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Unemployment and Spell Duration During the Great Recession in the EU

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Unemployment and spell duration during the Great Recession in the EU

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Abstract

The current economic recession has had unequal consequences on employment depending on the country considered. It is generally accepted that the negative impact of unemployment on individual welfare can be very different depending on its duration. However, conventional statistics on unemployment do not adequately capture to what extent the recession is not only increasing the incidence of unemployment but also its severity in terms of duration in time of ongoing unemployment spells. In this paper, we follow Shorrocks's (2009a,b) proposal of a duration-sensitive measure of unemployment in order to analyze the different dynamic characteristics of unemployment in a selected group of European Union countries during the current Great Recession. Our results add some evidence on the relevance of incorporating the duration dimension in measuring unemployment and provide a tool for dynamic analysis based on cross-sectional data.

Keywords: measurement of unemployment, spell duration, European Union

JEL codes: D30; D63; I31, J64.

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Introduction

The current economic recession has had a tremendous impact on the economy of most developed countries. However, its consequences for the labor market are rather unequal depending on the country considered. While some countries are facing only a minor impact on their level of employment (e.g. France, Netherlands or Sweden) others are experiencing large increases in their unemployment rate. Indeed, the Baltic countries have experienced rapid increases in unemployment during 2008 and 2009 while countries such as Spain, Greece, and Ireland have experienced the largest increases in unemployment rates in the EU27 between the end of 2007 and the end of 2011.

Any unemployment spell is clearly associated with an individual loss of wellbeing due to its harmful effects on present and future earnings, and also on other non-monetary dimensions, such as, self-esteem, human relations and family life, cognitive abilities, mental health, etc. (e.g. Sen, 1997). It is generally accepted that the actual negative impact of unemployment can be very different depending on its duration, this is because long spells tend to harm wellbeing proportionally more than short spells and also because a long unemployment spell largely reduces the individual's probability of finding a job in the future (e.g. McGregor, 1978, Machin and Manning, 1999, Güell and Hu, 2006). However, the conventional statistics on unemployment do not adequately capture to what extent the recession is not only increasing the incidence of unemployment but also its severity in terms of duration in time for currently ongoing unemployment spells. Usually, this gap is only filled by the use of partial measures such as the share of long-term unemployment (12 months or more) on total unemployment or a measure of the average unemployment spell length.

The fact that the intensity (duration) of unemployment is considered in the analysis of this phenomenon also raises the question of to what extent the experience of unemployment is either concentrated in fewer individuals with longer spells, or instead, is more spread across a large group of people experiencing shorter spells. The traditional measures of other forms of lack of wellbeing, such as poverty or discrimination, suggest that the former, i.e. unemployment being long and concentrated in fewer individuals, is socially less desirable, assuming there is a social preference for equality. That is, in measuring the impact of unemployment on a society's wellbeing, the whole distribution of unemployment spells across the labor

force should be considered as a base for constructing distribution-sensitive aggregate measures.

During the 1990s, a growing literature emerged proposing the use of aggregate unemployment measures incorporating the time dimension, but unfortunately these have seldom been used in empirical analysis so far (e.g. Paul, 1992, 2001, Riese and Brunner, 1998, Borooah, 2002, Sengupta, 2009, Shorrocks, 2009a,b)[1]. However, we claim that these measures can be helpful by providing more information for a better understanding of the nature of the massive increase in the unemployment rate in EU countries such as Spain, Greece, or Ireland in recent years (10-14 percentage points between 2007 and 2011). Indeed, there are clear signs of an increasing duration of unemployment spells during the crisis in a variety of countries within the European Union. For example, the long-term unemployment share increased, between the start of 2007 and the end of 2011, from 22 to 43 percent in Spain, from 34 to 52 percent in Lithuania, from 29 to 63 percent in Ireland, from 23 to 33 percent in the UK, and from 14 to 19 percent in Sweden.[2]

The aim of this paper is to provide comparative evidence on unemployment outcomes across a selected group of EU countries: Spain, Germany, Italy, UK, France, Greece, Portugal and Poland; before and after the start of the current global economic crisis, taking into account the duration of ongoing unemployment spells and their distribution across the population. These countries have been selected by their importance on overall employment in the European context and/or by their specific pattern in their unemployment performance. Based on European Labour Force Survey series quarterly results reported by Eurostat we measure unemployment using a duration-sensitive index proposed by Shorrocks (2009b) that uses the information on the time that each unemployed individual has spent in that situation. This index allows us to integrate within the same indicator not only unemployment incidence, as it is usually considered in a measure of unemployment, but also its intensity (mean duration) and the complete duration profiles that indicate the degree of inequality of the unemployment experiences among the population. The results will provide us with a more complete picture of both the heterogeneous pre-crisis situation and the asymmetric impact of the global economic crisis on unemployment across the EU.

[1] The last three papers were written at the beginning of the 1990s, although they have remained unpublished until 2009.

[2] Long-term unemployment here refers to unemployed persons with a spell of at least 12 months, as defined by Eurostat in its webpage using the EU Labor Force Survey, quarterly data.

This paper is organized as follows. In the first section we detail the methodology that allows us to incorporate time in the measurement of unemployment presenting the characteristics and properties of the indicators used. In the second section we describe the data source and present the empirical results obtained for these indexes describing the profile of unemployment duration before and after the crisis for the selection of EU countries considered. Finally the last section of the paper resumes the main conclusions.

1. Measuring unemployment accounting for time

1.1 The relevance of spell length and its distribution in measuring unemployment

The conventional unemployment rate counts the number of unemployed individuals as a proportion of the active population at a particular point in time, in other words, it measures the number of unemployment spells in progress out of those potential spells that could be experienced by active individuals in the labor force at that same moment. The problem here is that all spells are weighted equally regardless of their duration since their start. Given that the consequences of spell length are expected to be quite different on individual well-being, that is, the longer the spell the larger loss of welfare, we need an indicator that can incorporate the time dimension to the measurement of the unemployment phenomenon. In order to provide a complete picture of unemployment it is important that this indicator can be calculated with the same periodicity as the conventional unemployment rate but incorporating the memory about the duration of the current unemployment spell for each individual.

In this new context we are acknowledging the individual unemployment experience as heterogeneous given the difference in the length of their particular spell. This distribution of heterogeneous experiences of unemployment raises the question of how to deal with this distribution. One way to get round incorporating time to the indicator in a straightforward way is to take into account the mean of all spell durations. In this case we would be solving the problem by assuming that unemployment spell length distribution is irrelevant. For example, given two unemployed individuals whose total unemployment duration is ten periods it would be equivalent that one of them has completed only one period of unemployment and another one has completed nine, to the case in which both have completed five periods. There are at least two situations from a normative perspective in which this may not be desirable. The first one is when

we assume that the individual loss of wellbeing due to the harmful effects of unemployment increases more than proportionally with spell length, as some evidence suggests (see Sen, 1997, and Ahn et al., 2004, among others).[3] Provided we aim to maximize social welfare for a wide range of social welfare functions (included utilitarian welfare functions), the more equal the unemployment distribution, the more social welfare will be achieved.[4] The second one is when there is a social preference for equality in employment as there is in other dimensions of welfare-related attributes such as income, consumption, health, education, etc. In both cases we need an index that is sensitive to unemployment distribution, that is, that penalizes the concentration of unemployment in fewer individuals in the population.[5]

1.2 The duration of unemployment spells

A crucial matter in this analysis is the measurement of unemployment spell duration for each individual i, s_i. In this paper we follow what in the literature is referred to as the "interrupted spell length of a stock of unemployed" approach (see Salant, 1977, and Akerlof and Maine, 1981). This methodology measures the duration of the ongoing spell for each unemployed individual at moment t. Thus, $s_i = 0$ if the individual is not unemployed at moment t not excluding that she could have been unemployed earlier or may fall in unemployment in future periods of time. Additionally, $s_i > 0$ if the individual is unemployed at time t and s_i represents a continuous unemployment spell length which is in progress on the date the individual is surveyed.[6] In particular, in this paper we will express s_i as the duration in months of the individual ongoing unemployment spell within a fixed time bandwidth (in our empirical case limited to 48 months in line with the statistical information available).[7] Thus duration is not

[3] Some authors (mostly psychologists) have criticized this approach by considering that there are several reasons why the psychological impact of unemployment may decrease over time. In particular, the theory of adaptation and habituation suggests that unemployed individuals feel an improvement in their satisfaction levels over unemployment spells once they adapt to the situation (see Diener and Lucas, 1999, and Frederick and Loewenstein, 1999). The existing literature reports mixed evidence, although Easterlin (2005) identifies some dimensions (health, family life, etc.) where no adaptation is found. Lack of habituation is also found by Winkelman and Winkelman (1998) and Clark (2006).

[4] See Shorrocks (2009a) where he proposes a simple utilitarian welfare model (that is, without a preference for equality) in which the even distribution of spell length maximizes social welfare.

[5] From now onwards, and for simplicity, we will consider both arguments as interchangeable.

[6] Note that individuals that are found to be experiencing an ongoing unemployment spell at moment t may have had other unemployment spells which length we are not considering and may have also been out of the labor force in previous periods before the current unemployment spell began.

[7] The information about current unemployment spells collected in employment surveys is typically top-coded. For example, at 4 years in Eurostat's EU Labor Force Survey, or at 2 years in the Census Bureau's US Current Population Survey before January 2011 (5 years after that date). Additionally, reported results

normalized by the length of the bandwidth.[8] We choose to do so because our aim is to qualify each unemployment experience counted within the conventional unemployment rate by its severity related to the duration of the spell. An advantage of this strategy based on the interrupted-spell approach is that it will allow us to provide a general measure of unemployment where the conventional unemployment rate will be a particular case. Additionally, in this way, we are able to provide this measure using the information from macro-aggregates on unemployment coming from the same dataset and the same periodicity and immediacy as statistical offices report unemployment rates.

We are aware of the controversy in the literature about using this interrupted strategy approach. The main disadvantage of this methodology is that the mean unemployment duration is a biased estimation of the average duration of an unemployment spell in the population. As Salant (1977) highlights, this bias comes about first because this measurement does not report the completed length of spells given that the spell is currently ongoing ("interruption-bias") and secondly because it is spells with a longer than average duration that are more likely to be in progress at the time of the survey ("length-bias"). Given that each of these effects biases this mean spell duration in opposite directions, no statement can be made about which of these dominates. However, this is not limiting in our case because our aim is to qualify each unemployment experience effectively included in the conventional unemployment rate and not to provide an unbiased estimate of the average duration of a spell in the population. For providing such an estimate a different approach should be used. [9] In fact, the bias of the mean interrupted unemployment duration is equivalent to that of the unemployment rate when the aim is to measure the individual risk of

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are usually aggregated in intervals. Eurostat provides 8 intervals in months in the reported results, but only three in public use microdata files. The Bureau of Labor Statistics reports 4 intervals in their web, but CPS microdata are available in a detailed format. Top-coding and the use of intervals force researchers to impose some assumptions about the duration distribution.

[8] Therefore, for example, a three months spell will affect our unemployment measure equally regardless of the bandwidth limit. Of course, if one wishes to compare two cases where the information available differs in bandwidth one should collapse all durations in the longest bandwidth case to the value fixed by the smallest time span.

[9] The literature provides different ways to account for these estimation biases. For example, some authors use experience-weighted spells (Akerlof and Maine, 1981), complete spell length of a stock of unemployed (Kaitz, 1970, and Clark and Summers, 1979), or the distribution of unemployment experience within a given period (see Shorrocks, 2009b, for details). Note that these approaches, compared with the interrupted spells, are in general more information demanding and may imply further assumptions on labor market transitions.

unemployment in a given population. Further, all other characteristics referred to the stock of unemployed in a particular moment in time are also a biased estimate of the characteristics of the ever unemployed population. Indeed, duration is nothing else but another characteristic of the stock of unemployed, even if its value has implications on unemployment severity.[10]

1.3 The Shorrocks' duration-sensitive measure of unemployment

Once we have estimated the unemployment spell duration for each individual, s_i, we must aggregate all of them by using an indicator that is sensitive to unemployment distribution. Indicators with these characteristics have been already proposed in the literature. In particular, in this paper we follow one of the families of indices proposed by Shorrocks (2009b) which is in the line with Foster et al. (1984) poverty indices (FGT indices). Let us consider a population of *N* economically active individuals at moment *t* and suppose that the vector $s = (s_1, s_2, \dots s_i, \dots, s_N)$ provides information on unemployment duration for each individual, *i*. From now onwards we will consider vector *s* to be ordered from highest to lowest duration and we will refer to *q* as the number of active individuals who are unemployed. In this setting, we use the family of indices proposed by Shorrocks (2009b) that takes the following form:

$$U_\alpha(s) = \frac{1}{N}\sum_{i=1}^{N}(s_i)^\alpha$$

where $\alpha \geq 0$. If s_i measures the duration of the ongoing spell for each unemployed individual at moment *t*, such as it was detailed in the previous section (i.e. being $s_i = 0$ for individuals that are employed and $s_i > 0$ a measure of the duration of the ongoing unemployment spell for any individual who is unemployed at moment *t*, this family have an useful interpretation concerning the values of the parameter α. In the case that $\alpha = 0$ then the index, U_0, is the conventional *unemployment rate* with no memory about the particular duration of the ongoing spells. In the case that $\alpha = 1$, the index, U_1, is the *per-capita unemployment duration*, i.e. the mean duration of spells for all the economically active population. Therefore it incorporates the intensity of the unemployment phenomenon in the time dimension, i.e. the memory about spell

[10] Another example of a characteristic that implies a larger unemployment severity is the number of household members that are economically dependent on the unemployed individual, see Gradín *et al.* (2012).

duration without taking the distribution of spells into account.[11] In the case that $\alpha > 1$, the index incorporates a social preference for unemployment duration equality among individuals.[12] Regarding the specific choice of α, Shorrocks (2009a) discusses a variety of approximations based on the marginal cost of an increase in the length of the unemployment spell and concludes that a value of $\alpha = 2$ is not unreasonable. In fact, this is the most common value for this parameter when analyzing other welfare attributes using similar indices in the literature on well-being.

Although $U_\alpha(s)$ (with $\alpha > 1$) is not an inequality index, it is related to the family of Generalized Entropy indices defined over the whole active population (employed and unemployed) and therefore it is sensitive to inequality of durations between the two groups of active individuals (the unemployed and the employed, being the employed those with $s_i = 0$), and also to the inequality of durations within the unemployed (i.e. those individuals with $s_i > 0$).

Thus, for example, for $\alpha = 2$, $U_2(s)$ can be rewritten in the following way:

$$U_2(s) = \left(HI\right)^2 (1 + E_2)$$

where $H = \frac{q}{N}$ is the conventional unemployment rate (the proportion of active individuals who are unemployed at a given moment in time), $I = \bar{s} = \frac{1}{q}\sum_{i=1}^{q} s_i$ is the *mean unemployment duration* (i.e. the mean of the spell duration length only for the unemployed), and $E_2 = \frac{1}{N}\sum_{i=1}^{N}\left[\left(\frac{s_i}{\mu}\right)^2 - 1\right]$, with $\mu = \frac{1}{N}\sum_{i=1}^{N} s_i = HI$, is just a scalar transformation of the Generalized Entropy index when the parameter associated to inequality aversion is also equal to 2 and it is equal to the squared Coefficient of Variation: $E_2 = 2GE_2 = (CV)^2$. Therefore, E_2 captures how unevenly distributed is unemployment duration across the active population.[13]

Taking into account the decomposition property of General Entropy indices we can decompose the index $U_2(s)$ in this way:

$$U_2(s) = \left(HI\right)^2 (1 + E_2^B + E_2^W)$$

[11] See Shorrocks (2009a) for a list of references on the authors that have contributed to incorporate mean duration in the analysis of unemployment duration.

[12] More specifically in this case the index verifies the properties of symmetry, replication invariance, monotonicity and preference for duration equality (see Shorrocks, 2009b, for a mathematical formalization of these).

[13] More specifically, for any $\alpha > 1$ the Generalized Entropy index is: $GE_\alpha = E_\alpha/\alpha(\alpha - 1)$.

where $E_2^B = \frac{1-H}{H}$ and $E_2^W = \frac{1}{H}E_2^q$ are the *between* groups and the *within* group components of E_2, and E_2^q is the E_2 index only defined over unemployed population, $E_2^q = \frac{1}{q}\sum_{i=1}^{q}\left[\left(\frac{s_i}{\bar{s}}\right)^2 - 1\right]$. Substituting these values in the above expression we can obtain that:

$$U_2(s) = HI^2(1+E_2^q)$$

Therefore, $U_2(s)$ can be then decomposed in a parallel way to the traditional decomposition of the FGT poverty index into incidence, intensity and inequality components (Foster *et al.*, 1984).

It is easy to show that every index belongs to $U_\alpha(s)$ family can be decomposed by the expression:

$$U_\alpha(s) = HI^\alpha(1+E_\alpha^q).$$

In the particular case when $\alpha = 0$ the conventional *unemployment rate*, $U_0(s) = H$. If $\alpha = 1$ the *per-capita duration* index, $U_1(s)$, is the product of the unemployment rate and the mean unemployment duration:

$$U_1(s) = HI.$$

In turn, when $\alpha = 2$,

$$U_2(s) = HI^2\left(1 + E_2^q\right) = U_1(s)\, I\, (1 + E_2^q) = U_1(s)\, \omega$$

where $U_2(s)$ incorporates incidence and intensity components through $U_1(s)$, and inequality component by term $\omega = I(1 + E_2^q)$. Thus, if there is no inequality within the spell durations of the unemployed, $E_2^q = 0$ and $\omega = I$. Therefore, the difference between $U_2(s)$ and $U_1(s)$ would only come from inequality between the employed and the unemployed: $U_2(s) = U_1(s)\, I$. Further, given a quantity of *HI* months to distribute between an active population, the $U_2(s)$ indicator will be larger the larger the duration intensity is, while in the case of $U_1(s)$ the distribution of months between the active population does not matter. Thus, $U_1(s)$ is indifferent between having an unemployed individual two months or two unemployed individuals one month each, while $U_2(s)$ considers the first situation as worse than the second one because unemployment is concentrated in a smaller number of individuals. Indeed, the higher α, the more sensitive our indicator will be to this concentration of unemployment. For $\alpha = 2$, there

is implicitly a number of months of increase in intensity that compensates the reduction of the number of individuals affected by unemployment, thus maintaining $U_2(s)$ constant.

1.4 Partial unemployment orderings

Finally, it is possible to obtain robust partial unemployment orderings of populations by constructing a duration profile curve also introduced by Shorrocks (2009b). Dominance in these curves guarantees a unanimously ranking for a wide range of indices verifying a set of adequate properties. This duration profile curve is constructed using the vector s of individual unemployment spell durations. Taking into account that the vector is ordered from highest to lowest values, for each $p = \frac{m}{N}$, where $1 \leq m \leq N$, the duration profile curve, $D_p(s)$, can be expressed as:

$$D_p(s) = \frac{1}{N}\sum_{i=1}^{m} s_i$$

This duration profile curve accumulates individual unemployment durations, and shows i) the *incidence* of unemployment (the unemployment rate), ii) the *intensity* of unemployment spells in terms of time (mean unemployment duration), and iii) the *inequality* of unemployment spell durations across the unemployed. This curve starts almost at the origin and is continuous, non-decreasing and concave. The value of p at which the curve becomes horizontal represents the unemployment rate, its maximum height is the *per-capita unemployment duration* and the slope of the segment that goes from the origin to the corresponding value of the curve when $p = H$ is the mean unemployment duration. Finally its curvature is the rotated Lorenz curve of unemployment spells among the unemployed and, therefore, depicts its degree of inequality.

The dominance in these curves allows for the identification of partial orderings in aggregate unemployment which are robust to the choice of a particular aggregate unemployment indicator satisfying a set of desirable properties defined over s.[14] A vector s' (weakly) duration dominates another vector s whenever the curve of the former is always equal or above that of the latter:

[14] In particular these indices must verify the properties of symmetry, replication invariance, monotonicity, preference for duration equality.

$$D_p(s') \geq D_p(s) \text{ for all } \frac{1}{N} \leq p \leq 1$$

The aggregate indicator $U_\alpha(s)$ is consistent with a partial ordering that comes from dominance criteria for $\alpha > 1$.

2. Unemployment and spell duration in the EU

2.1. Data and previous definitions.

In this section we will analyze the effect of the Great Recession on unemployment in several EU countries taking into account not only the incidence of the problem but also the length of spells and their distribution among the population. We select a group of countries where there is a varied effect of the current economic recession on the incidence of unemployment within the active population: Germany, Spain, UK, France, Italy, Greece, Portugal and Poland. In all the countries considered, except for Germany and Poland, unemployment has been consistently increasing in the last five years (2007-2011 period). However, in Spain, Greece and Portugal the unemployment rate has grown significantly more than in the rest of the countries (more than ten percentage points in Spain and Greece and almost seven in Portugal) while in the UK, France and Italy it has grown much less, no more than four percentage points.

The data we use come from the *detailed quarterly survey results* series that are regularly reported by Eurostat based on the European Labour Force Survey.[15] In order to focus on the effect of the recession we will consider the time period between the first quarter of 2007, before it started in all countries, and the last survey available (fourth quarter, 2011), when most countries are still in severe economic depression. In this database the definition of unemployed follows the usual ILO standard[16] and there is also detailed information on the number of unemployed[17] distributed in different intervals by the

[15] These data are available at employment and unemployment statistics in Eurostat's webpage: http://epp.eurostat.ec.europa.eu/portal/page/portal/employment_unemployment_lfs/data/database.

[16] A person is considered unemployed when without work during the reference week, but currently available for work and actively seeking work in the past four weeks (or had already found a job to start within the next three months). In our case, we consider individuals between 15 and 64 years of age except in the case of Spain and the UK where the interval is 16 to 64. This definition is known to underestimate the extent of the labor market downturn because it does not take into account the increasing number of underemployed workers or discouraged people not counted in the labor force because they did not look for work believing that there were none available for them (e.g. OECD, 2010).

[17] We exclude from the number of both active and unemployed those classified by Eurostat as either "not started", "other", or "unknown" in their duration of unemployment.

duration of their ongoing spell of unemployment[18] (less than 1 month, from 1 to 2 months, from 3 to 5 months, from 6 to 11 months, from 12 to 17 months, from 18 to 23 months, from 24 to 47 months, and 48 months or over) as well as by other characteristics. Assuming a uniform distribution of spell durations within each interval (except for those with durations over 48 months), for each unemployed individual *i* we estimate the value of s_i as the midpoint of the interval where she is classified. For those individuals with unemployment spells longer than four years (48 months) we truncate the distribution of duration profiles so that the value of $s_i = 48$.[19]

2.2 The pre-recession scenario

In a first discussion of results, we focus on the situation of unemployment in the countries considered the year before the Great Recession started. This will help us in order to better understand the magnitude of the changes labor markets went through in recent years. In 2007, as Figure 1 shows, the variability of unemployment rates (*H*) was relatively low in this group of EU countries. In fact, in Germany, Portugal, Greece, Spain and France the level of unemployment was outstandingly similar (around an 8 percent of the active population). However, this apparently homogenous situation concealed very different duration patterns depending on the country. Our first main point then is that a conventional unemployment measure, e.g. percentage of unemployed individuals within the active population, cannot adequately reflect the existence of heterogeneity between countries regarding the severity of unemployment stemming from differences in unemployment duration.

Unemployment in Germany was of a relatively large intensity in terms of duration given that unemployment spells' mean duration was estimated to be 22 months.[20] Indeed, as reflected in Figure 2, many German unemployed suffered from long-term unemployment: 56 percent were in that situation for a year or more (23 percent for at least four years), with only 5 percent being recently unemployed (less than one month).

[18] Duration of unemployment is defined as the duration of search for a job, or the length of the period since the last job was held (if this period is shorter than the duration of search for a job).

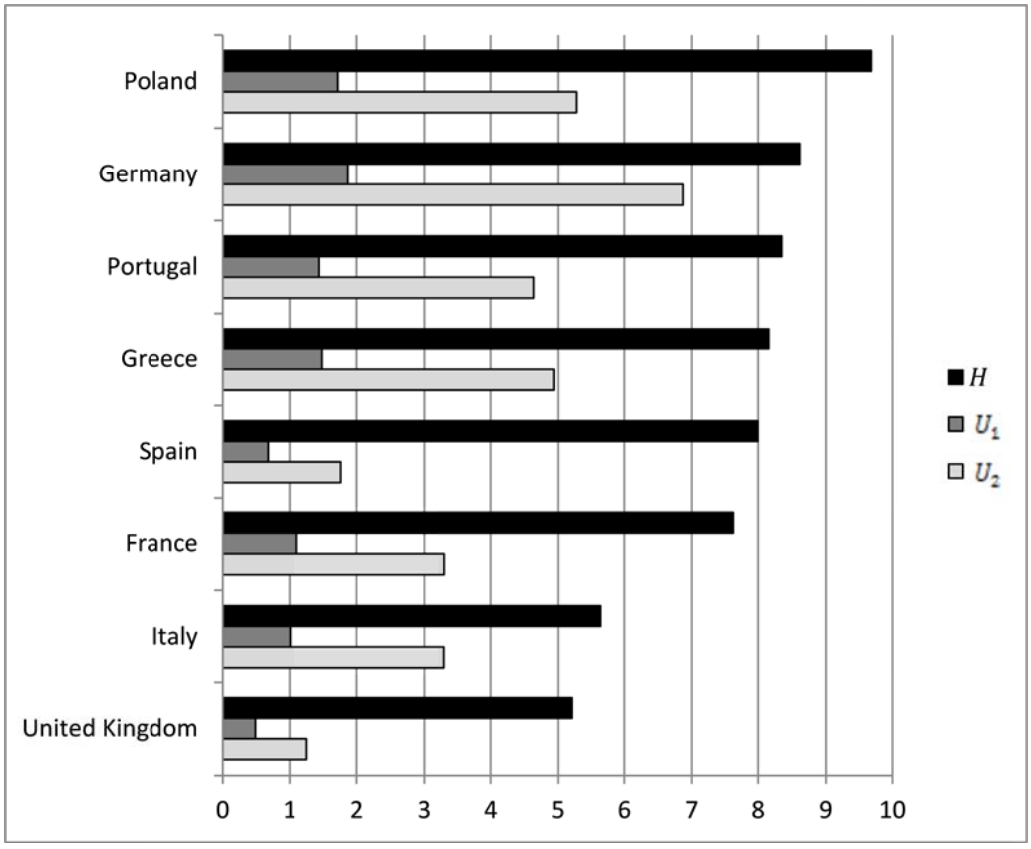
[19] There would be different approaches in order to impute spell duration for these individuals assuming a particular probability distribution in the upper tail. Given that imputation is not straightforward and results would be sensitive to the imputation method, we assume the simplest and most conservative solution to this problem that is assuming that their spell is 48 months long (thus underestimating their actual length). The impact of using the midpoint in the other intervals on the estimated mean duration is not clear as it depends on how the unemployed are actually distributed within the interval.

[20] It is important to recall that all mean durations through this paper are estimates based on Eurostat's reported intervals, and thus might be underestimated, especially in the case of Germany for its large share of workers with duration over 48 months.

This is in contrast with the situation in Spain in the same period, also shown in Figure 2, where mean unemployment spell duration was only 8 months, and the proportion of recently unemployed (less than a month) was 20 percent, a share which was equivalent to those whose duration was one year or longer (21 percent). Only 4 percent of the unemployment spells lasted at least four years. In general, Spain is well-known for leading flexibility-at-the-margin reforms producing a dual labor market with a large share of temporary contracts (32 percent of all employees before the recession period, the largest figure in the EU, in comparison to 14 percent in Germany). The rest of the countries considered registered an intermediate duration profile, i.e. they are between that of Germany and Spain; with the UK being the closest to Spain, in this case most likely due to its generally flexible labor market (see Table A.1 in the Appendix).

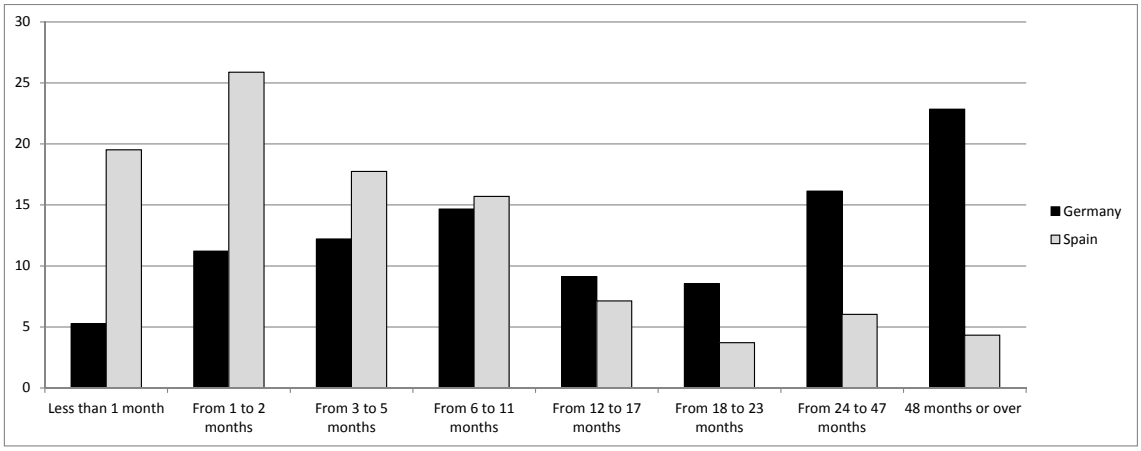
Figure 1. Measures of unemployment for a group of EU countries in 2007

H=unemployment rate; U_1=per-capita spell duration; U_2=duration distribution-sensitive unemployment measure



Source: Own construction based on quarterly information from European Labour Force Survey reported by Eurostat, 2nd quarter, 2007.

Figure 2. Unemployment duration distribution in Germany and Spain, 2007



Source: Own construction based on quarterly information from European Labour Force Survey reported by Eurostat, 2nd quarter, 2007.

We propose to approach the measurement of unemployment using an index that incorporates information on the whole duration profile and which takes into account the total number of unemployed months and how these are distributed across the labor force. As one could expect from our earlier discussion, when we measure unemployment using the per capita unemployment spell duration $U_1 = HI$ (i.e. the total number of months spent in unemployment divided by the size of the active population, which is the product of incidence and intensity) we find that there is a larger variability of unemployment experiences between countries in comparison to when only unemployment incidence is considered (see Figure 1). This unemployment index in 2007 was considerably larger in Germany (1.9 months per capita) than in any other country, with the lowest values observed in the UK and in Spain (0.5 and 0.7 months respectively).

This variability in unemployment increases further if we incorporate the whole distribution of time in unemployment among the active population, as shown by U_2 also depicted Figure 1. Indeed, the way in which the per capita amount of time in unemployment is obtained in each country is not innocuous and this is reflected by U_2, that corrects U_1 by a factor that takes into account the distribution of time spent in unemployment across the labor force. If a given per capita amount of time in unemployment comes about due to a large mean unemployment duration among the unemployed (I), relative to incidence (H), as it is the case in Germany, this means that relatively few people bear all the unemployment burden with its well-known adverse consequences on well-being. This is exactly the opposite of what we find in Spain and

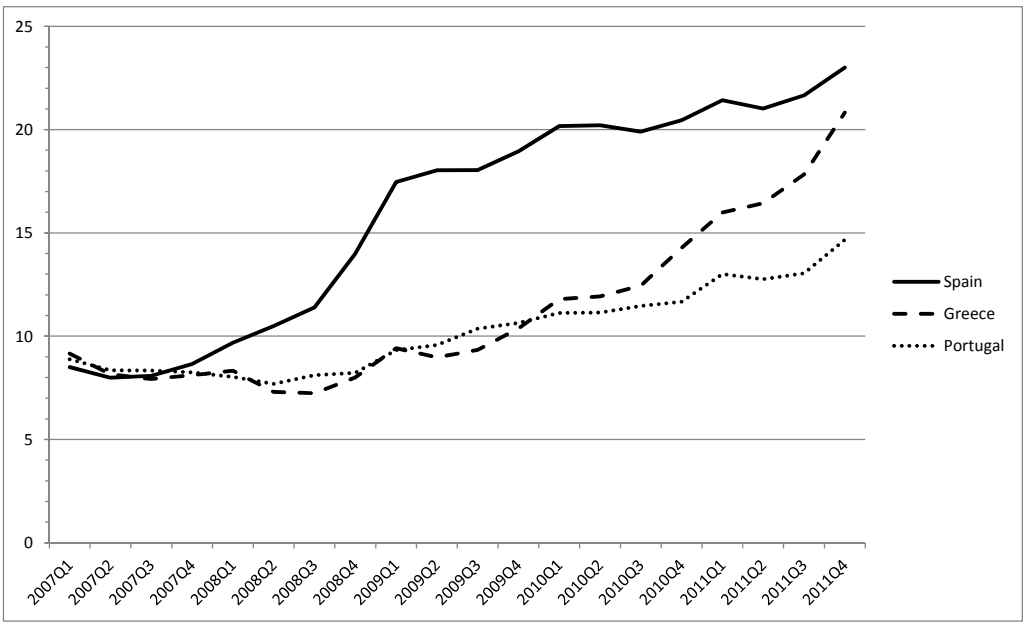
in the UK, where the overall amount of time in unemployment is smaller and more equally distributed among the labor force (many workers bear a short unemployment spell). For this reason, using a duration-profile sensitive measure, in 2007 unemployment was much more of a burden in Germany than in Spain, Portugal, Greece or France. Also, in the case of Poland, a country with a higher unemployment rate than Germany, unemployment turned to be less severe given that its intensity (18 months) was significantly lower, and long-term unemployment were less frequent than in Germany (10 percent with one-year or longer spells). The same reasoning can be applied to Spain in comparison to Italy. An outstanding case is the UK, which kept its position as the country with the lowest unemployment level regardless of the index used because it combined the lowest incidence with relatively low unemployment spell durations.

2.3 The impact of the recession on unemployment

Within the countries with unemployment rates around 8 percent in 2007, Spain, Greece and Portugal were the most hardly hit by unemployment increases with the recession, as Figure 3 shows. However, there are also some differences in these countries in terms of the evolution of unemployment and its time dimension. The Spanish unemployment rate began to increase relatively earlier, and in a more intense way, than in any of the other two countries, although with Greece eventually catching up (23 percent in Spain, 21 percent in Greece, 15 percent in Portugal in the last quarter of 2011). Spain was an outstanding case because of the accumulation of a large temporary work force that is known to increase unemployment volatility (e.g. Sala *et al.*, 2012), its specific industrial structure, and the huge housing bubble bust. In any case, all these three countries were shocked by an unprecedented sovereign-debt crisis of varied origin that intensified the impact on employment by continuing the recession for a longer period than anywhere else.[21]

[21] As the OECD suggests, the reaction of unemployment to the contraction of the GDP was larger in countries where a boom-bust pattern in the housing market played an important role in causing the recession (notably Spain and the US), while it was unusually smaller in countries such as Germany where the downturn was driven by a sharp decline in exports (OECD, 2010). The destruction of jobs was especially significant among young, temporary and low-skilled workers in the construction and manufacturing sectors.

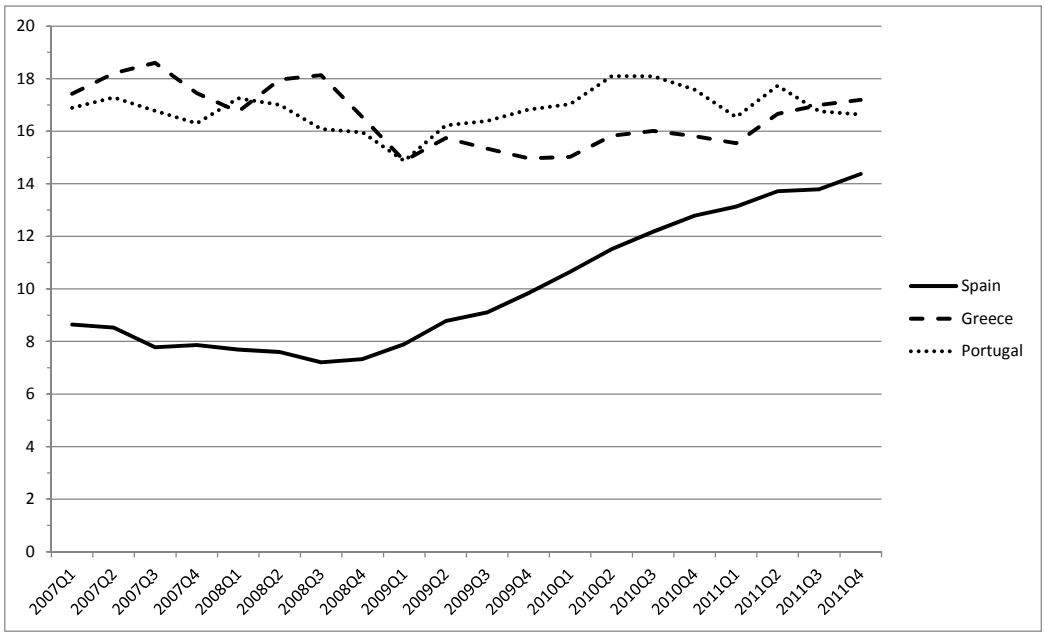
Figure 3. Unemployment rates (Incidence, H) in the 2007-2011 period: Spain, Greece and Portugal



Source: Own construction based on quarterly information from European Labour Force Survey reported by Eurostat, 2007-11.

While Spain was registering a large increase in unemployment incidence (*H*), it was also registering a dramatic change in its unemployment spell duration profile. By the end of 2007 the labor market collapsed, such that there was a continuing and massive accumulation of new unemployed workers starting their spells, at the time that exit from unemployment was virtually blocked. As a consequence, see Figure 4, there was first a slight fall in unemployment duration intensity (*I*) driven by new-comers, but soon the large increase in the durations of the already unemployed pushed the mean spell duration from 7 up to 14 months between the end of 2008 and 2011. Thus, the exceptionality of the Spanish unemployment profile vanished in the context of the prolonged recession. Indeed, Spain approached the level of unemployment intensity observed in Greece or Portugal, countries which, in contrast, had a more stable unemployment duration intensity level around 16-18 months during this period.

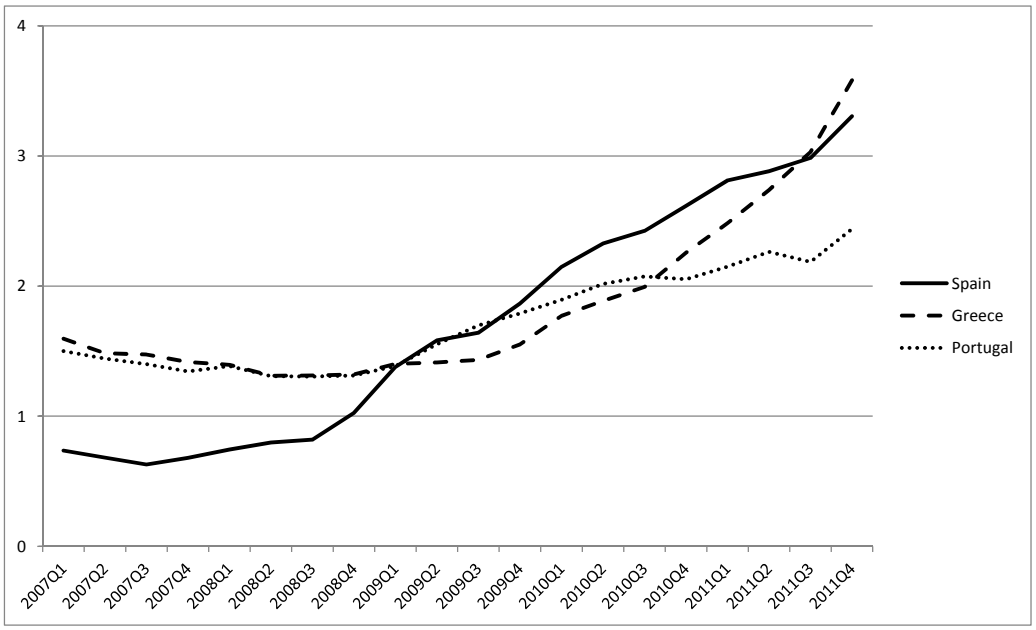
Figure 4. Mean unemployment duration (Intensity, I) in the 2007-2011 period: Spain, Greece and Portugal



Source: Own construction based on quarterly information from European Labour Force Survey reported by Eurostat, 2007-11.

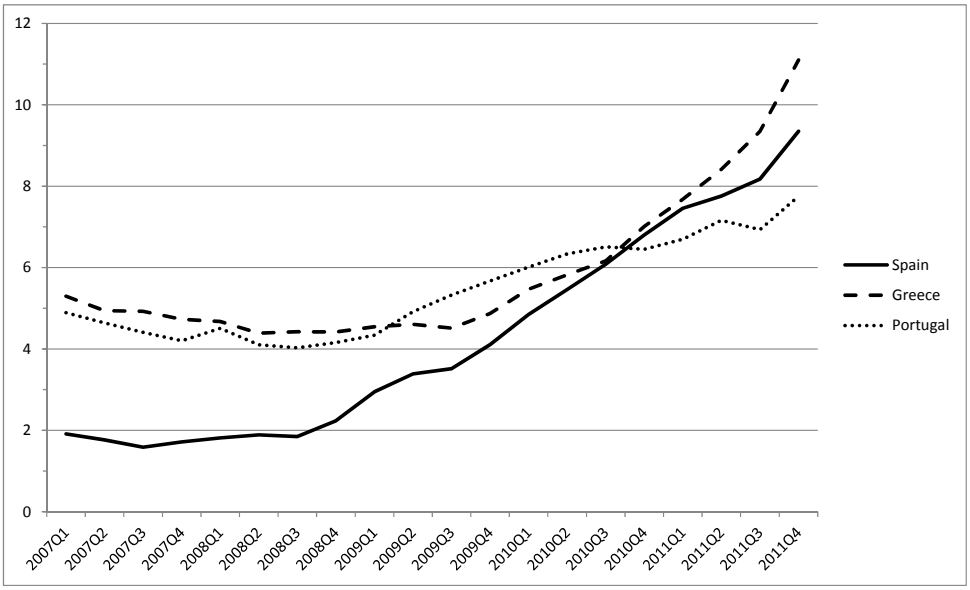
As a consequence of these results, unemployment duration-sensitive indicators, U_1 and U_2, depicted in Figures 5 and 6, show that Spain started from a relatively better position in comparison with Greece and Portugal because the per capita unemployment duration was smaller, as indicated by U_1, and it was more evenly distributed across the population (the gap was larger using U_2). However, all along the recession period, unemployment in Spain soars to levels in between those of Greece and Portugal. For example, U_1 goes from 0.6 to 3.3 months per capita between the third quarter of 2007 and the last of 2011, while U_2 goes from 1.6 to 9.4 during the same period. It is important to underline that it is most clearly observable that in Greece both U_1 and U_2 grew most rapidly in the last quarters of 2011 (U_1=3.6 months; U_2=11.1). Thus, both duration-sensitive unemployment measures underline that unemployment is a larger burden in Greece than in Spain by the end of 2011, even when unemployment incidence in the former is below than in the latter. The dominance of duration profile curves, $D_p(s)$, depicted in Figure 7, confirm this result because Greek curve dominates the Spanish and Portuguese ones. Thus, this ordering is robust to the choice of a particular aggregate unemployment indicator $U_\alpha(s)$, for any $\alpha > 1$. The key issue is that despite the aforementioned large unemployment rate increase, Spain still has significantly lower unemployment duration intensity than Greece.

Figure 5. Per capita unemployment duration U_1 in the 2007-2011 period: Spain, Greece and Portugal



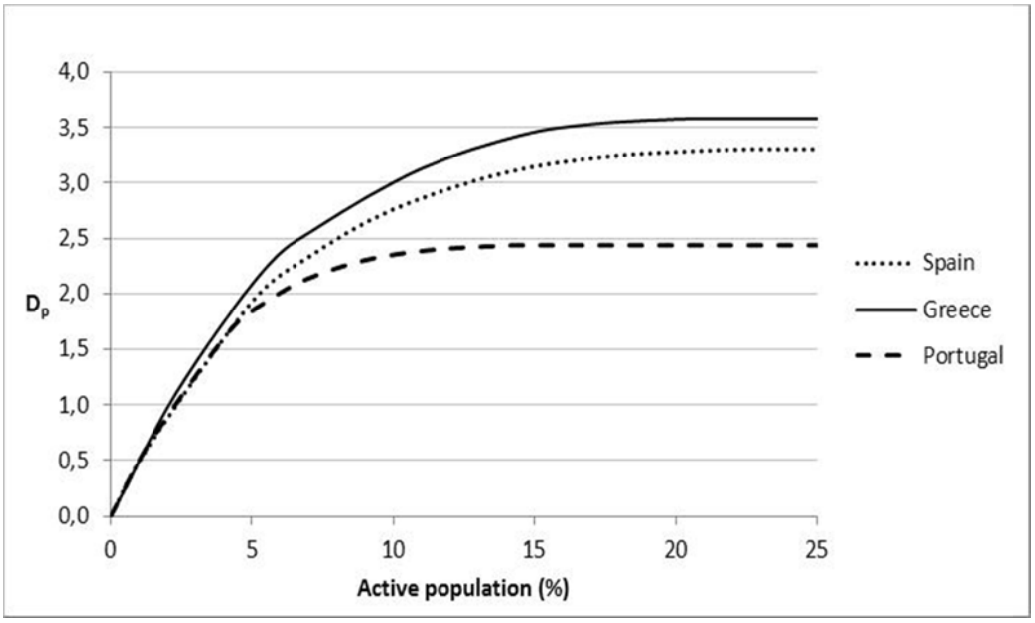
Source: Own construction based on quarterly information from European Labour Force Survey reported by Eurostat, 2007-11.

Figure 6. Unemployment Index U_2 in the 2007-2011 period: Spain, Greece and Portugal



Source: Own construction based on quarterly information from European Labour Force Survey reported by Eurostat, 2007-11.

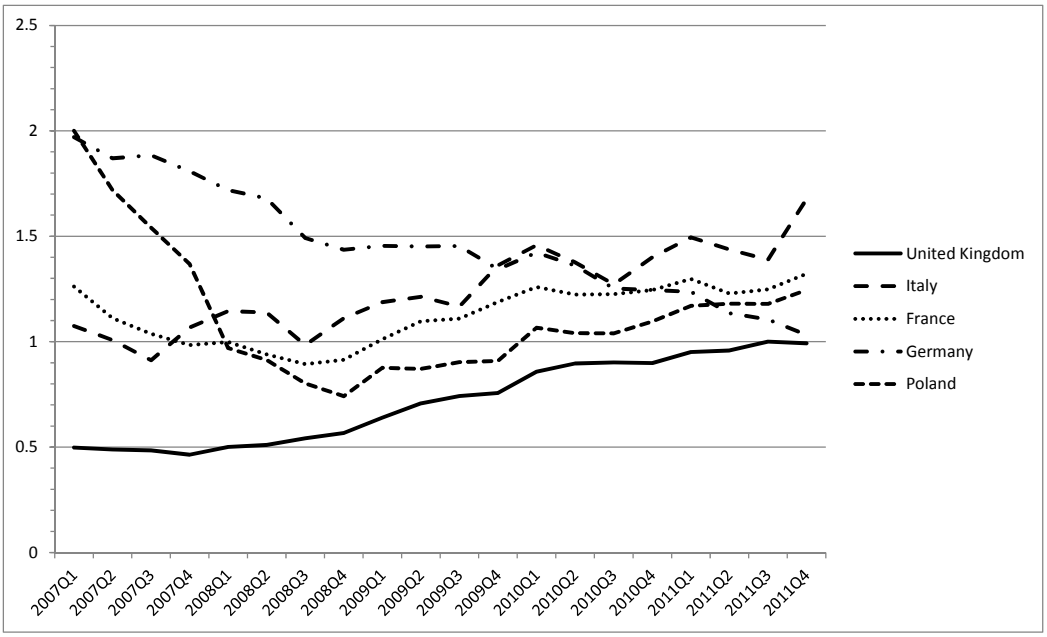
Figure 7. Duration profile curves, $D_p(s)$, at the end of 2011: Spain, Greece and Portugal



Source: Own construction based on quarterly information from European Labour Force Survey reported by Eurostat, 2011.

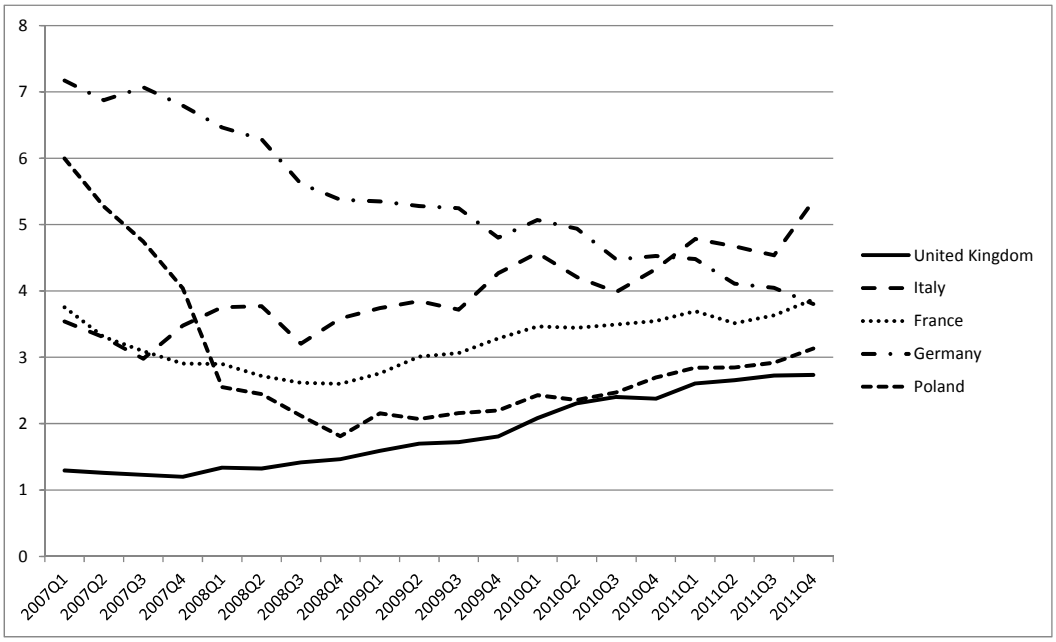
The UK and Italy also showed increases in their unemployment rate during the recession, but of a smaller magnitude than Spain, Greece or Portugal. The UK unemployment rate grew from 5 to 9.5 percent between the end of 2007 and third quarter 2011; that of Italy increased from 5.5 to 9.5 percent between the end of 2007 and of 2011. However, being similar, these trends look quite different once we take into account each country's spell duration profiles. According to U_1 and U_2, Italy seems to bear a heavier unemployment burden compared to the UK because of its larger per capita duration and more uneven distribution among the labor force, see Figures 8 and 9. This pattern remains constant along the whole time period. Poland and France, although starting somewhat later (in 2008), also follow similar upward paths in unemployment, positioning themselves between the UK and Italy by 2011 using the U_2 index. As showed in Figure 10 this ordering among these four countries is again robust to the choice of a particular aggregate unemployment indicator $U_\alpha(s)$, for any $\alpha > 1$.

Figure 8. Per capita unemployment spell duration, U_1, in the 2007-2011 period: Germany, Poland, France, UK and Italy



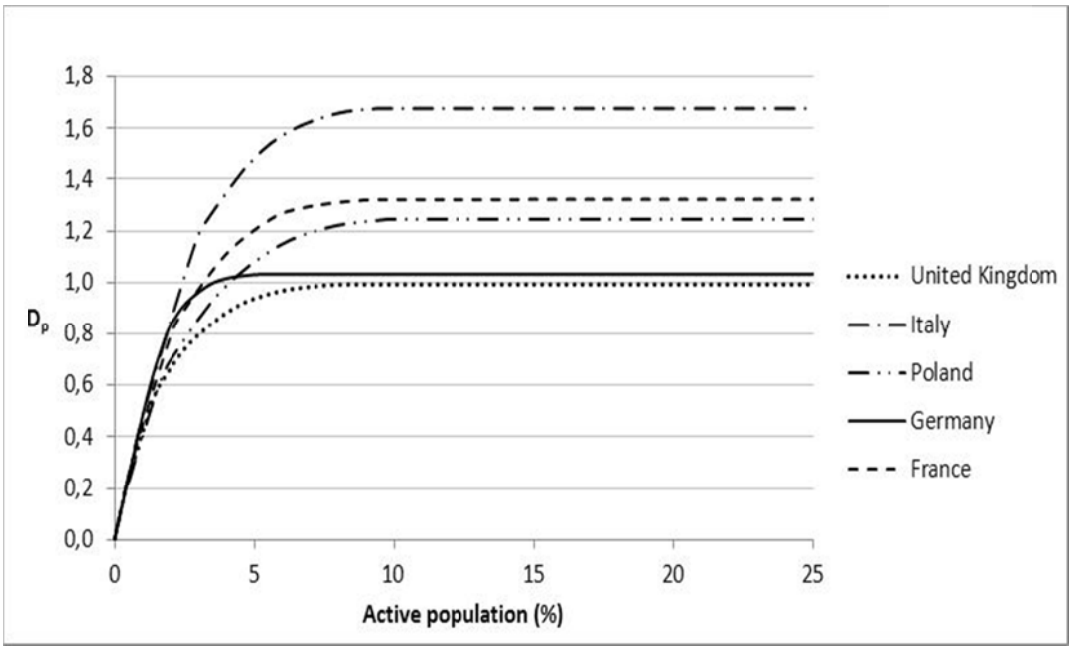
Source: Own construction based on quarterly information from European Labour Force Survey reported by Eurostat, 2007-11.

Figure 9. Unemployment, U_2, in the 2007-2011 period: Germany, Poland, France, UK and Italy



Source: Own construction based on quarterly information from European Labour Force Survey reported by Eurostat, 2007-11.

Figure 10. Duration profile curves, $D_p(s)$, at the end of 2011: Germany, Poland, France, UK and Italy



Source: Own construction based on quarterly information from European Labour Force Survey reported by Eurostat, 2011.

A very different situation from that described so far can be found in Germany, which went through the Great Recession with a persistent reduction in its unemployment rate. As mentioned above, in 2007 Germany registered a level of unemployment incidence that was higher than in the UK, Italy and France and below that in Poland. Nevertheless, taking unemployment duration into account in the measurement of unemployment, Germany had a higher unemployment level than any of these countries due to its high duration intensity. During the recession, the German mean spell duration declined from 22 to 17.5 months between 2007 (third quarter) and 2010 (first quarter) along with a reduction in the unemployment rate. This falling trend changed at the end of 2011 to a growing pattern increasing this country's mean spell duration up to 19 months. As a consequence, reviewing Germany's duration-sensitive indexes evolution along the crisis, we find that there is also a clearly falling trend in unemployment once spell durations were incorporated (U_1 achieves its minimum at 1 month per capita by the end of 2011). Therefore, the U_2 index shows that, by the end of 2011, Germany had a similar unemployment situation (3.8) to that observed in France, better than that in Italy (5.3), but worse than Poland and the UK (3.1 and 2.7), although all of these countries, except Germany, have seen their duration-sensitive unemployment indexes grow, at least since 2008. Apart from the fact that the recession

in Germany was deep but shorter than in other countries, it is well-known that a big part of the labor market adjustment to the recession was in the form of reducing working hours either through collective bargaining or by an intensive use of short-time work programs that allowed sharing the burden of unemployment hours among a larger share of the population, being for that reason more equitable than layoffs.[22]

Conclusions

The Great Recession has brought massive unemployment back to several EU countries. In this paper we defend the need to account for duration in unemployment profiles when measuring this phenomenon in order to consider this dimension because of the disproportionally negative effects of long spells. Given a certain amount of months in unemployment, the more they are borne by a small share of the population, the more unemployment is a burden for a country. Although both dimensions, incidence and spell durations, could be accounted for separately, we believe that combining them in one composite indicator provides an advantage in terms of empirical analysis. We do so by reintroducing a duration-sensitive measure of unemployment that allows us to qualify each ongoing unemployment spell by its duration and to consider not only the total time spent in unemployment but also its distribution across the labor force.

Or results show that the apparent homogeneity in unemployment experiences across several EU countries before the recession concealed a large heterogeneity regarding duration profiles. The most straightforward differences appear between Germany on the one side, with predominantly long-term unemployment, and Spain and the UK on the other side, with high rotation between employment and unemployment and thus shorter spells, with the remaining countries in the middle. After taking this into account the pre-crisis unemployment ordering changes significantly. The recession dramatically shifted the situation in Spain towards much longer durations soaring unemployment not only in its incidence, but also in its time-intensity and inequality

[22] Short-time work programs are unemployment insurance schemes in which employers are allowed to reduce employees' working hours for economic reasons, while workers receive a compensation for that reduction. However, these programs, if used too intensively, might put a risk of benefiting permanent workers at the expense of outsiders, whose entry into employment can be made even more difficult, thus promoting long-term unemployment (Cahuc and Carcillo, 2011). In this paper we follow the ILO convention to classify the active population into unemployed and employed, with no consideration of underemployment (when a worker would wish to increase her working hours). For a methodology in which the equity implications of underemployment are considered in the measurement of employment deprivation, see Gradín *et al.* (2012).

dimensions. Further, the crisis has also hit Portugal and Greece seriously, and to a lower extent the UK, France, Italy, or Poland, countries with a smaller impact on their spell duration profiles that also generally shifted towards longer durations in a variety of ways. The only country in our study that managed to significantly reduce its unemployment rates all along the recession was Germany, although keeping a large share of long-term unemployment and maintaining its record as the country with the longest mean spell duration among those studied.

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Appendix. Table A1. Unemployment in selected EU countries 2007-11

	Spain	Germany	Italy	UK	France	Greece	Portugal	Poland
2007								
Unemployment rate (%), H	8.0	8.6	5.6	5.2	7.6	8.2	8.3	9.7
Unemployed by duration (%)								
Less than 1 month	19.5	5.3	6.3	15.2	12.2	4.2	5.6	2.3
From 1 to 2 months	25.9	11.2	12.2	23.4	13.9	12.4	11.8	10.9
From 3 to 5 months	17.7	12.2	15.1	19.6	11.1	14.7	15.1	14.0
From 6 to 11 months	15.7	14.7	15.8	17.1	21.3	18.1	20.3	19.9
From 12 to 17 months	7.1	9.1	15.4	9.5	13.8	13.3	11.8	16.4
From 18 to 23 months	3.7	8.6	4.0	4.4	5.2	8.2	7.0	8.5
From 24 to 47 months	6.0	16.1	19.2	6.1	14.8	13.7	16.4	18.1
48 months or over	4.3	22.9	12.1	4.8	7.7	15.4	12.0	9.9
All durations	100	100	100	100	100	100	100	100
Mean unemployment duration (months), I	8.5	21.7	17.8	9.4	14.6	18.2	17.3	17.7
Per-capita unemployment duration (months) U_1	0.7	1.9	1.0	0.5	1.1	1.5	1.4	1.7
Unemployment, U_2	1.8	6.9	3.3	1.3	3.3	4.9	4.6	5.3
2011								
Unemployment rate, H (%)	21.0	5.9	7.6	7.9	8.7	16.4	12.8	9.6
% unemployed by duration								
Less than 1 month	7.5	7.6	4.0	10.3	11.0	3.7	4.2	2.4
From 1 to 2 months	14.1	12.8	9.7	18.8	14.6	12.0	11.4	15.9
From 3 to 5 months	16.9	15.2	13.1	18.5	10.0	15.4	15.9	20.9
From 6 to 11 months	20.5	15.5	16.8	17.7	21.8	19.0	17.8	23.6
From 12 to 17 months	12.0	8.4	16.7	11.4	14.3	16.0	12.6	15.5
From 18 to 23 months	10.1	7.6	4.5	5.7	6.7	9.3	8.6	7.8
From 24 to 47 months	14.4	11.6	19.9	11.1	13.4	12.4	18.9	10.6
48 months or over	4.4	20.8	11.8	5.6	6.7	11.4	10.6	3.3
All durations	100	100	100	100	100	100	100	100
Spell mean duration, I (months)	13.7	19.1	18.9	12.2	14.2	16.7	17.7	12.3
Per-capita spell mean duration U_1	2.9	1.1	1.4	1.0	1.2	2.7	2.3	1.2
Unemployment, U_2	7.8	4.1	4.7	2.7	3.5	8.4	7.2	2.8

Source: Own construction based on quarterly information from European Labour Force Survey reported by Eurostat, 2007-11, second quarter.