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**Conference Paper**

## Age discrimination on wages as a determinant of older workers - labour participation in Spain

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# **Age discrimination on wages as a determinant of older workers' labour participation in Spain**

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## **Abstract:**

Spain, like the whole European Union (EU), is suffering a dramatic ageing process, while older workers (55-64 years) have high inactivity rates. In this sense, the promotion of active ageing will be necessary to guarantee the financial sustainability of pension systems as well as general macroeconomic performance. In order to achieve this purpose, it is essential to give attention to the determinants which favour older workers' participation in the labour market. In this study we focus on age discrimination in employment as one of those factors that can affect negatively older workers' labour participation. In the current literature, age discrimination in hiring or discharge has received most attention. We analyze the role which age discrimination on wages could play. The idea is that a wage below the expected discourages labour participation and may be a decisive element in choosing early retirement when combined with overly generous retirement programs. To achieve these results, the methodology of Oaxaca (1973) is applied based on data from the Spanish Structure of Earnings Survey (SES) for the years 2002 and 1995. The figures obtained show that wage discrimination towards older workers was significant in 1995 and declined in 2002. As the Oaxaca's methodology presents some problems, we propose a distributional analysis of wage discrimination by age, applying the Del Río *et al.* methodology. The results confirmed the trend outlined by the first methodology.

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# 1 Introduction

Spain, like the whole European Union (EU), is suffering a dramatic ageing process, while older workers (55-64 years) have high inactivity rates. Both events could become a serious problem for growth in medium and long term endangering the financial sustainability of pension systems. Faced with this problem, the EU has started several measures to promote active ageing (Stockholm and Barcelona employment targets<sup>1</sup>) aiming to increase elderly workers participation in the labour market.

To understand the origins of the current situation which are living the Spanish older workers, we must go a few decades back ago. According to Conde-Ruiz and García (2004), the labour participation of older males (55-64 years) in Spain, experienced a sharp decline from 84.2% to 60.3% between 1970 and 2000<sup>2</sup>. Furthermore, between 1960 and 1990 the average retirement age dropped by 9.1 years while life expectancy increased 7.5 years between 1960 and 1999. The reduction in retirement age (specially stimulated by early retirement schemes) together with the delay in entering the labour market by young people (due to the greater length of their formative stage), led to shorter periods of activity in the labour market. This trend of *living longer, but working for less time* during the second half of the twentieth century in Spain was not unconnected with the other OECD countries and could lead to very negative effects on the financial sustainability of pension system<sup>3</sup>.

Since the introduction of the Stockholm and Barcelona targets there has been some improvements. The employment rate of older workers has increased from 39.2% to 44.6% between 2001 and 2007 in Spain. However, we need to clarify three points. On one hand, while the advance in Spain was of a bit more than five points, in the whole EU-15 the advance was of eight points for the same years (from 38.8% to 46.6%). These positive developments at the global level hide a very uneven sex

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<sup>1</sup> The Stockholm goal (2001) pretends to raise the employment rate for people between 55 and 64 years to 50% by 2010. The Barcelona target (2002) aims to increase in five years the effective average age at which Europeans leave the labour market. Both targets are complementary and reflect the promotion of active ageing.

<sup>2</sup> In the same year (2000), older workers' participation rate was of 40.9%, while that of older women was only 22.7% (Eurostat).

<sup>3</sup> According to current estimates from Eurostat, the dependency ratio of older people in the EU (the ratio between the number of individuals older than 65 years and the number of individuals aged between 15 and 64 years) will be multiplied by more than two in the horizon 2004-2050. Spain will be, followed by Italy, the country with the highest dependency ratio (67.5% in 2050) despite the strong population growth from 40.5 million to 44.4 million occurred in the period 2000-2006 (due to the massive influx of immigrants most of them in central ages).

distribution in the work of over 55 years. During the 2001-2007 period, the difference in employment rate among older men and women remained above 30% and is currently one of the biggest in the EU-25. Finally, it is unlikely to achieve the EU target of an employment rate of 50% for workers between 55 and 64 years by 2010.

In relation to the Barcelona target, the average age of retirement in Spain has increased by almost two points since 2001, reaching 62 years in 2006. In this case, the evolution is slightly better than that of the whole EU-15 and there are hardly differences between men and women. There is even a small difference in favour of the latter, implying that there are few women over 55 years working, but in terms of leaving the labour market they do follow similar patterns of behaviour to men.

As the European Commission warns (COM, 2004), elderly low employment levels are a waste of individual life chances and social potential. As life expectancy grows and the population boom generation approaches the age between 55 and 64, this loss will become increasingly unsustainable. Due to the continued increase in longevity, people have more opportunities to develop their potential during a longer life. However, if they do not have enough opportunities to participate in employment, their living conditions will not reach its full potential. For the whole economy, increasing participation and employment rates of older people are crucial to fully exploit the labour supply and support economic growth, tax and benefits regimes and social protection systems.

In this context, the objective of this paper is to analyze the determinants of the low labour force participation of elderly workers in Spain. We focus on a factor that has received little attention in the current economic literature. This factor is the possible existence of age discrimination in employment. Our ultimate goal will be the study of age discrimination on wages.

## 2 Determinants of older workers' labour participation in Spain

From our point of view, the key question of the matter is: why do older workers despite having significantly increased their life expectancy remain active for less time? This fact is especially surprising taking into account that nowadays the older workers' age group is "younger" than the same age group a few decades ago from a biological point of view. As we have seen, especially older women are affected by this situation.

Their activity rates are half than those of older men. In the following section we mention some of the determinants of older workers' labour participation.

## 2.1 Appropriate financial incentives

Economic theory shows us how individuals take into account the flow of current and future income, in a rational attitude for choosing the optimal age of retirement and maximizing their welfare (Hamermesh, 1984). This means that the pension legislation plays a significant role in the decisions for retiring (Gutiérrez-Domènech, 2006) which, among other things, determines the value of retirement benefits, but not only that. To explain the high inactivity rates in elderly' people, the unemployment and disability benefits may also be very relevant. The key question is to make the labour market profitable for older workers.

Gruber and Wise (2001 and 2003) and Blöndal and Scarpetta (2003) have shown how the sharp decline in the labour force participation of workers older than 55 can be explained by the adoption of generous early retirement schemes. Therefore, one of the phenomena that are threatening the financial sustainability of social security systems, is the optimal response of workers to the introduction of pension programs that encourages early retirement and make retirement economically profitable or satisfactory. It is noted that the number of individuals who leave the labour market at younger age is greater in countries with a pension system that encourages early retirement. The authors show that the Spanish pension system, gave intensively incentives for early retirement. Similar conclusions are pointed out in other studies as the report by the former Labour Department (MTAS, Colección Informes OCDE, 2004).

## 2.2 Good health and safety conditions at work

According to the European Commission report of 2004 (COM, 2004), the second most important reason (after retirement) why older workers leave their job is long-term illness or disability. The report emphasizes the importance of understanding workers' health problems increase with age and that if we want to encourage retention and re-attract older people to the job market, we must offer them attractive occupational

and safety conditions. This would also help to avoid unwanted loss in labour productivity as a result of an increase in the number of working days lost (COM, 2004).

## 2.3 Flexible forms of work organization

Layoffs or cuts are another important cause of low labour force participation of older workers. Especially in periods of crisis, the elderly are most at risk of losing their jobs. There are several ways to deal with this problem. These include greater flexibility in labour relations, effective labour market policies and continuing access to training or learning.

In relation to the flexibilization of the labour market, within the life cycle strategy, there are various ways to promote transitions between different ages, both in young people getting their first job and in retirees reducing their hours of work, making the retirement process gradual instead of a timely event. In this context, we could consider the following three options: part-time work, reduction of working hours or self-employment (there are also other more specific methods such as home working).

## 2.4 Continuing access to training

Experience tells us that job retention and employment levels of older workers are strongly correlated with the level of training they receive and their initial educational attainment level. There is also a strong positive correlation between the educational attainment level and the quality of employment in terms of pay and working conditions (COM, 2004). Furthermore, there are several studies showing that the productivity potential of older workers does not decrease with age, but by the skills obsolescence suffered by these workers and the way to solve this is by developing an adequate policy of lifelong learning (Ok, W. and P. Tergeist, 2003).

## 2.5 Effective labour market policies

As it happened during the crisis of the seventies and eighties, in the event of economic restructuring or reductions of work, older workers are the most exposed to the risk of losing their jobs. As the European Commission exposes, labour market policies

should seek to anticipate changes and thereafter manage the best possible economic restructuring (COM, 2004), through personalised approaches to meet individual needs, including through guidance services, specific training and outplacement systems<sup>4</sup>.

### 3 Age discrimination in employment

Employment discrimination is complex and often difficult to identify, but there are attitudes and actions that can be clearly labelled as discriminatory. In this section we go briefly over some short-sighted solutions which our employer's belief in that clearly discriminate older worker, encouraging early retirement schemes. These beliefs, mostly unjustified from the standpoint of economic efficiency, can be summarized into three groups:

1. The first one is the fallacy of the fixed amount of work. For a long time, it has been argued in Spain that it is necessary to remove older workers from the labour market for filling their vacancies by younger workers seeking to enter into the market. Empirical reality shows the opposite. Firstly, because economic growth creates new jobs for all. Secondly, at least at European level there is no empirical evidence that younger and older workers are substitutes. The exits of older workers and inflows of younger workers do not occur in the same sectors (COM, 2004). Finally, the increase in employment rate of elderly grows normally in parallel with the employment rate of younger workers (see COM, 2004).

2. Another justification for early retirement is cost savings. On one hand this argument is totally myopic since it is "short-term gain, long term pain". Early retirement entails loss of human capital, in learning from mistakes, in decision-making capacity, in resolution capacity in difficult moments and in accumulation and transmission of knowledge. Early retirement also leads to increases in training costs, creating uncertainty among workers and discourages investment in training, both, by employees and employers due to the shorter investment recovery time. It represents a breakdown in workers' loyalty, and could even lead to a negative image towards customers.

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<sup>4</sup> Experience shows that active labour market policies to combat unemployment are much more efficient than passive policies. Anyway, this fact is not a strong enough reason for authorities to invest in active labour market policies. It would be very interesting to conduct a rigorous study on the objectives achieved so far with these policies and to check how efficient they have been. Making social policy is not an end in itself but a tool for a purpose that is beneficial to the whole society.



In relation to cost savings philosophy, two problems. Firstly, pay systems based on seniority are bad for older workers (they incentivize specific and not general human capital accumulation, which enables finding a new job when becoming unemployed or retired). Secondly, make the employment protection legislation more neutral. Currently this protects more the workplaces than the workers (e.g., redundancy payments are set according to seniority on the job).

3. Prejudice about the lack of flexibility or adaptability in older workers is also a problem, especially in relation to new information and communication technologies, or the lack of innovative capacity. Actually, what happens is that some of these workers often do not have the opportunity, nor the incentives to train as we have earlier discussed.

At a regular basis, job advertisements target a very specific age population. For example, offerings for youth 23 to 27 years in various companies in the banking sector, etc. These facts could be analyzed even from the perspective of a occupational discrimination.

Finally, it is clear that a wage which is lower than the expected discourages the participation of workers and may be the decisive element in early retirement of elderly workers when combined with overly generous retirement programs. We will consider this possibility in detail. Firstly, we will show the characteristics of older workers in Spain and then, we will present a model to analyze discrimination in older workers' wages.

## 4 Older workers' characteristics in Spain

In this section we realize a descriptive analysis of older workers' characteristics. We therefore use the Structure of Earnings Survey (SES) of 2002, which is the main database used in this study. We are especially interested in those features that may justify a wage gap. In this sense, we will subsequently discuss a number of personal characteristics of older workers and others connected with the supply and demand in the labour market, which can influence their wages. These features will be used in the study of wage discrimination. The idea is to compare older workers' situation with a reference group which we will call the middle-aged workers (25-54 years) and to which we will refer later.

Regarding personal characteristics, if we look at Table 1, we see how from the three analyzed groups (elderly, central age and younger workers), on average, older workers are those with fewer years of formal education, in contrast with more years of previous experience and seniority in the current job. When regarding years of formal education, we know that according to human capital theory, they have a great influence on salaries. That the Spanish elderly, despite being older, are less educated is probably due to a generational and cultural backwardness problem consequence of Franco's stage. With respect to seniority, older workers nearly double the central ones. Finally, differences in previous experience (potential experience) are, in relative terms, even more pronounced. In this case, older workers have a previous experience that is more than the double of that of workers aged between 25-54 years. However, this variable can provide a zero or even negative effect on the wage level. The reason is that a very high previous experience can be associated with a higher rotation or instability in the labour market.

**Table 1: Average years of formal education, previous experience and seniority by age groups (2002)**

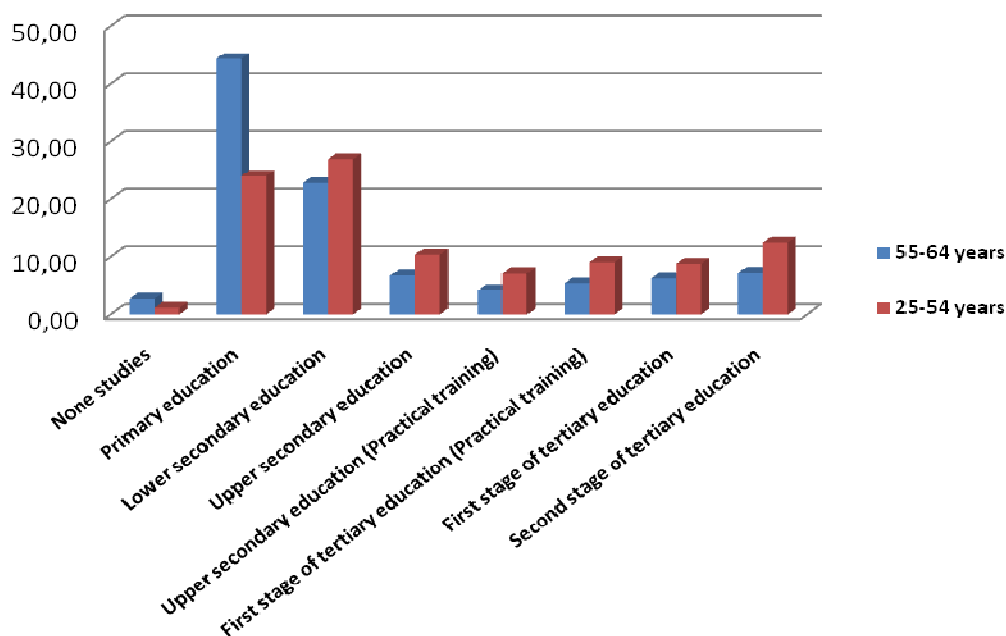
	55-64 years	25-54 years	16-24 years
Average years of formal education	8,7	10,09	9,18
Average years of previous experience	25,14	14	5,86
Average years of seniority	18,27	7,58	0,91
Source: SES, 2002			

Graph 1 shows the distribution of older and middle aged workers according to their education. This data confirms that elderly present on average lower levels of education when compared to workers aged between 25 and 54. Almost 45% of older workers have only completed stages of primary education, figure that drops to less than 25% in the middle-aged group. Moreover, this second group almost doubles the higher age one when referring to above graduate education.

Concerning workplace characteristics, this study focuses on variable occupation in both groups. As shown in Figure 2, workers aged between 55 and 64 tend to have higher percentages in management and operators' positions, as well as in skilled and unskilled duties.

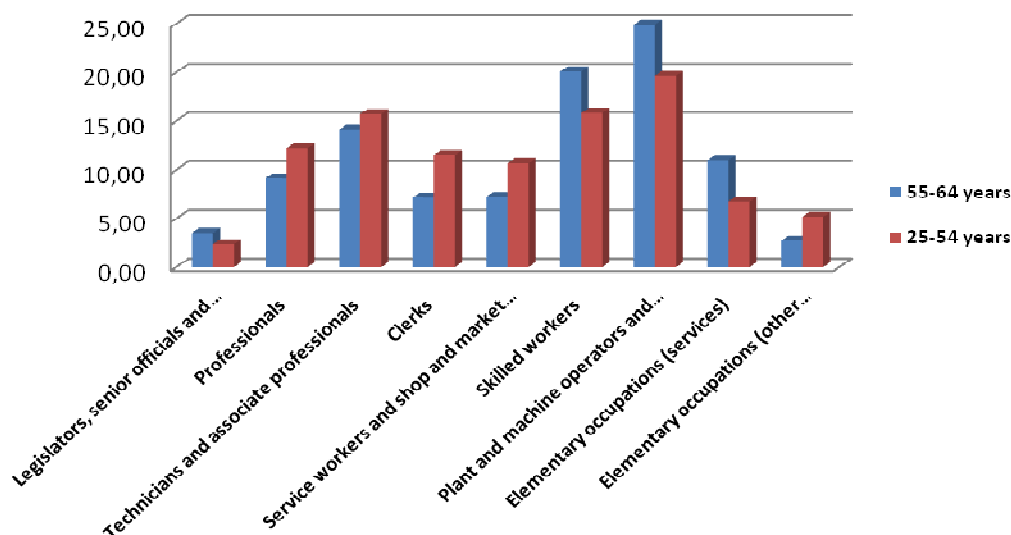
Not surprisingly, workers of the younger group excel in those jobs that require a university degree, as in technical positions, administrative jobs, but also in those of labourers, due to their physical condition.

**Graph 1: Older workers' (55-64 years) and middle aged workers' (25-54 years) distribution according to their education (Spain, 2002)**



Source: SES, 2002

**Graph 2: Older workers' (55-64 years) and middle-aged workers' (25-54 years) distribution according to their occupation (Spain, 2002)**



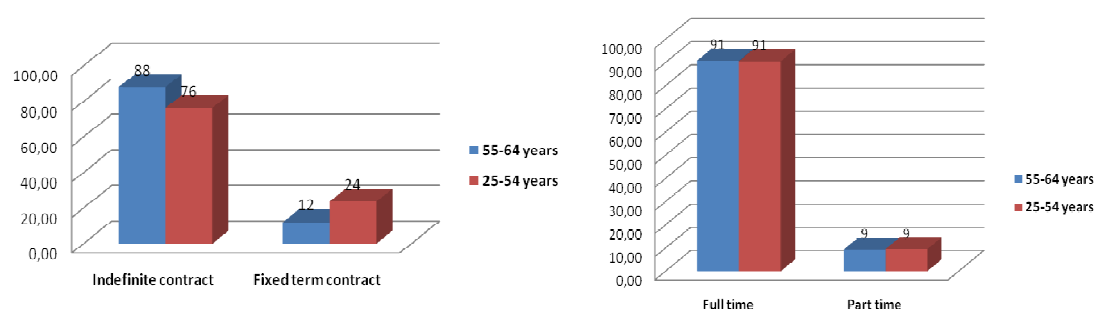
Source: SES, 2002

When analysing contract type and working hours (figure 3), the only difference between both age groups is that older workers have a somewhat higher percentage as

fixed-term workers. However, both groups match-up on the percentage of part-time workers. As mentioned in section 2.3, the actual forms of organization do not encourage participation or retention of older workers within the active labour market. At this point, it is important to note that positions occupied by each group are very different when based on their life cycle, principle that also applies to their needs.

Finally, Table 2 illustrates the distribution of both age groups in relation to geographical agreement type and company size, leading to no significant differences between them.

**Graph 3: Older workers' (55-64 years) and middle-aged workers' (25-54 years) distribution according to their contract type and working hours (Spain, 2002)**



Source: SES, 2002

**Table 2: Older workers' (55-64 years) and middle-aged workers' (25-54 years) distribution by agreement type and firm size (Spain, 2002)**

	Type of agreement		
	National agreement	Regional agreement	Firm agreement
55-64 years	70,22	27,25	2,53
25-54 years	77,12	20,01	2,87
	Firm size		
	Between 10 and 49 employees	Between 50 and 99 employees	More than 100 employees
55-64 years	34,57	24,87	40,56
25-54 years	36,02	26,48	37,50
Source: SES, 2002			

## 5 Wage discrimination in older workers

### 5.1 The classical approach: the Oaxaca-Blinder decomposition (1973)

From a theoretical point of view, wage discrimination exists when the observed differences in wages between two groups of workers are not related to productivity (Arrow, 1973). Sloane (1985) considers that this definition may exclude the possibility that equally productive workers could perceive lower wages due to differences in supply conditions. These pay gaps would have nothing to do with prejudices of the employers, but with their eagerness to maximize profits. He therefore defines discrimination as any form of unequal treatment between groups, which doesn't arise directly from cost minimization.

Assuming Arrow's definition of wage discrimination and on basis that age is not directly related to productivity (in contrast to experience and seniority), we will estimate wage discrimination by age groups using the decomposition of Oaxaca (1973) and Blinder (1973). The analysis of discrimination requires comparing these groups.

In this particular study, where the variable that defines each group is age, we will focus on the older workers' while the middle-aged group will be used as reference group. The goal is to analyze any differences between these categories.

In order to do this, we subdivide wage differential into two categories: while in one we will analyse the wage differential related to any difference in characteristics, the second one will explain the gap which can only be caused by favouritism or discrimination against older workers.

However, the chosen method does have some drawbacks. Just to name a few, we can point out that the most prominent literature on the subject shows some variations depending on chosen non-discriminatory wage structure<sup>5</sup>, as well as the different characteristics taken into account to estimate productivity<sup>6</sup>. Another problem is that we

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<sup>5</sup> As already mentioned, in our case, we have chosen the middle age workers' wage structure as the non-discriminatory reference. The justification for this choice comes from the fact that the middle age workers are the age group of "maximum performance" and which, a priori, is less likely to suffer discrimination (see Villosio et al., 2008).

<sup>6</sup> The main problem in the identification of wage discrimination is that workers' productivity is not directly observable. To estimate it we normally use observable characteristics of workers (those we saw in Section 4) which directly affect their productivity and earnings (for example, schooling years, educational level, experience, "seniority", "age", etc.), or affect the supply and demand conditions in the labour market and hence indirectly the productivity and wages (such as the occupation, contract type, economic sector, company size, public/private sector, agreement type, unionism, location, etc.).

are only considering *mean* older and middle-aged workers, respectively, for quantifying the discrimination and favouritism. Finally, we assume that discrimination and favouritism are distributed evenly along the wage line, without taking into account individual cases where some older age worker could be more or less discriminated than another.

Considering the statement by Del Rio, Gradín and Cantó (2006), which states that in whatever non-discriminatory remuneration structure of reference, the use of the mean wage distribution is a large waste of information. These would mean that the mean does not allow for differences in the discriminatory experience at different points of the wage distribution. Furthermore, and most importantly, it implies assuming that to give the same weight to each individual discrimination experience, is a desirable way of adding wage gaps, disregarding the actual degree of discrimination suffered by each individual (the following section analyzes the distributional approach to wage discrimination). Finally, the results depend crucially on group definition based on age as a variable. In this first approach we have chosen an arbitrary classification that could be improved with a deeper analysis of the evolution of activity rates by age<sup>7</sup>.

In the absence of discrimination, and following Becker's (1957) approach, the ratio of wages between both groups must be equal to the ratio of their respective products. Any exception of this rule implies an inefficient behaviour in remuneration (whether by favouritism or by discrimination). To estimate this inefficiency, we begin by estimating two separated *mincerian* log wage equations by ordinary least squares for the both age groups.

$$\ln w_i = Z_i' \hat{\beta} + u_i$$

where  $w_i$  the hourly wage for the  $i^{th}$  worker is,  $Z_i'$  stands for the vector of individual characteristics,  $\hat{\beta}$  are the return rate of the characteristics, and  $u_i$  is the corresponding error term. From Oaxaca (1973) we define the non-discriminatory wage structure of reference as:

$$\beta^o = \hat{\beta}_c$$

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<sup>7</sup> The choice of the groups is based on the study of Villosio et al. (2008).

where  $\hat{\beta}_c$  the prices of valuation of characteristics of central age group workers' are. We can then calculate the wage differential, basis of the analysis of wage discrimination, as:

$$\overline{\ln w_o} - \overline{\ln w_c} = (\overline{Z'_o} - \overline{Z'_c})\hat{\beta}_c + (\hat{\beta}_o - \hat{\beta}_c)\overline{Z'_o}$$

where the upper line indicates the average of the variable and the subscripts  $o$  and  $c$  stand for older and central age workers, respectively. In this equation, the average wage differential is obtained as the sum of the wage differential explained by the characteristics (first component) and the favouritism or discrimination toward the elderly, according to each case (second component)<sup>8</sup>.

Table 3 shows the results of the wage discrimination analysis according to the decomposition of Oaxaca for the years 1995 and 2002 in Spain<sup>9</sup>. It shows that the wage differential between workers aged 55-64 and those aged 25-54 (being favourable to elderly) rose slightly between 1995 and 2002. In fact, according to characteristics, the wage gap between elderly and middle-aged workers should be greater in both years (larger in 1995 than in 2002, see the third column). Moreover, when we apply the Oaxaca decomposition, we find that the unexplained percentage decreased from 44.09% to 7.50%. Considering this fact, the total discrimination in Spain also fell sharply from a 6.17% to 1.32%. On the other hand, the wage differential due to differences in characteristics was also reduced (from 20.43% to 18.88%)<sup>10</sup>.

<sup>8</sup> To obtain simultaneously discrimination and favouritism toward the elderly is a consequence of the choice of working with the Oaxaca's two-fold decomposition for measuring discrimination.

<sup>9</sup> The degree of age discrimination on wages has been estimated by the calculation of a 'normal' hourly wage obtained as the monthly earnings divided by the number of hours worked in October, the reference month (extra hours are included). This month does not feature payments or periods of absence of a seasonal character such as payments due beyond the month or holiday periods. In this way it is possible to obtain 'normal' or 'ordinary' monthly earnings, minimising the incidences in questionnaire answers due to the beginning or end of labour activity during this month. The resulting hourly wage is lower than what it would be if annual data were used. In this case, extraordinary bonuses and payments made in random periods or with a regularity of more than one month would be added. The reason for using this method is that the estimation of hours worked in the reference month is more precise than the estimation of annual hours. Finally, in order to stand comparisons between workers, the monthly earnings of those who did not get a complete monthly wage due to unpaid absences has been adjusted by taking into account the days of complete wages.

<sup>10</sup> For realizing the comparison of wage discrimination between 2002 and 1995, we had to eliminate the sectors of education, healthcare and other social activities in the SES 2002, as these sectors were not included in the SES 1995. In a sectorial analysis, it was found that the first two sectors are among the five sectors with the highest percentages of discriminated elderly. To contrast their impact on the overall aggregate wage discrimination, these sectors were included in the sample and the Oaxaca wage decomposition was recalculated for the year 2002. The results are shown in the last row of Table 3. As

**Table 3: Discrimination for Spain though Oaxaca's decomposition**

	$W_c/W_o$	% wage gap due to characteristics	% wage gap due to discrimination	$W_c/W_o$ (in absence of discrimination)	Wage gap due to differences in characteristics	Discrimination
1995	85,74%	144,09%	-44,09%	79,57%	20,43%	-6,17%
2002	82,43%	107,50%	-7,50%	81,12%	18,88%	-1,32%
2002 (total)	83,90%	111,50%	-11,50%	82,04%	17,96%	-1,85%

Source: SES, 1995 and 2002

## 5.2 The distributive approach in analysing wage discrimination

Jenkins (1994) applies the procedure of calculating poverty to the analysis of wage discrimination. Establishing a comparison between the two phenomena, the author proposes that discrimination and poverty experiences are intrinsically individual events, which play an important role among the affected population when quantifying the aggregate level of discrimination. As highlighted by Del Rio et al. (2006), Jenkins introduces two important issues in the analysis of wage discrimination, which are: how to identify which individuals suffer discrimination and in what quantity; and how to sum up the wage gaps using an index which verifies a set of desirable normative properties. In this way, Jenkins develops a framework for the study of wage discrimination, based on the literature of poverty and deprivation.

In the previous section, we saw how the classical approach solved the first issue reasonably well, namely, the definition problem of what we call wage discrimination and the identification problem of who we consider is discriminated and to what extent. However, this approach fails when dealing with the problem of adding individual discrimination. The decomposition of Oaxaca (1973) allows to develop an index that summarizes the overall level of discrimination in a population:

$$D_0 = 100 \times \left\{ \exp \left[ \overline{Z'}_o (\hat{\beta}_c - \hat{\beta}_o) \right] - 1 \right\}$$

None the less, the main problem with this index is that by quantifying the wage discrimination suffered by the *mean* older worker when compared to the *mean* middle-aged worker, we evaluate the discrimination in the mean distribution of the

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noted, wage discrimination towards older workers is somewhat higher when we include these sectors in the analysis.



characteristics. Therefore, we would be adding levels of individual discrimination by considering all of them equally discriminated against, regardless of the individual supported level of discrimination. In this case, analyzing only the mean of the wage distribution represents an enormous waste of information, because the salary structure is not constant throughout the range of wages (see Del Rio et al., 2004).

The distributive approach in analyzing wage discrimination seeks to overcome these problems by adding individual discriminatory experiences. The purpose is to create some normative discrimination measures that address the "individual experience" and are therefore functions of the individual discrimination  $(\hat{r}_{oi} - \hat{y}_{oi})$  and not from the salary distributions  $\hat{r}_{oi}$  and  $\hat{y}_{oi}$  taken separately ( $\hat{r}_{oi}$  accounts for the  $i^{th}$  older worker the estimated salary when his characteristics are being paid at the average prices of the central age workers- it is the non-discriminatory wage –while  $\hat{y}_{oi}$  the estimated salary is if their features at the average prices of elderly payroll are, i.e., the wage with discrimination or favouritism, as appropriate<sup>11</sup>).

From these definitions, we obtain the level of discrimination suffered by each worker by considering the salary he would have perceived in the absence of discrimination. In this way we define  $v_{oi}$  so that:

$$v_{oi} = \left( \frac{\hat{r}_{oi} - \hat{y}_{oi}}{\hat{r}_{oi}} \right)$$

The individual data obtained in this way allows us to calculate the Normalized Discrimination Curve (Del Rio et al., 2006). This curve would reflect the cumulative discrimination per capita for the total discriminated older workers ordered from the most disadvantaged to the less discriminated. To obtain this result, we calculate for each  $p=k/n$  ( $0 \leq p \leq 1$ ),

$$D(g; p) = \sum_{i=1}^k \frac{g_i}{n}$$

where,  $g_i(x_o) = \max\{v_{oi}, 0\}$  the vector of individual wage discrimination is,  $n$  the total number of older workers and  $k$  any integer such that  $k \leq n$ . We can define  $q=k^*/n$  as the proportion of older who suffer discrimination, which allows us to estimate the

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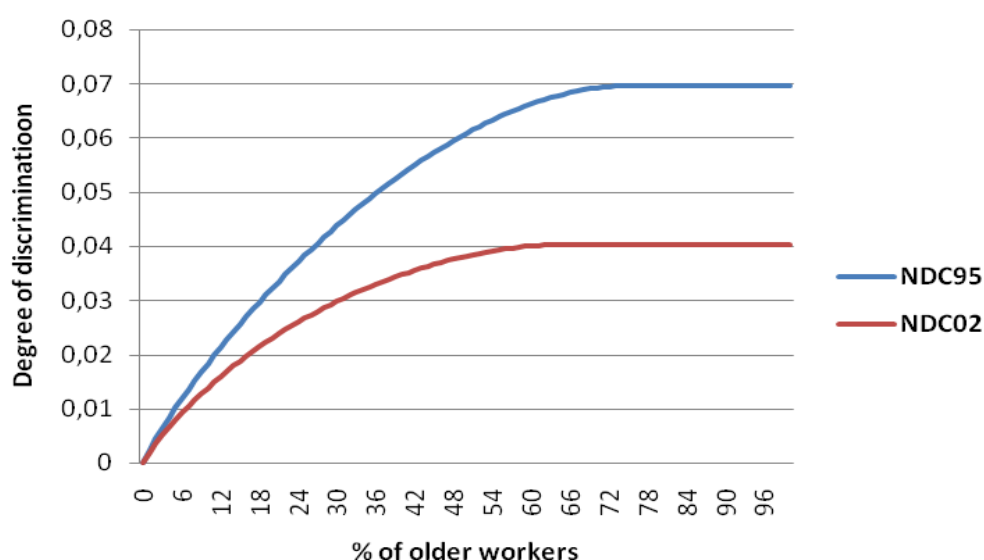
<sup>11</sup> Both wages are obtained according to the following expressions:  $\hat{y}_{oi} = \exp(Z'_{oi} \hat{\beta}_o)$  and  $\hat{r}_{oi} = \exp(Z'_{oi} \hat{\beta}_c)$ .

incidence of discrimination. Furthermore, the degree of concavity of the curve before point q shows the inequality aspect of the discrimination distribution.

One advantage of the curve is that, as defined, it only focus on the discrimination suffered by the elderly. The workers who are "privileged" become a value of zero (the individual wage discrimination vector takes the value zero when  $\hat{r}_{oi} \prec \hat{y}_{oi}$ ). In this sense, the discrimination curve fulfils the *Focus Axiom* and the discrimination suffered by some older workers is not compensated by the favouritism perceived by other elderly.

Figure 4 shows the normalized discrimination curves for the whole of Spain for the years 1995 and 2002<sup>12</sup>. We would highlight the following aspects. First, the normalized discrimination curve of 2002 dominates in discrimination the one for 1995. In second place, the detected levels of aggregate discrimination for both years, are greater with this approach (that is, the intensity of the discrimination) than those detected in the classical approach. Finally, between 1995 and 2002 the proportion of discriminated older workers decreased from approximately 70% to 60%, while the intensity of discrimination decreased from 7% to 4%. These facts confirm the trend of a sharp fall in wage discrimination towards older workers underlined by Oaxaca's methodology in the previous section.

**Graph 4: Normalized Discrimination Curves (Spain, 1995 -2002)**



Source: SES, 2002

<sup>12</sup> Since the wages of the SES 1995 are not directly comparable with those of the SES 2002 (the first are in Pesetas and the second in Euros), it is particularly desirable to use normalized discrimination curves instead of the standard absolute discrimination curves.

## 6 Conclusions

The purpose of this study was to analyze age discrimination as a critical factor when measuring labour force participation of older workers in Spain. Such a study is justified by the fact that our older workers have very low activity rates in relation to other age groups. After reviewing other factors that may explain why Spanish elderly, despite having increased their life expectancy significantly, remain active for less time, we have analyzed the characteristics of those workers, specifically in relation to middle-aged workers.

The next section analyzed the possible case of age discrimination in employment from a theoretical point of view. It concluded that there are several "fallacies" in our society which are harmful to older workers and encourage their retirement. Also, a wage below personal expectancy discourages labour participation and may be a decisive element in choosing early retirement of aged workers, when combined with the overly generous retirement programs. A model to show whether there is or not discrimination in salaries of older workers was presented.

To achieve these results, the methodology of Oaxaca (1973) was applied based on data from the Structure of Earnings Survey (SES) for the years 2002 and 1995. The figures obtained show that wage discrimination towards older workers was significant in 1995 and declined ever since then, although, this approach implies quantifying the wage discrimination experienced by the *mean* older workers in comparison to the *mean* central workers. As stated before, this process only evaluates the average discrimination in the mean of the characteristics distribution.

Therefore, we are adding the levels of individual discrimination considering all of them equally discriminated, regardless of the individual level of discrimination. Besides, analyzing only the mean of the wage distribution represents an enormous waste of information, because the salary structure is not constant throughout the range of wages.

With the aim of solving these and other problems, we proposed a distributional analysis of wage discrimination by age, applying the Del Río *et al.* methodology. Following Del Río *et al.* (2006), normalized discrimination curves were developed for the years 2002 and 1995.

Once being able to decompose these two effects; discrimination and favouritism, we obtained higher levels of aggregate wage discrimination towards older workers. Moreover, the analysis showed that in 1995-2002 the proportion of elderly discriminated dropped from 70% to 60% and the intensity of discrimination also fell down from 7% to 4%. Both approaches, classical and distributional, confirmed that between 1995 and 2002 wage discrimination towards older workers was reduced considerably.

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## Appendix

**Table A1. Coefficients of the mincerian equations in Spain in 1995**

<i>Variables</i>	<i>workers aged 55-64</i>	<i>workers aged 25-54</i>
<b>Sex</b>		
Woman	-0,20***	-0,16***
Men	reference	reference
<b>Education</b>		
Without studies or with primary education	-0,17***	-0,16***
Lower secondary education	-0,13***	-0,15***
Upper secondary education, Upper secondary education (Practical training), First stage of tertiary education (Practical training)	reference	reference
First stage of tertiary education and second stage of tertiary education	0,07**	0,05***
<b>Previous experience</b>		
Less than 5 years	-0,01	-0,04***
From 5 to 9 years	reference	reference
From 10 to 14 years	0	0,04***
From 15 to 19 years	0	0,07***
More than 19 years	-0,06*	0,12***
<b>Seniority<sup>2</sup></b>	0,00***	0,00***
<b>Seniority</b>		
Less than 2 years	-0,04	-0,09***
From 2 to 4 years	-0,02	-0,06***
From 5 to 9 years	reference	reference
More than 9 years	0,07***	0,07***
<b>Occupation</b>		
Legislators, senior officials and managers	0,54***	0,49***
Professionals	0,30***	0,33***
Technicians and associate professionals	0,24***	0,21***
Clerks	0,06***	0,04***
Service workers and shop and market sales workers	-0,03	-0,03***
Skilled workers	reference	reference
Plant and machine operators and assemblers	-0,02	0
Elementary occupations (services)	-0,12***	-0,10***
Elementary occupations (other activities)	-0,18***	-0,13***
<b>Type of contract</b>		
Indefinite contract	0,11***	0,09***
Fixed term contract	reference	reference
<b>Working time status</b>		
Full time	reference	reference
Part time	-0,04	-0,06***
<b>Firm size</b>		
Between 10 and 49 employees	-0,07***	-0,09***
Between 50 and 99 employees	reference	reference
More than 100 employees	0,08***	0,08***

**Table A1. Continued**

<i>Variables</i>	<i>workers aged 55-64</i>	<i>workers aged 25-54</i>
National agreement	reference	reference
Regional agreement	0,14***	0,13***
Firm agreement	0,03	0,04**
<b>Activity sector</b>		
Mining and quarrying	-0,16***	0
Manufacture of textiles, textile products; leather and leather products	-0,31***	-0,38***
Manufacture of food products, beverages and tobacco	-0,20***	-0,25***
Manufacture of wood and wood products	-0,35***	-0,35***
Manufacture of pulp, paper and paper products; publishing and printing	-0,19***	-0,20***
Manufacture of coke, refined petroleum products and nuclear fuel	0,14*	0,05**
Manufacture of chemicals, chemical products and man-made fibres	-0,08**	-0,10***
Manufacture of rubber and plastic products	-0,24***	-0,22***
Manufacture of other non-metallic mineral products	-0,22***	-0,18***
Manufacture of basic metals and fabricated metal products	-0,17***	-0,20***
Manufacture of machinery and equipment n.e.c.	-0,19***	-0,20***
Manufacture of electrical and optical equipment	-0,23***	-0,26***
Manufacture of transport equipment	-0,21***	-0,22***
Manufacturing n.e.c.	-0,30***	-0,33***
Electricity, gas and water supply	0,03	-0,06***
Construction	-0,16***	-0,21***
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	-0,22***	-0,29***
Hotels and restaurants	-0,21***	-0,23***
Transport, storage and communication	-0,22***	-0,21***
Financial intermediation	reference	reference
Real estate, renting and business activities	-0,19***	-0,30***
Constant	7,08***	6,95***
<i>Adjusted R-Square</i>	0,4	0,45
<i>Number of observations</i>	11960	105480
* Significance at 5% level.		
** Significance at 1% level.		
*** Significance at 0,1% level.		



**Table A2. Coefficients of the mincerian equations in Spain in 2002**

<i>Variables</i>	<i>workers aged 55-64</i>	<i>workers aged 25-54</i>
<b>Sex</b>		
Woman	-0,20***	-0,17***
Men	reference	reference
<b>Education</b>		
Without studies or with primary education	-0,10***	-0,11***
Lower secondary education	-0,11***	-0,10***
Upper secondary education, Upper secondary education (Practical training), First stage of tertiary education (Practical training)	reference	reference
First stage of tertiary education and second stage of tertiary education	0,09***	0,08***
<b>Previous experience</b>		
Less than 5 years	-0,06***	-0,05***
From 5 to 9 years	reference	reference
From 10 to 14 years	-0,01	0,06***
From 15 to 19 years	0,02	0,09***
More than 19 years	-0,03	0,11***
<b>Seniority<sup>2</sup></b>	0,00***	0,00***
<b>Seniority</b>		
Less than 2 years	-0,09***	-0,13***
From 2 to 4 years	-0,06***	-0,08***
From 5 to 9 years	reference	reference
More than 9 years	0,07***	0,10***
<b>Occupation</b>		
Legislators, senior officials and managers	0,76***	0,68***
Professionals	0,56***	0,49***
Technicians and associate professionals	0,29***	0,20***
Clerks	0,08***	-0,02***
Service workers and shop and market sales workers	-0,01	-0,04***
Skilled workers	reference	reference
Plant and machine operators and assemblers	-0,02*	-0,03***
Elementary occupations (services)	-0,17***	-0,15***
Elementary occupations (other activities)	-0,21***	-0,14***
<b>Type of contract</b>		
Indefinite contract	0,07***	0,06***
Fixed term contract	reference	reference
<b>Working time status</b>		
Full time	reference	reference
Part time	-0,04**	0,02***
<b>Firm size</b>		
Between 10 and 49 employees	-0,11***	-0,09***
Between 50 and 99 employees	reference	reference
More than 100 employees	0,05***	0,07***
<b>Type of agreement</b>		
National agreement	reference	reference
Regional agreement	0,10***	0,08***

**Table A2. Continued**

<i>Variables</i>	<i>workers aged 55-64</i>	<i>workers aged 25-54</i>
Firm agreement	0,03	0,01*
<b>Activity sector</b>		
Mining and quarrying	-0,19***	0
Manufacture of textiles, textile products; leather and leather products	-0,42***	-0,36***
Manufacture of food products, beverages and tobacco	-0,30***	-0,24***
Manufacture of wood and wood products	-0,42***	-0,33***
Manufacture of pulp, paper and paper products; publishing and printing	-0,19***	-0,16***
Manufacture of coke, refined petroleum products and nuclear fuel	0,19***	0,27***
Manufacture of chemicals, chemical products and man-made fibres	-0,11***	-0,05***
Manufacture of rubber and plastic products	-0,23***	-0,19***
Manufacture of other non-metallic mineral products	-0,27***	-0,17***
Manufacture of basic metals and fabricated metal products	-0,24***	-0,17***
Manufacture of machinery and equipment n.e.c.	-0,25***	-0,17***
Manufacture of electrical and optical equipment	-0,27***	-0,20***
Manufacture of transport equipment	-0,25***	-0,16***
Manufacturing n.e.c.	-0,38***	-0,31***
Electricity, gas and water supply	-0,16***	-0,05***
Construction	-0,21***	-0,14***
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	-0,27***	-0,23***
Hotels and restaurants	-0,31***	-0,21***
Transport, storage and communication	-0,25***	-0,16***
Financial intermediation	reference	reference
Real estate, renting and business activities	-0,32***	-0,26***
Education	-0,35***	-0,21***
Health	-0,38***	-0,26***
Other services	-0,28***	-0,23***
Constant	2,34***	2,10***
<i>Adjusted R-Square</i>	0,57	0,51
<i>Number of observations</i>	15981	167398
* Significance at 5% level.		
** Significance at 1% level.		
*** Significance at 0,1% level.		