=}d^d{}_f{\cdot}a_{nf} \tag{9}$$

Hence, when taking into account prices and quantities separately, the Leontief inverse that would result is given by:

$$[\,I\text{-}<p>{\cdot}A^*{}_f{\cdot}<p>^{-1}\,]^{-1} = <p>{\cdot}[I\text{-}A^*{}_f]^{-1}{\cdot}<p>^{-1} \tag{10}$$

where $<c>$ is the diagonal matrix containing the consumption of the OAPs (measured in monetary terms), which has been exclusively purchased by their pensions. In formal terms:

$$<c>{=}<p>\ {\cdot}<c_f>{\cdot}R \tag{11}$$

$$b = p \cdot c_f \tag{12}$$

where $< c_f >$ is the basket of physical consumer goods that the average value b of a pension can purchase (assuming that the total amount of this income is devoted to consumption) and R being the number of OAPs.

Taking all this into account, equation (4) can be expressed as follows:

$$L_T = a_{nf} \cdot < p >^{-1} < p > \cdot [I\text{-}A_f^*]^{-1} \cdot < p >^{-1} < p > \cdot < c_f > \cdot R \tag{13}$$

This equation makes it clear that although it is not known how many physical units are consumed by OAPs because there is no separate information on prices and quantities, the vector of total labour required to produce these consumer goods is independent from the set of prices. Therefore, deflating would not be strictly needed to make comparisons between the labour requirements in two different periods of time.

3.2. The shift-share analysis

Once the amount of employment linked to OAPs' consumption has been worked out, we then analyse the main components used in the calculation in order to determine the variation of employment during the period of time under consideration. We use these results to develop simulations of future scenarios.

Thus, the procedure entails decomposing the variation of employment L_t associated with the expenditure of pensions into three elements: the total labour per unit of surplus output v_{ft}, the amount of goods and services c_{ft} that can be acquired with the average value of a pension and the number of pensioners R_t. The starting point is equation (13) for each period t of the analysis and for each country the following holds:

$$L_{Tt} = v_{ft} \cdot < c_{ft} > \cdot R_t \tag{14}$$

where $v_{ft} = a_{nf\,t}[I\text{-}A_{f\,t}^*]^{-1}$ is the vector of vertically integrated labour coefficients, using the terminology in Pasinetti (1973) or also Dejuán and Febrero (2000). Equation (14) can be rewritten as:

$$L_{Tt} = v_{ft} \cdot < p_t >^{-1} \cdot < e_t > \cdot < e_t >^{-1} \cdot (< p_t > \cdot < c_{ft} > \cdot b_0^{-1}) \cdot b_0 \cdot R_t \tag{15}$$

in which the diagonal matrix of deflators $< e_t > = < p_t > \cdot < p_0 >^{-1} \cdot$ of every year t referenced to the base year has been included. Grouping the terms in equation (15), we finally have:

$$L_{Tt} = v_t^R \cdot < c_t^R > \cdot R_t \tag{16}$$

where v_t^R stands for total employment required in period t to produce the amount of commodities included in one million pounds (UK) or euros (Spain) of the base year:

$$v_{ft} \cdot < p_t >^{-1} \cdot < e_t > = \cdot v_{ft} \cdot < p_0 >^{-1} = v_t \cdot < e_t > \rightarrow v_t^R \tag{17}$$

In equation (17) $< c_t^R >$ is the basket of commodities which goes to one pensioner in period t, measured in prices of the base year:

$$< e_t >^{-1} \cdot (< p_t > \cdot < c_{ft} > \cdot b_0^{-1}) \cdot b_0 = (< p_0 > \cdot < c_{ft} > \cdot b_0^{-1}) \cdot b_0 \rightarrow < c_t^R > \tag{18}$$

where R_t is, as already stated, the number of OAPs.

Next, the shift-share analysis consists in disaggregating the variation of the total labour requirements into the changes of its determinants. We define a variable in period t in relation to its value in the base year as:

$$x_i(t) = x_i(0) \cdot (1 + g_{xi})^t \tag{19}$$

Therefore, if between the base year and the current period of analysis there is a difference of just one period of time, then, we have:

$$\frac{L_{Tit} - L_{Ti0}}{L_{Ti0}} = \frac{v_{fi0}^R \cdot (1 + g_{vi})}{v_{fi0}^R} \cdot \frac{c_{i0}^R \cdot (1 + g_{ci})}{c_{i0}^R} \cdot \frac{R_0 \cdot (1 + g_{Ri})}{R_0} - 1 \tag{20}$$

And after arranging, equation (20) yields:

$$\frac{L_{T\,it} - L_{T\,i0}}{L_{T\,i0}} = g_{vi} + g_{ci} + g_R + g_{vi} \cdot g_{ci} + g_{vi} \cdot g_R + g_{ci} \cdot g_R + g_{vi} \cdot g_{ci} \cdot g_R$$

(21)

3.3. The labour required to meet pensioners' demand in 2030

This section estimates the labour input that will be needed in 2030 to meet OAP demand by means of projecting the results of the previous calculations. We are aware that 20 years is a long period, and subject to many contingencies. Therefore, our intention is to forecast some scenarios which quantify the employment and its sectoral distribution necessary to produce goods and services that OAPs might consume in 20 years' time (that is, when the baby-boomers begin to retire). This exercise requires a large number of assumptions, so it would be rather naive to believe that we can predict what will happen in the future with a high level of accuracy.

In short, rather than estimating the exact amount of employment that will depend on pensions in the future, our main purpose is to develop a forecasting exercise intended to contribute to the analysis of the impact caused by the demographic transition on the economic structure of the UK and Spain. Input-Output methodology will be used to predict the relationships between a relevant part of the final demand, the output and the employment, under the following initial assumptions.

Firstly, the vector of vertically integrated labour coefficients for each country is assumed to change according to this pattern:

$$v_i(t) = v_i(0) \cdot (1 + g_{vi})^t$$

(22)

where g_{vi} is the average annual change rate of the vertically integrated labour in sector i.

Secondly, we consider three scenarios regarding the evolution of the pension benefit per pensioner.

1) The average OAP pension remains constant with respect to 2005.

2) The average OAP pension increases by 10%, but the composition of the basket remains the same as in 2005.

3) The average OAP pension increases by 10%, and the composition of the consumption basket varies according to the trend shown between 1995 and 2005, determined by the following equation:

$$c_i(t) = (1 + 0{,}1) \cdot \theta_i \cdot c_i(0) \cdot (1 + g_{ci})^t \tag{23}$$

where θ_i stands for the relative weight of commodity i in the basket of consumer goods of a pensioner in 1995 (base year).

Thirdly, we consider two scenarios with respect to the number of pension beneficiaries:

1) The number of future beneficiaries is estimated by applying the same coverage rate[7] in 2005 to the population aged 65 or older in 2030.

2) We increase the previous coverage rate by 10%.

The criteria adopted in these scenarios are for following reasons.

The viability of any pension system can be threatened by at least two risk factors: *(i)* that the proportion of retirees increases above a certain threshold in relation to the working population, and *(ii)* that the unemployment rate exceeds a certain level, which would result in the amount of contributions being less than necessary to balance the budget of the pension system. This paper focuses only on the first problem, taking for granted that the pension receipts guarantee sufficient funding. This hypothesis considers an economic system gravitating around a full employment position and it implies greater and longer-term social contributions and therefore greater benefits in a DB-PAYG pension system.

OAPs' consumption is not only determined by the fact that old-age population is expected to increase in the near future. The total expenditure of the elderly on goods and

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[7] Defined as the percentage of pensioners aged 65 or older with respect to the total population aged 65 or older.

services not only will be higher, but also the nature of this consumption is likely to change. The growth in longevity projected by Eurostat for both countries will also improve considerably the quality of life in the early years of retirement. Therefore, the traditional pattern of consumption focused on essential products to cover basic necessities will be transformed to include other items related to leisure, culture and social participation, which normally are characterized by having a strong impact on the labour market. Hence the relevance of considering the behavioral changes during the period under study by means of several hypothetical scenarios.

4. EMPIRICAL RESULTS

This section provides information about the main results obtained. Firstly, we consider that a brief description of the sources used in this paper can be useful:

a) WIOD[8]. The domestic SIOT as well as the number of workers and their compensation at a sectoral level for the UK and Spain has been obtained from this database.

b) The Household Budget Survey (HBS) carried out by Eurostat. This database provides information on the amount and structure of households' expenditure according to the COICOP[9]. It also includes socio-economic characteristics related mainly to the standard of living, income, professional activity of the household reference person. The processing of these data allows us to define a distribution of consumption for a particular group of households (in this case, pensioners and workers).

c) Annual statistical reports of the Spanish Ministry of Labour and Social Affairs, from which we have obtained the figures of the monetary value and the number of pensions for Spain.

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[8] WIOD (World Input-Output Databases) is a project funded by the European Commission, Research Directorate General as part of the 7th Framework Programme, Theme 8: Socio-Economic Sciences and Humanities. For further information, see www.wiod.org

[9] *Classification of Individual Consumption by Purpose* is one of the classifications of the National accounts system (SCN). It is used to classify transactions made between producers and the institutional sector of households.

d) Statistics at the Department for Work and Pensions, from which we have obtained the amount and the number of state pensions for the UK.

4.1. Main results

We begin this section by describing how vector c of OAPs' consumption that is presented in equation (3) has been obtained. Final consumption appears in SIOT classified only in three levels, namely, Households, NPISH and Administration. Consequently, we need a procedure to extract the information related to the consumption of pensioners from the consumption of the total number of households. To accomplish this, we used the statistics of the households' consumption contained in the HBS provided by Eurostat. By defining specific data filters related to age and earnings, we are able to distinguish those households where a retirement pension is the main source of income and the reference person is aged 65 or older from the rest of the population. The results are presented in Table 3.

The first column for any particular year reports the composition of the items of expenditure of an OAP's consumption basket in percentage terms for the UK and Spain. In addition, the second column gives the monetary value of the various items derived by applying the previous percentages to the average OAP pension for each country.

Moving to the next term in equation (3), matrix AC containing the information related to the workers' consumption is obtained from HBS data following a similar procedure to the previous one described for the pensioners. Nevertheless, we assume that workers do not use up all their salaries and save a fraction of their income.[10] At this point, it is important to mention that these results have been obtained taking into account two important requirements: *(i)* the deduction of VAT, since we have to know the expenditure of pensioners in basic prices to make it compatible with the TSIO data and *(ii)* the discounting of the imputed rents included in the values of housing and real estate, since the nature of this expenditure would distort the labour input linked to this activity.

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[10] According to the data collected from Eurostat, the households saving rate in the UK was 9.42% in 1995, 4.25% in 2000 and 2.82% in 2005, whilst these values in Spain were 10.92%, 11.05% and 10.82% for the same years.

Table 3 shows a significant difference in housing and real estate between the UK and Spain. As calculated values exclude the imputed rents, then real rents and current house expenditures are the only records incorporated in the accounting of this sector. Consequently, the difference between the two economies can be mainly understood as the secular tradition of the Spanish families of owning their dwellings and bequeathing those properties to the next generations.

TABLE 3: Percentage composition and monetary value of an OAP's consumption basket for the UK and Spain (1995 prices)

UK	1995		2000		2005	
	%	**£**	**%**	**£**	**%**	**£**
Agriculture and fishing	2.21%	65.10	2.74%	96.83	2.43%	93.17
Mining and quarrying	0.50%	14.89	0.25%	8.74	0.12%	4.52
Food, beverages and tobacco	9.00%	265.77	8.27%	292.69	5.61%	215.47
Clothing, textiles and footwear	1.76%	52.02	1.18%	41.78	0.38%	14.60
Chemicals and intermediate products	0.24%	302.38	9.20%	325.43	7.00%	268.55
Machinery and electrical equipment	4.43%	130.90	3.96%	140.03	3.72%	142.90
Furnishing, accesories and recycling	1.19%	35.13	1.39%	49.21	1.10%	42.08
Electricity, gas and water supply	6.81%	200.90	6.33%	224.14	6.17%	236.86
Construction	1.56%	46.07	1.49%	52.87	1.00%	38.28
Sale and repair of motor vehicles and fuels	3.31%	97.63	3.56%	125.82	3.40%	130.41
Maintenance services	2.53%	369.78	6.88%	597.39	20.20%	775.42
Restaurants and Hotels	7.40%	218.51	6.17%	218.47	8.13%	312.15
Transport	2.75%	81.26	3.08%	108.92	2.71%	103.89
Post and telecommunications	4.63%	136.65	4.79%	169.40	3.89%	149.34
Insurance and Financial services	7.41%	218.57	0.16%	359.69	15.72%	603.47
Housing and real estate	8.91%	262.94	8.37%	296.12	6.64%	255.01
Business services	2.21%	65.26	1.44%	50.92	1.46%	56.01
Education	0.27%	7.95	0.45%	16.10	0.20%	7.72
Health and social work	3.29%	97.12	2.53%	89.39	2.48%	95.13
Community, recreation and personal services	9.58%	282.82	7.78%	275.18	7.66%	294.14
Consumption basket valued in 1995 prices (£)		**2,951.64**		**3,539.10**		**3,839.12**
Spain	**1995**		**2000**		**2005**	
	%	**€**	**%**	**€**	**%**	**€**

Agriculture and fishing	5.80%	305.90	5.38%	304.30	4,76%	280,86
Mining and quarrying	0.06%	3.04	0.04%	2.22	0,06%	3,28
Food, beverages and tobacco	5.15%	798.71	2.58%	711.46	13,05%	769,90
Clothing, textiles and footwear	4.35%	229.31	3.42%	193.41	1,87%	110,44
Chemicals and intermediate products	6.16%	324.85	6.98%	394.80	7,53%	444,44
Machinery and electrical equipment	4.79%	252.78	4.34%	245.39	3,42%	201,93
Furnishing, accesories and recycling	3.10%	163.26	1.98%	111.99	1,58%	93,03
Electricity, gas and water supply	3.86%	203.38	4.49%	254.14	4,67%	275,59
Construction	1.78%	93.78	2.23%	126.05	2,43%	143,08
Sale and repair of motor vehicles and fuels	2.15%	113.61	2.67%	151.19	3,14%	185,05
Maintenance services	1.48%	605.22	8.78%	496.27	7,86%	463,85
Restaurants and Hotels	7.85%	941.17	7.32%	979.40	16,96%	1.000,54
Transport	3.81%	201.07	4.80%	271.48	4,34%	255,88
Post and telecommunications	2.62%	138.39	3.79%	214.56	4,41%	260,35
Insurance and Financial services	1.60%	84.47	5.76%	325.95	6,77%	399,28
Housing and real estate	0.79%	41.87	0.89%	50.07	0,87%	51,44
Business services	1.86%	98.05	1.66%	93.63	2,39%	141,20
Education	0.73%	38.58	1.04%	58.77	0,73%	43,14
Health and social work	3.94%	208.01	4.21%	238.05	4,92%	290,14
Community, recreation and personal services	8.12%	428.20	7.64%	431.81	8,25%	486,58
Consumption basket valued in 1995 prices (€)		**5,273.65**		**5,654.94**		**5,899.99**

Source: Authors' calculation.

The monetary values referenced to 1995 show a positive trend during the period of time considered. Such development is consistent with the ageing process that is taking place in both countries. As a result of the demographic change described in the introduction, the number of pensioners in the UK rose by 4.92% from 1995 to 2000 and by 4.23% from 2000 to 2005, whilst the increase for the same five-year periods in Spain was 10.38% and 3.07%. Consequently, as it will be shown in next Table 4, the production and the employment associated to the consumption of the elderly also expanded at a similar pace.

Having calculated OAPs' and workers' consumption, we next estimated the total amount of labour required to produce the pensioners' consumption basket, as given by equation (4). The results are shown in Table 4, where X^P accounts for the direct and indirect output in prices of 1995 that is related to the consumption of the pensioners and the workers producing the goods and services acquired by these OAP, following equations (2) and (3), whilst L stands for the employment associated to those values of X^P according to equation (4).

TABLE 4: Total output in prices of 1995 and labour input associated to OAP and workers' consumption

UK	1995		2000		2005	
	X^p £ million	L	X^p £ million	L	X^p £ million	L
Agriculture and fishing	3,237.40	47,155	3,878.82	74,858	3,819.74	67,116
Mining and quarrying	1,537.63	3,658	1,530.82	1,726	1,200.55	846
Food, beverages and tobacco	7,603.79	153,521	9,501.50	166,326	8,495.78	110,375
Clothing, textiles and footwear	1,544.15	27,779	1,408.62	24,280	527.18	7,250
Chemicals and intermediate products	10,447.73	147,835	12,854.82	167,716	11,011.35	124,914
Machinery and electrical equipment	4,240.63	63,305	5,470.82	66,151	5,292.93	62,228
Furnishing, accesories and recycling	950.46	17,389	1,391.98	25,661	1,309.30	19,638
Electricity, gas and water supply	5,571.44	48,160	8,041.58	53,966	8,097.81	45,671
Construction	2,658.76	36,681	3,497.78	45,343	3,102.49	32,533
Sale and repair of motor vehicles and fuels	2,761.39	78,509	4,414.53	101,591	5,874.74	94,460
Maintenance services	12,020.99	315,339	19,345.28	500,178	23,937.08	571,704
Restaurants and Hotels	5,800.28	176,321	8,052.17	194,619	10,148.95	254,433
Transport	5,452.01	71,178	9,264.86	86,960	9,656.17	83,246
Post and telecommunications	4,248.72	118,791	8,747.12	109,826	9,792.97	89,075
Insurance and Financial services	8,357.54	146,261	14,289.65	233,971	20,133.23	324,011
Housing and real estate	4,568.25	288,126	5,865.97	359,670	5,686.01	318,890
Business services	6,131.80	34,621	11,363.57	29,066	13,792.00	30,323
Education	1,081.66	8,924	1,976.17	20,689	1,783.82	11,095
Health and social work	2,196.47	87,723	2,575.68	89,184	3,619.15	84,594
Community, recreation and personal services	6,083.91	226,117	8,162.46	231,605	9,123.00	267,735
Total	**96,495.02**	**2.097,393**	**141,634.19**	**2.583,385**	**156,404.26**	**2.600,136**

Spain	1995		2000		2005	
	X^p € million	L	X^p € million	L	X^p € million	L
Agriculture and fishing	5,145.72	93,915	5,056.54	78,028	4,168.37	77,603
Mining and quarrying	317.95	559	179.72	382	182.13	578
Food, beverages and tobacco	9,219.00	188,460	8,350.12	150,050	8,918.92	162,957
Clothing, textiles and footwear	2,542.89	56,477	2,115.71	46,053	1,322.80	26,163
Chemicals and intermediate products	7,783.43	51,536	8,281.24	57,107	8,638.76	66,385
Machinery and electrical equipment	3,478.66	39,710	3,349.24	33,464	3,430.83	28,702
Furnishing, accesories and recycling	1,364.57	38,833	1,222.70	24,607	1,181.37	20,554
Electricity, gas and water supply	2,868.52	19,503	3,655.85	19,130	4,442.52	20,062
Construction	1,762.33	24,725	1,955.85	34,071	2,615.34	40,593
Sale and repair of motor vehicles and fuels	2,016.75	23,093	2,237.51	31,202	2,459.11	37,307
Maintenance services	8,075.83	172,172	7,432.86	142,928	7,985.50	131,378
Restaurants and Hotels	8,979.96	204,302	8,878.68	216,558	9,084.29	244,348
Transport	4,439.34	38,549	4,754.77	49,008	4,783.18	54,294
Post and telecommunications	1,610.63	20,896	2,991.51	26,564	4,028.31	29,139
Insurance and Financial services	3,132.44	12,961	4,120.61	46,904	5,378.86	45,449
Housing and real estate	467.07	9,426	503.01	15,516	532.90	20,280
Business services	3,038.72	22,509	3,286.81	21,292	3,778.28	35,348
Education	835.35	10,266	1,063.19	15,790	1,025.83	11,711
Health and social work	1,697.41	50,046	2,002.32	58,675	2,383.00	75,353
Community, recreation and personal services	4,199.67	138,593	4,299.46	133,266	4,886.36	151,294
Total	**72,976.24**	**1.216,532**	**75,737.68**	**1.200,595**	**81,226.65**	**1.279,499**

Source: Authors' calculation.

Next, a shift-share analysis is performed to explain changes in the vector of total labour requirements. Table 5 present the results in accordance with equations (20) and (21), which figures show the causes of the variation in the employment required to produce the consumer goods demanded by OAPs.

TABLE 5: Change in the rate of labour input associated to OAP and workers' consumption

UK	1995-2000				2000-2005			
	g_v	g_c	g_R	g_L	g_v	g_c	g_R	g_L
Agriculture and fishing	1,72%	48,75%	4,92%	58,75%	-10,60%	-3,78%	4,23%	-10,34%
Mining and quarrying	-23,34%	-41,33%	4,92%	-52,81%	-9,06%	-48,29%	4,23%	-50,98%
Food, beverages and tobacco	-6,24%	10,13%	4,92%	8,34%	-13,52%	-26,38%	4,23%	-33,64%
Clothing, textiles and footwear	3,73%	-19,69%	4,92%	-12,59%	-18,02%	-65,05%	4,23%	-70,14%
Chemicals and intermediate products	0,47%	7,62%	4,92%	13,45%	-13,41%	-17,48%	4,23%	-25,52%
Machinery and electrical equipment	-6,89%	6,97%	4,92%	4,50%	-11,56%	2,05%	4,23%	-5,93%
Furnishing, accesories and recycling	0,40%	40,09%	4,92%	47,57%	-14,14%	-14,49%	4,23%	-23,47%
Electricity, gas and water supply	-4,27%	11,57%	4,92%	12,06%	-23,17%	5,67%	4,23%	-15,37%
Construction	2,66%	14,77%	4,92%	23,61%	-4,92%	-27,60%	4,23%	-28,25%
Sale and repair of motor vehicles and fuels	-4,30%	28,87%	4,92%	29,40%	-13,93%	3,65%	4,23%	-7,02%
Maintenance services	-6,42%	61,56%	4,92%	58,62%	-15,52%	29,80%	4,23%	14,30%
Restaurants and Hotels	5,22%	-0,02%	4,92%	10,38%	-12,21%	42,88%	4,23%	30,73%
Transport	-13,13%	34,04%	4,92%	22,17%	-3,71%	-4,62%	4,23%	-4,27%
Post and telecommunications	-28,92%	23,97%	4,92%	-7,55%	-11,73%	-11,84%	4,23%	-18,89%
Insurance and Financial services	-7,35%	64,57%	4,92%	59,97%	-20,81%	67,78%	4,23%	38,48%
Housing and real estate	5,65%	12,62%	4,92%	24,83%	-1,23%	-13,88%	4,23%	-11,34%
Business services	2,56%	-21,98%	4,92%	-16,05%	-9,01%	10,00%	4,23%	4,33%
Education	9,09%	102,56%	4,92%	131,83%	7,23%	-52,02%	4,23%	-46,37%
Health and social work	5,28%	-7,96%	4,92%	1,66%	-14,49%	6,43%	4,23%	-5,15%
Community, recreation and personal services	0,34%	-2,70%	4,92%	2,43%	3,76%	6,89%	4,23%	15,60%
Total (Average)	**-2,09%**	**19,90%**	**4,92%**	**23,17%**	**-10,98%**	**8,48%**	**4,23%**	**0,65%**

Spain	1995-2000				2000-2005			
	g_v	g_c	g_R	g_L	g_v	g_c	g_R	g_L
Agriculture and fishing	-24,34%	-0,52%	10,38%	-16,92%	4,55%	-7,70%	3,07%	-0,54%
Mining and quarrying	-15,16%	-27,06%	10,38%	-31,68%	-0,70%	47,68%	3,07%	51,14%
Food, beverages and tobacco	-19,03%	-10,92%	10,38%	-20,38%	-2,63%	8,21%	3,07%	8,60%
Clothing, textiles and footwear	-12,41%	-15,66%	10,38%	-18,46%	-3,47%	-42,90%	3,07%	-43,19%
Chemicals and intermediate products	-17,40%	21,53%	10,38%	10,81%	0,19%	12,57%	3,07%	16,25%
Machinery and electrical equipment	-21,36%	-2,92%	10,38%	-15,73%	1,13%	-17,71%	3,07%	-14,23%
Furnishing, accesories and recycling	-16,31%	-31,41%	10,38%	-36,64%	-2,44%	-16,93%	3,07%	-16,47%
Electricity, gas and water supply	-28,89%	24,96%	10,38%	-1,91%	-6,17%	8,44%	3,07%	4,88%
Construction	-7,12%	34,41%	10,38%	37,80%	1,84%	13,51%	3,07%	19,14%
Sale and repair of motor vehicles and fuels	-8,02%	33,08%	10,38%	35,11%	-5,22%	22,40%	3,07%	19,56%
Maintenance services	-8,29%	-18,00%	10,38%	-16,99%	-4,58%	-6,53%	3,07%	-8,08%
Restaurants and Hotels	-7,72%	4,06%	10,38%	6,00%	7,16%	2,16%	3,07%	12,83%
Transport	-14,70%	35,02%	10,38%	27,13%	14,04%	-5,75%	3,07%	10,78%
Post and telecommunications	-25,72%	55,04%	10,38%	27,12%	-12,29%	21,34%	3,07%	9,70%
Insurance and Financial services	-15,04%	285,89%	10,38%	261,88%	-23,25%	22,50%	3,07%	-3,10%
Housing and real estate	24,71%	19,58%	10,38%	64,61%	23,44%	2,73%	3,07%	30,70%
Business services	-10,26%	-4,51%	10,38%	-5,41%	6,81%	50,80%	3,07%	66,02%
Education	-8,54%	52,36%	10,38%	53,81%	-1,96%	-26,60%	3,07%	-25,83%
Health and social work	-7,19%	14,44%	10,38%	17,24%	2,23%	21,88%	3,07%	28,42%
Community, recreation and personal services	-13,62%	0,84%	10,38%	-3,84%	-2,25%	12,68%	3,07%	13,53%
Total (Average)	**-16,62%**	**7,23%**	**10,38%**	**-1,31%**	**-0,89%**	**4,33%**	**3,07%**	**6,57%**

Notes g_v, g_c and g_L are the growth rate of, respectively, the vector of vertically integrated labour coefficients, the OAPs consumption and the number of pensioners.

Source: Authors' calculation.

In the first period of time, the most remarkable aspect to be considered is the significant growth in employment observed for the UK. The raise of 19.90% in the OAP consumption leads to a spectacular increase of 23.17% in the total employment needed for the production of these good and services purchased by the pensioners between 1995 and 2000. However, the Spanish economy shows a decrease of 1.31% in the total employment related to OAPs' consumption. The substantial increase in the number of pensioners (g_R=10.38%) fuels the expansion of the expenditure in consumption, although it is not enough to compensate the growth in productivity for all sectors, except the activities related to housing and real estate.

In the last period considered, the combined effect of increasing consumption and the number of pensioners offsets the figures of productivity for Spain in most of the sectors considered, providing a 6.57% of improvement in the total number of jobs. However, the British economy shows a marginal growth of 0.65% in the employment during the same period of time, which is basically based on a large increase in productivity for all sectors except Education and Community, recreation and personal services.

Finally, Table 6 presents the simulation results of the scenarios described in the previous section.

Scenario 1 provides a result of 1,520,807 employed for Spain producing for OAPs' consumption (18.86% more than in 2005) and 2,927,969 for the UK (12.61% more than in 2005), assuming no changes in the composition and monetary values of the consumer basket or in the coverage rate for 2005. The number of OAP changes according to the population projections of Eurostat for the UK and Spain and the variation of the sectoral productivity follows the pattern of change from 1995 to 2005.

Scenario 2 gives a result of 1,672,888 employed for Spain (30.75% more than in 2005) and 3.220,766 for the UK (23.87% more than in 2005), simulating a situation where in addition to the change in productivity and the number of OAP, the average pension increases by 10%, but the composition of the consumption basket and the coverage rate remains unchanged.

Scenario 3 shows a result of 1,657,479 employed for Spain (29.54% more than in 2005) and 3.188,813 for the UK (22.64% more than in 2005). These values are obtained by applying the figures of productivity, number of OAPs, average pension and coverage rate related to previous Scenario 2, but modifying the pattern of consumption according to the growth rates obtained during the observation period. This combination allows us to consider the relevance of the deviation in consumption due to the pensioners' behaviour. Indeed, Figure 2 provides a measurement of such modification, and illustrates the changes in the shares of items in the basket of consumption due exclusively to the new expenditure pattern that retirees are expected to occur in 2030.

FIGURE 2: Changes in the OAPs' consumption basket due to the expected expenditure pattern in 2030
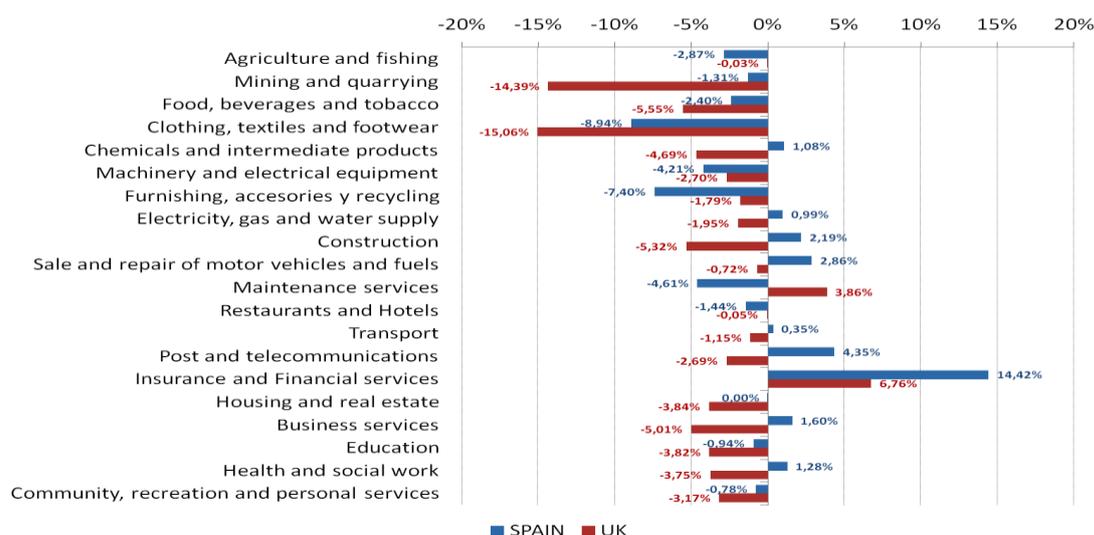
Source: Authors' elaboration from Households Budget Survey (Eurostat).

Scenario 4 shows the most radical change in this simulation exercise. That is to say: (i) The productivity and the pattern of consumption varies according to the trend observed from 1995 to 2005 for both countries, (ii) the number of OAPs follows the population projections of Eurostat for the UK and Spain, and (iii) the coverage rate and the average pension increase by 10%. After considering these hypotheses, the final number of workers points to 3,507,694 for the UK (34.90% more than in 2005) and 1,823,227 for Spain (42.50% more than in 2005).

TABLE 6: Employment projections for 2030 associated with OAPs and workers' consumption

UK	L_{2005}	L_{2030}			
		Scen 1	Scen 2	Scen 3	Scen 4
Agriculture and fishing	67,116	82,084	90,293	90,267	99,294
Mining and quarrying	846	533	586	502	552
Food, beverages and tobacco	110,375	101,353	111,488	105,299	115,829
Clothing, textiles and footwear	7,250	7,497	8,247	7,005	7,706
Chemicals and intermediate products	124,914	136,753	150,429	143,379	157,717
Machinery and electrical equipment	62,228	59,369	65,306	63,543	69,898
Furnishing, accesories and recycling	19,638	21,014	23,115	22,701	24,971
Electricity, gas and water supply	45,671	32,862	36,148	35,444	38,989
Construction	32,533	47,490	52,239	49,460	54,406
Sale and repair of motor vehicles and fuels	94,460	90,201	99,222	98,511	108,362
Maintenance services	571,704	492,698	541,968	562,912	619,203
Restaurants and Hotels	254,433	323,565	355,921	355,754	391,329
Transport	83,246	82,623	90,886	89,840	98,824
Post and telecommunications	89,075	43,073	47,380	46,106	50,716
Insurance and Financial services	324,011	231,683	254,851	272,082	299,291
Housing and real estate	318,890	550,112	605,123	581,863	640,050
Business services	30,323	39,562	43,518	41,337	45,470
Education	11,095	25,461	28,007	26,936	29,630
Health and social work	84,594	100,870	110,957	106,798	117,478
Community, recreation and personal services	267,735	459,166	505,083	489,073	537,980
Total (Average)	**2.600,136**	**2.927,969**	**3.220,766**	**3.188,813**	**3.507,694**

Spain	L_{2005}	L_{2030}			
		Scen 1	Scen 2	Scen 3	Scen 4
Agriculture and fishing	77,603	68,187	75.006	72.853	80.138
Mining and quarrying	578	594	654	645	710
Food, beverages and tobacco	162,957	142,018	156.220	152.476	167.724
Clothing, textiles and footwear	26,163	27,147	29.862	27.192	29.911
Chemicals and intermediate products	66,385	65,294	71.823	72.600	79.860
Machinery and electrical equipment	28,702	25,561	28.117	26.933	29.626
Furnishing, accesories and recycling	20,554	19,545	21.500	19.910	21.901
Electricity, gas and water supply	20,062	11,519	12.671	12.796	14.076
Construction	40,593	55,755	61.330	62.674	68.941
Sale and repair of motor vehicles and fuels	37,307	41,791	45.970	47.285	52.014
Maintenance services	131,378	148,596	163.456	155.922	171.514
Restaurants and Hotels	244,348	375,139	412.653	406.726	447.399
Transport	54,294	80,015	88.016	88.327	97.159
Post and telecommunications	29,139	15,763	17.340	18.095	19.904
Insurance and Financial services	45,449	24,633	27.097	31.005	34.106
Housing and real estate	20,280	94,152	103.567	103.566	113.922
Business services	35,348	50,197	55.217	56.101	61.711
Education	11,711	14,075	15.482	15.337	16.871
Health and social work	75,353	104,328	114.761	116.227	127.849
Community, recreation and personal services	151,294	156,497	172.147	170.809	187.890
Total (Average)	**1.279,499**	**1.520,807**	**1.672.888**	**1.657.479**	**1.823.227**

Source: Authors' calculation.

5. CONCLUSIONS

According to the demographic projections for 2050, the population aged above 64 will reach 67% of the working population in Spain and 40% in the UK. Consequently, the expenditure in pensions is expected to increase considerably, and, at the same time, the economic activity related to the pensioners' demand is likely to expand at a similar pace. Hence, measuring the consumption of the OAPs becomes relevant in order to assess its impact on employment not only at the present time, but also in the near future. Thus, this research estimates the labour input required to produce the consumption needs of the retirees and does so by means of several hypothetical scenarios.

In 2030, the total amount of labour linked to OAPs' consumption expenditure is likely to reach roughly 3.2 million people in the UK and 1.7 million in Spain, according to the different assumptions taken into account in our research. These results depend on the generosity and eligibility of the pension system. We find particularly notable the increase observed in housing and real estate for Spain as well as in education for the UK. These results represent an increase of approximately 24% to 35% for the UK and 31% to 42% for Spain in the total number of jobs related to the OAP consumption from 2005 to 2030, but also allow us to estimate for these 25 years an additional growth of 1.12% in the UK and 1.18% in Spain for each percentage point higher in the average pension or the coverage rate.

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