Is Long-Term Unemployment unaffected by flexible labour market legislation?

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Abstract

This paper applies duration and competing risks models (CRM) to individual-level data on unemployment spells from the 1993-2003 labour force surveys in Italy. CR and duration models are becoming increasingly pervasive in applied research to explain the factors determining both the time in a state (i.e. unemployment) and the exit route from the state (i.e. leaving unemployment for a job or non-participation). Following a description of the main features and findings on unemployment duration and long term unemployment (LTU) for European countries we add empirical evidence for Italy.

For a sample of individuals experiencing unemployment we estimate unemployment duration at the beginning and at the end of the decade by using piecewise constant hazard models, which provide the best fit to the duration data. We find evidence of strong negative duration dependence. This leads to increased unemployment persistence and consequently to enhanced LTU incidence. The individual characteristics do not exert a sizeable impact on the hazard of exiting. And the effectiveness of recent labour market regulations is related to the reduction of short term unemployment. The usefulness of these regulations was also related to reduction of the incidence of the shadow economy. The long-term unemployed, instead, remain locked-in the state of unemployment. This highlights the need for proper policy interventions to increase the employment opportunities of the long-term unemployed.

Then, by considering two different competing causes, we estimate CR models to investigate what individual characteristics drive transitions out of unemployment. Younger and better educated males have higher re-employment probabilities, while a considerable proportion of females leave the labour force after experiencing unemployment, signalling the presence of a discouragement effect.

JEL Classifications: C24, C41, J64
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1 Introduction

How long do individuals spend unemployed? How does the duration of unemployment vary across individuals? What are the destination states of the unemployed? By investigating issues like the time in a state (i.e. unemployment) and the exit route from this particular state, duration and CR models promise a deeper empirical insight into the processes accounting for individual differences in such outcomes. And in evaluating labour market conditions and considering the labour market experience of the unemployed, economists have often found it useful to look

beyond the unemployment rate and to look at the actual length of unemployment spells. This helps also to investigate the features of unemployment in depth. For these analyses these primarily refer to the incidence of LTU and the feasible evolution of this phenomenon consequent to recent labour market regulations.

Statistical analyses of unemployment duration are primarily concerned with the probability of leaving unemployment conditional on the current duration of unemployment. The determinants of this escape probability have been studied empirically by, *inter alia*, Clark and Summers (1979), Lancaster (1979), and Nickell (1979). Furthermore, the probability of an unemployed person's finding a job after a certain length of time out of work, and the variation in this probability, are currently especially useful from a policy perspective, and for the general public alike.[1]

While applications of this type are used to inform the policy makers of many foreign countries, in Italy we lack this kind of analysis. For this reason, the aim of this paper is to offer a starting point of analysis by presenting empirical evidence on unemployment duration and CR for Italy, emphasizing the key dimensions of heterogeneity of these phenomena (i.e. geographical differential). The effectiveness of the recent labour market regulations on LTU incidence will also be evaluated.

The structure of the paper is the following. The second section explains the European context and the main empirical evidence on LTU. In section 3, we describe the data and offer insights and measurement issues on LTU. The main features of Italian unemployment duration are given in this section. The fourth section provides an application of the duration analysis to the Italian labour market, emphasizing the relevance of the methodology applied. The main implications of this analysis are explained in depth. In section 5 we introduce the CR approach and apply this technique to the sample of unemployed referring to the whole decade (1993-2003). A detailed explanation of the results, and an attempt to advance the main policy implications are given in this section. Conclusions are provided in section 6.

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[1] These measures are often used as parameters to judge the effectiveness of new regulations or, even better, to introduce them. For example, as mentioned by Thomas (1996), in the UK they have been useful to know the observable characteristics of those who are more likely to leave unemployment via part-time jobs.

2 European Unemployment: evolution over time

Literature on European unemployment emphasizes the relevance of this phenomenon and the need for a proper analysis of its evolution to capture the basic facts and theories in order to present a detailed picture of the actual consistence of this problem.

This section attempts to offer a time evolution of European unemployment, explaining its main features and expressing the usefulness of a detailed investigation, mainly from a policy perspective. First of all, the need for a proper analysis implies the choice of a proper unemployment measure. Even if the standardised unemployment rate is the indicator most commonly employed, the empirical evidence highlights its limitations, especially for a dynamic approach. Details of these drawbacks will be given later in the paper.

The evolution of unemployment has been widely analysed, since it is one of the major policy concerns for European countries. We will primarily refer to the results recently obtained by Blanchard (2006). In this work empirical evidence for 15 European countries (EU15) is summarized.[2] Firstly, looking at European unemployment rates in 2005, there is strong evidence of heterogeneity across countries. More precisely, the average unemployment rate is the result of quite dissimilar patterns. On the one hand, the United Kingdom, the Netherlands, Denmark, Ireland, and Austria have lower unemployment rates than the United States. High average European unemployment reflects, therefore, high unemployment in the four main continental countries, namely Germany, France, Italy, and Spain. Even among these four nations, the differences are striking. France and Italy have experienced high and persistent unemployment rates since the early 80s. But the Italian rate – as will be emphasized below – summarizes heterogeneous regional rates. These discrepancies underline the need for a geographically detailed investigation of this phenomenon. More precisely, there need to be country-specific policy interventions since this problem cannot be treated homogeneously in all countries. And the standard unemployment is the result of the product of two terms: flows into and out of unemployment and unemployment duration. The high

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[2] These results refer to the 15 EU Member States in 2005: Greece, Spain, France, Germany, Finland, Belgium, Italy, Portugal, Sweden, Netherlands, Denmark, Luxembourg, United Kingdom, Austria, and Ireland.

European rates, then, could be the result of high inflows and outflows from this state, or of high average duration of unemployment.

This decomposition of the unemployment rate offers scope for subsequent analysis of Italian unemployment duration, and it seems to be the most appropriate way to investigate this issue in depth. It is therefore essential to discover what real causes lie behind this phenomenon, and then to try to suggest the proper policy implications.

As regards general and commonly observed trends, being unemployed in Europe has always been a different experience from being unemployed in the U S, since joblessness in the latter is characterised by shorter durations, and the discrepancies between these two nations have increased over time.

Another relevant aspect to take into consideration relates to the effects of unemployment on different population groups, such as skilled versus unskilled workers, young versus older, men versus women. One of the often mentioned features of European joblessness relates to the high unemployment rate faced by young workers. The evidence available from European countries shows that some nations - mainly Italy and Greece - are characterised by very high youth unemployment rates. On the other hand, Germany shows the lowest levels of youth joblessness. Whether this reflects a uniquely European pathology is less clear, however. It is necessary to underline that the comparison of the European and US series did not reveal the existence of remarkable discrepancies and, on average, the European experience does not appear that unusual.

The empirical evidence offers a range of plausible explanations for the evolution of European unemployment over the last two decades. Firstly, it is necessary to underline that in the 90s European unemployment maintained the high levels registered in the previous decade. One of the main causes of this, as the OECD report (2002) argued, is the presence of ill-adapted labour market institutions. The necessity for proper reforms - from the design of unemployment insurance and employment protection, to the reduction of the tax wedge and the minimum wage, to better training and active labour market policies programmes - has also been underlined. The report was, and in some aspects still is, extremely influential. The notion that "labour market rigidities" are at the core of European unemployment has

gained wide acceptance among policy makers. Italy, indeed, has recently introduced specific regulations to promote labour force flexibility.

In parallel, on the academic research side, the shift in focus towards institutions has been made easier by the emergence of a new and richer framework to think about unemployment, a framework based on flows, matching and bargaining, suggesting therefore the scope for a dynamic approach to analyse unemployment. This approach, as already stated, will be adopted for the Italian context.

2.1 Unemployment Duration: dynamics and empirical evidence

Analysis of LTU[3] has been focused not only on the usual unemployment indicators (unemployment rates), but also on specific statistics summarizing duration distribution, since these permit an exhaustive description of this phenomenon. One of the measures most commonly used is the incidence of LTU in the total unemployment pool.

As regards the evolution of the incidence of LTU in OECD countries, Machin and Manning (1998) underlined an increased incidence of LTU lagging behind the raised level of unemployment. The discrepancy within countries of that incidence emphasizes the existence of some systematic patterns. In most nations, such as Italy, it is lower for women than men though the gap is quite small and there are very few countries where the reverse is true. There are a certain number of possible reasons for these discrepancies. Firstly, countries differ in the relative unemployment rates of men and women, and it is noticeable that nations where the female unemployment rate is relatively high tend to have rather high levels of incidence of LTU among women. On the other hand, it is likely that the attachment of women to the labour force may also matter, since a higher proportion of females than males moves from unemployment to inactivity rather than entering employment. If many women leave the labour force after an unemployment experience then this will tend to lead to a low incidence of LTU even if the exit rate into employment is low.

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[3] The International Labour Office (ILO) defines LTU the individuals which have experienced 12 or more months of unemployment, while the very LTU are the individuals with unemployment spells of at least 24 months. Anyway, in cross-countries comparisons, the very long-term spells of unemployment have duration of four years (48 months). This is the OECD definition of very LTU that has found to be convenient for reconciling the experiences of the country analysed (the OECD members analysed in the Employment Outlook, 2002).

In all countries the LTU incidence is substantially higher among older workers than younger. It is well-known that the labour market histories of young workers, especially after the new regulations aimed to promote flexibility (in Italy the first attempt to promote such mobility is dated 1997), are often characterised by frequent transitions between employment and unemployment, which means that long spells in both states are relatively rare. Differences in the incidence of LTU by education are less marked.

Generally it would seem that groups with high unemployment rates also tend to have a high incidence of LTU, the main exception to this being the young. It also seems that LTU emerges as a problem wherever unemployment is a serious concern. This raises obvious questions about the reason for this correlation and literature has tried to offer valuable answers. It is necessary to underline, however, that part of the variation in the incidence of LTU does not seem able to be explained simply by the overall unemployment level.

As regards the causes of variation in the incidence of LTU in OECD countries, Machin and Manning (1998) stressed the role played by changes in the inflows and outflows from unemployment, but also by the nature of duration dependence. The framework adopted is aimed at discovering whether the rise in European LTU incidence was associated either with changes in the average exit rate from unemployment or the degree of duration dependence. Such an attempt obviously has implications for policies that one might pursue to reduce the incidence of LTU. For example, evidence of an increased relevance of duration dependence might suggest that something should be done to improve LTU exit rates. But, unfortunately, when one looks at the existing literature there is surprisingly little information relating to this basic question. The relevance of the issue and the paucity of existing information offered the scope to summarize the main findings available for OECD countries and, next in the paper, to investigate the Italian context on the basis of the available data.

The former analysis refers primarily to Machin and Manning (1998). The authors fit a Weibull duration model to the data on the duration structure of incomplete spells. The evidence suggests that there is no indication of worsening duration dependence over time and that the increase in the LTU incidence can be accounted for by a reduction in exit rates from unemployment at all durations. If

anything, negative duration dependence seems to have been reduced. This statement has to be carefully interpreted since, as will be outlined below, there are reasons for thinking that the negative duration dependence induced by heterogeneity among the unemployed becomes more acute when the overall exit rate from unemployment is high. One of the other findings of interest is that of a LTU which lags behind actual unemployment.[4] Further, it does not seem that there has been any deterioration in the relationship between unemployment and LTU over a long period of time. This is consistent with the finding of duration dependence and inflow rates that do not seem to have changed very much over time. The collapse of the exit rates, thus, remains the only cause of the increased LTU incidence.

3 The Italian LFS

The quarterly LFS was introduced in our country in 1959 by the Italian National Institute of Statistics (Istat). It has been changed many times, and the features here emphasized refer to the structure employed up to 2003, which is the last year of the decade analysed.[5] The unit of survey is the household. Every household member resident in Italy is interviewed.

The survey was conducted every quarter, with the interviews in January, April, July, and October. The overall sample included almost 75,000 families. The quarterly sampling design was composed of two stages, with a stratification of the units of the first stage; the first stage units are municipalities, while the second stage ones are families.

The rotation scheme employed for the surveyed sample is fundamental for the generation of longitudinal data of the kind used in this paper, and it allows the labour market flows' estimation and valuable analysis of the labour mobility. The 2-2-2 rotation scheme implies, indeed, a 50% overlapping of the theoretical sample to a

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[4] If we start from the peak of the cycle as unemployment rises the share of LTU actually falls at first but then rises. Once we reach the trough and unemployment starts to fall the proportion of LTU continues to rise for a while but then falls. The consequence is that for a given level of unemployment, the incidence of LTU is generally higher in the recovery than the slump. This point is theoretically explained in Machin and Manning (1998).

[5] For a detailed description of the changes occurred in 1990, 1992, and 1999, see Istat (2002). A new structure has been introduced since January 2004 and it lead to the continuous LFS. Here we do not include those details since they do not refer to the time span examined.

quarter of distance, a 25% overlapping to three quarters, a 50% to four quarters, and a 25% to five quarters.

Record-linkage procedures then allow combining data related to two surveys - typically collected at time distances of three and twelve months - in order to build up the corresponding labour market transition matrix. The information collected on the same individuals at different points in time represents the longitudinal component of the LFS. But the quarterly LFS does not re-interview the individuals changing residence or going abroad. For this reason it cannot be defined as a panel. The data-linkage, therefore, refers to the population re-interviewed after three, twelve, or fifteen months, respectively. This is defined as longitudinal population. The longitudinal population estimates constitute a sub sample of the quarterly LFS, since the longitudinal component does not represent the total population, but the portion resident in the same municipality both at the beginning and at the end of the time span analysed.

The longitudinal part, then, cannot be truly representative of the total Italian population, since the behaviour of people staying in the country is totally different from that of those moving abroad. The generalisation of the longitudinal results to the overall population would thus imply a bias into the flows' estimates. But the observed low degree of geographical mobility can guarantee that only a small proportion of the overall population is not included in the estimations (almost 2.2% of the population change municipality of residence every year). For this section of the population, however, it is possible to obtain estimates of the labour market status at the beginning and at the end of the period.

The datasets used in these applications refer to ten years combined data. These are ten single datasets referring to the longitudinal population surveyed after twelve months. These cover the time-span 1993-2003.

3.1 LTU: insights and measurement issues

During the last two decades the labour market in industrialised countries has been characterised by a deep structural unemployment change leading to a stronger emphasis on its duration features. The rise in European unemployment in recent years does not seem to be primarily due to an increase in the number of people entering unemployment, but rather to increased difficulties in finding work once unemployed. Such observations suggest that "efforts to reduce the unemployment duration spells should be a key element in strategies aimed to diminish unemployment."[6]

To analyse unemployment duration, as explained above, it seems opportune to employ specific indicators summarizing duration distribution, since the features of this phenomenon cannot be entirely captured by the usual unemployment rates. One of the most commonly used statistics for this phenomenon is the incidence of LTU. This is statistically defined as the fraction of the currently unemployed for more than a certain period (it is based on information about the duration structure of incomplete spells). Typically - and this is the case for Italy - that period of time is a year. These statistics dominate the analysis of LTU since they are generally widely and readily available.

The table below presents the incidence of LTU for Italian regions and for Italy too, for the period 1993-2003. But they do suffer from some weaknesses: notably that a single day out of unemployment will reset the clock for the duration of unemployment back to zero so that these statistics are very sensitive to short breaks in unemployment (Machin and Manning, 1998). The LTU rate, instead, is defined as the proportion of long term unemployed in the total labour force. It follows that the LTU rate is the result of the product between unemployment rate and LTU incidence.

Unemployment duration is commonly inferred from the LFS and it refers to the ongoing spell for the individuals classified as unemployed. With a specific question for the people in search of work the survey captures unemployment duration (expressed in months), but this has strong consequences in terms of measurement problems, issues investigated in depth by Torelli and Trivellato (1993). The authors

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[6] This is one of the purposes contained in the OECD Employment Outlook (2002, p. 187). Further, Machin and Manning (1998) note that the rise in unemployment seen in the bulk of these European countries since the 70s (after the first oil-shock) has been associated with an increase in the average duration of unemployment, rather than with an increase in the inflows rate.

underline the existence of measurement problems mainly due to the so called "heaping effect".[7] This characterizes mainly periodic LFS (the Italian survey also) with a rotating panel design and retrospective questions. It is well-known that, as a result of the unreliability of human memory, retrospective data suffer from several recall errors. It should be emphasized that this evidence is by no means peculiar to Italian data.[8] Similar patterns of response errors, indeed, are found in similar analyses carried out on U S data from the Current Population Survey (i. e. Horvath, 1982).

Karr (1997) emphasizes the tendency to underestimate the LTU incidence mainly due to the fact that the official published statistics are based on ongoing unemployment spells with right-censored durations; therefore these durations are censored and shorter than the complete ones. Salant (1977), instead, explains how the "length bias" problem could lead to an over-representation of the longer spells, since the likelihood of being sampled is found to be proportional to the spell length.

The OECD Outlook (2002) shows how ongoing unemployment episodes defined as short could instead exceed the 12 months threshold. On the other hand, it is also emphasized that the effective amount of longer spells could often be downward biased from a sectional survey that takes a picture of the unemployment stock at a specific point in time. The empirical evidence suggests the predominance of the "length bias" effect; it follows that the actual LTU incidence is lower than that published.

Voluminous literature has been produced to analyse unemployment duration, both to try to analyse its causes and consequences (Machin and Manning, 1998) and

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[7] The "heaping effect" is the abnormal concentration of responses at certain durations. Specifically, with reference to LFS with rotating panel designs, the distribution of unemployment duration resulting from a single survey shows a strong "heaping effect". Typically, spikes occur at 12 and its multiples (i.e. years), when the time unit for unemployment duration is the month. This becomes of a certain concern if the LTU definition is based on the 12 months threshold, as it is for Italy (ILO definition). Moreover, the tendency toward rounding-off reported durations is higher for longer spells (Trivellato, Marliani, and Torelli, 1989).

[8] The Italian LFS is a quarterly survey with a rotating panel design of the 2-2-2 type. This implies that each family is interviewed for two consecutive surveys, dropped from the sample for two surveys, and interviewed for two final surveys. It is this panel structure that allows the construction of longitudinal files by matching persons who participate in different surveys.

In each survey, persons who identify themselves as unemployed job-seekers are asked how long they have been looking for work. Responses are coded from 1 to 99 months. One-month duration is also coded for persons who say they have been looking for fewer than four weeks. Anyone reporting duration of more than 99 months is given 99 months because of the two-digit coding limit for this question.

By using matched data from two consecutive surveys and combining responses to the retrospective question on the length of the unemployment spell in progress at the time of the survey, it has been possible to identify both individuals in continuing spell and individuals with a completed spell of unemployment.

to show the relevant empirical evidence related to industrialised countries (OECD Employment Outlook, 2002).[9]

Great interest lies also in the relationship between the overall unemployment rate and the incidence of LTU for OECD countries. Even if literature from European countries has emphasized a positive correlation between LTU and the overall unemployment rate, it is exceedingly dangerous to interpret this correlation as evidence of causality running from LTU to the level of unemployment. The OECD (2002) argues that this relationship, indeed, does not seem to be confirmed by the analysis of the historical series of the 30 members' states.

Italy shows (Table 1) an increasing LTU incidence that reached a peak in 2000. This increase seems to be a common feature of the European OECD countries. Even overseas countries such as the U.S. are starting to experience rising incidences.[10]

These countries also show negative unemployment duration dependence, since the likelihood of leaving unemployment successfully (entering employment) decreases with the time spent in this state. The destination states of the previously unemployed that do not find work, instead, vary across countries. For some states very long durations are accumulated by the jobless, while for other countries there is an increased propensity to leave the labour force.

This distinction is relevant to define the proper policy interventions to overcome these problems. Labour market policy, indeed, can attempt to influence the incidence of LTU through "prevention" or "cure". But the emphasis to be given to each approach in an optimal strategy depends on a number of considerations related to state dependence, the importance of individual differences affecting the rate of entry to LTU, the characteristics of the LTU, and the phenomenon of lock-in when the short term unemployed participate in long-term labour market programmes.

The availability of LTU incidence allows and emphasizes the relevance of a detailed analysis of the labour market, mainly because at a given unemployment rate it can lead to two conflicting situations. On the one hand the overall population could experience brief unemployment spells. On the other hand a group of "hard-core

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[9] In 2000 the average incidence of the LTU in the industrialised countries has been by 30%, but the features and the dynamics of this phenomenon are heterogeneously distributed over the countries. Italy and Germany are the countries with the highest incidence (greater than 50%), while United States and Canada are the states with the lowest incidence.

[10] This is showed and explained in the OECD Outlook (2002).

unemployed" could bear the total weight of the unemployment. Certainly these different situations imply different policies, both in terms of active interventions (to increase the employment opportunities for the unemployed), but also in terms of economic and social interventions to assist the people in need.[11]

The changes in the inflows and outflows from unemployment and the existence of duration dependence are the main causes identified by the literature on this phenomenon. A collapse of the exit rates from this state will lead to an increase of LTU incidence, and this is confirmed for many European countries. Table 1 shows that a rise in this persistence has also been experienced in Italy, although this tendency has lessened in recent years. This tendency is confirmed, as explained below (Table 2), by the evidence of a rising trend of average unemployment duration.

Table 1: The Survey-Based Incidence of LTU in Italy, 1993-2003

	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02	02/03
Italy	39.3	42.6	44.6	46.2	47.8	49.6	50	50	48	48.2
Piedmont	32.3	38.1	39.8	38.9	40.3	41.9	38.3	34.2	33.9	36.4
A.Valley	7.9	10.9	10.9	10.3	10	10.2	12.1	11.1	17.9	23.1
Lombardy	30.4	35	36.1	38.3	37	36.4	37.2	37.9	34.8	33.8
Trentino	11.5	12.9	12.8	16.5	19.3	21.8	23.8	21.7	15.1	17.8
Veneto	20.2	23.5	23.3	20.9	21.1	20.3	18	14.9	13.2	17.2
Friuli	28.5	29.5	29	29.8	29.6	28.5	27.7	26.8	23.3	23.2
Liguria	28.2	33.5	37.1	36.1	33.3	33	32.7	20.1	26.7	33.6
Emilia	22.7	25.9	25.7	25.7	26.1	27.4	24.4	23.2	24.9	26.5
Tuscany	52.6	58.8	59.4	57.2	57.1	57	59	57.3	54.8	47.4
Umbria	39.3	41.9	44.8	47.2	45.6	47.3	47.1	42.5	44.6	44
Marche	46.4	52.6	48.2	43.5	43.4	45.8	49.2	47.2	45.2	39.7
Lazio	27.4	30.9	36	39.8	40.7	43.7	46.1	46.5	42.7	43.6
Abruzzo	64.7	63.7	62.3	62.3	62	63.3	65.1	62.7	60.3	55.3
Molise	45.4	52.7	55.9	54.6	54.6	57.7	59.8	57.3	52.3	50.6
Campania	39.1	44.8	47.5	48.6	51.2	53.5	52.9	53.1	51.4	51.2
Apulia	48.1	49.6	50.4	54.2	54.8	55.6	54.3	53	54.6	56.7
Basilicata	46.4	49.2	49.2	50.7	53.6	55.4	56.1	60.5	61.1	59.6
Calabria	46.7	52.7	53.8	57.1	59.7	62.3	62.5	62.2	58.9	57.1
Sicily	51.8	51.8	55.1	58.3	59.4	60.6	61.6	62.6	62.4	61.4
Sardinia	48.7	50.7	54.5	55.8	58.5	60.2	60.4	60.1	55.6	53.8

Notes: The figures refer to the proportion of the unemployed who have been joblessness more than a year (LTU) and are computed as the ratio of LTU rates over the total unemployment rates taken from the official statistics (Istat).
Source: Author's calculations using 1993/2003 LFS

An overall 22% change within the decade 1993-2003 can be inferred. This is the average of a wide and heterogeneous range across Italian regions. On the one

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[11] In their work, Payne and Payne (2000), and Paggiaro (2001) provide specific approaches to identify the people more exposed to the risk of unemployment.

hand we find Campania (30.9%), Trentino (54.8%), Lazio (59.1%), and the Aosta Valley (192%) with the highest increases. On the other hand, the Veneto (-14.8%), Friuli (-18.6%), Tuscany (-9.8%), Marche (-14.3%), and Abruzzo (-14.5%) experienced a reduction. It seems opportune to analyse in detail the issue of unemployment persistence. In this paper we want to determine the main causes of its increase, examining if the collapse of the outflow rates is a proper explanation (as argued by Machin and Manning for OECD member states) even if it has already been defined as relatively crude for the kind of data employed.

The impact of the recent labour market regulations will also be evaluated. This will be achieved by looking at the features of unemployment duration in two different time spans (1993-1994 and 2002-2003, respectively). The geographical discrepancies of this persistence will be emphasized and discussed in detail. Focusing on disaggregated dimensions of the LTU problem offers important insights into the interaction of market and institutional features in shaping the structure and dynamics of Italian unemployment. Simple statistics on the structure of LTU in the time period 1993-2003 show that Italian unemployment is characterized by three key dimensions of heterogeneity: a regional differential, an age differential and a gender differential. And the differentials in the LTU structure reflect the heterogeneous features of unemployment in our country.[12]

Our discussion will be mainly in terms of unemployment duration and of the competing causes after a jobless experience. But in many countries there has also been a sharp increase in inactivity rates in demographic groups that previously had a very strong labour market attachment (i.e. prime-aged men). This has led some researchers to alter their focus from unemployment to inactivity. One could obviously then produce a similar analysis based on duration of spells of non-employment. But little has yet been done outside the US, where, for example, Juhn, Murphy and Topel (1991) documented that the rise since the 80s in the incidence of long-term-inactivity is much more marked than any trends in LTU.

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[12] These issues are strongly emphasized also in Bertola and Garibaldi (2002).

3.2 Inflows and Outflows from the state of unemployment

Analysis of unemployment stock in terms of its dynamic components - mainly inflow and outflow rates - is essential to evaluate if the findings of Machin and Manning (1998) are confirmed for the Italian labour market.[13] For this purpose it is useful to introduce the results obtained by the Italian LFS used in this paper. First of all, the incidence of LTU is related to the time evolution of the number of unemployed of short and long duration. Analysis of the unemployment pool's durations can provide evidence on the inflow dynamics. By dividing unemployment into short (inflow over the last year) and long term (twelve months or more) durations it is possible to study the relationship between these two components. This kind of analysis covered the time period 1993-2003. One of the most interesting patterns is that of inflow, which showed a sharp decrease, reducing its value by approximately half. And the decreasing trend was noted in every geographical area examined. This confirms the inverse relationship between the inflow rate and the incidence of unemployment, at least in the short run.[14] This result obviously contrasts with the findings of Machin and Manning (1998).[15] As regards the medium term effects, the analysis is focused on the LTU series which, as mentioned above, lags behind that of short duration. Given that the LTU are a fraction of previous years' inflows that didn't change their state, the inflow reduction is also going to affect this category, but with a time lag.

Looking at the states of destinations, there are three possible alternatives: to become employed, remain unemployed, or leave the labour force.[16] The evidence is towards a substantial stability of these historical series. This is true for all geographical partitions and for both the LTU and the short term unemployed. Also this result contrasts with that of Machin and Manning (1998).

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[13] They conclude, as mentioned above, that the raise in the LTU incidence is mainly due to a reduction of the exit rates from unemployment, given that duration dependence and inflow rates do not seem to have changed very much over time.

[14] For further details on the analysis described, see Contini, B. and Trivellato, U. (2005, chapter 8).

[15] This statement comes from the fact that Machin and Manning (1998) suggest that the raise in the LTU is mainly due to a reduction of the exit rates from unemployment, while the Italian analysis (time span 1993-2003) suggests a decreasing inflow trend causing the raise of LTU incidence.

[16] The labour force statistics in OECD countries divide the adult population into three, mutually exclusive groups: employed, unemployed, and inactive. But it is possible to reach a greater deal of precision by allowing the existence of a greater number of states, since quite often these categories are too broad, including individuals heterogeneous in terms of behaviour and attitudes.

It is therefore quite interesting to explore these issues further by comparing unemployment duration between two times intervals related to a wide period, using longitudinal data on unemployment spells from the Italian 1993-2003 LFS. This will allow a precise identification of the causes and intertemporal differences of unemployment duration for our country.

Looking at the two intervals analysed - 1993/1994 and 2002/2003, respectively - we will try to offer an evaluation of the effectiveness of the labour market regulations introduced within the time span, emphasizing the relevance of this methodology also from a policy perspective.[17] We will attempt to assess the efficacy of these regulations in terms of employment opportunities for the young, females (and other disadvantaged categories), increased flexibility and, therefore, a reduction of unemployment duration (shorter spells): since there has been a change, we want to evaluate its impact and if it corresponds with expectations. Descriptive information on the two samples – examining both the dependent variable and the covariates used in our estimates- is provided in Table 2. The composition of the two samples differs in some important ways.

Table 2: Description of Unemployment Duration Covariates

Variable Name	Variable Label	1993-1994 Means	2002-2003 Means
spell	unemployment duration in months	27.464	36.881
sex	1 if male	0.473	0.457
age	age of the individual, [15-64] years age bracket	29.394	32.377
married	1 if married	0.364	0.408
famsize	1 if the family size is 4 or 5	0.595	0.559
north	1 for living in Piedmont, Aosta Valley, Lombardy, Liguria, Trentino Alto Adige, Veneto, Friuli Venezia Giulia, and Emilia Romagna (omitted category)	0.257	0.177
centre	1 for Tuscany, Umbria, Marche, and Lazio	0.171	0.120
south	1 for living in Abruzzo, Molise, Campania, Apulia, Basilicata, and Calabria	0.393	0.465
islands	1 for living in Sicily and Sardinia	0.179	0.238
loweduc	1 if illiterate or completing 5 years of schooling	0.183	0.132
compulsory	1 if completing compulsory education or holding a qualification that does not allow university admission	0.501	0.459
diploma	1 for holding diploma	0.275	0.334
degree	1 for holding degree or PhD (omitted category)	0.041	0.075
urate	regional unemployment rates (annual average)	12.166	13.32
experience	1 for unemployed with job experience	0.495	0.502
fullt	1 if available only for full-t works (base category)	0.361	0.258
partt	1 if available only for part-t works	0.061	0.065
betterft	1 if full-time work is the preferred option	0.295	0.373
betterpt	1 if part-time work is the preferred option	0.083	0.108

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[17] For a description of the institutional changes of the Italian labour market, see Contini, Leombruni, Pacelli, and Villosio (2007).

everytype	1 if the type of work is indifferent	0.198	0.196
gdpgrowth	regional gdp growth rate (annual average)	5.104	3.733
ulatot	industrial labour units/total labour units (annual change)	-1.619	-0.814
industry	industry value added (annual change)	-0.313	-1.393
no. observations	sample sizes for 1993-1994 and 2002-2003	3444	3201

Source: Author's calculations using 1993/2003 LFS

Explanations for the recent rising trend of average unemployment duration (spell) rely either on the compositional changes of the labour force or, more fundamentally, on the emergence of some economic or institutional mechanisms. The analysis presented in this paper will try to better understand the reasons for the trend observed in the Italian labour market. This behaviour of unemployment duration has also been observed in other labour markets previously not affected by the problem. One of the most striking examples is the US labour market, normally not affected by unemployment problems. And some authors have suggested the reasons for this increase.[18]

The unemployed nowadays are older, marry more frequently, but have smaller families than during the nineties. The educational attainment of the jobless has increased, as can be noted both by the reduction of the low and middle educated and by the increase of the proportion of the unemployed holding a diploma or a degree. The geographical location of the unemployed has also changed. While the jobless in the nineties were more concentrated in the south and in the north (39% and 26%, respectively), the trend has changed in recent years. In 2002-2003, even if the most of the unemployed were still located in the south, there was a striking reduction in the north, and at the same time an increase in unemployment on the islands. The sample sizes in the two periods indicate a reduction of the number of unemployed during the decade that caused a decreasing trend of the unemployment rate. This tendency, as explained above, comes with an increased unemployment duration incidence, and leads to the well-known phenomenon of the "hard-core unemployment". This means a small number of individuals experiencing prolonged periods of unemployment. The rising trend of the incidence of LTU and reduction of the unemployment rate are currently continuing. It is thus necessary to understand what caused this increasing tendency by looking at what happened during the decade

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[18] An exhaustive explanation for the rising trend of the unemployment duration is in Machado, J.A.F., Portugal, P., and Guimaraes, J. (2006).

examined. An in depth analysis of the LTU is also needed to understand its causes and consequences.

4 Modelling the Hazard of Leaving Unemployment

The features of the Italian LFS data emphasized in section 3 lead to a specific model choice to explain the factors determining both the time spent in unemployment, and the exit routes from this state (competing causes for leaving joblessness, section 5). The wide time range for the duration distributions (1-99 months) collected by these data is one of the main reasons that motivated the use of a flexible proportional hazard (PH) model to try to overcome the rigidities implied by standard parametric models, such as the exponential, Weibull, and Gompertz. This is the piecewise constant hazard model (PCHM thereafter) and it has more baseline parameters to estimate than the parametrical models just mentioned, which have only one baseline hazard parameter.[19] The PCHM is popular because of its flexibility. It can be formalized as follows. The conditional hazard rate $\lambda(t|x)$ can be factored into separate functions of

$$\lambda(t|x) = \lambda_0(t,\alpha)\phi(x,\beta),$$

where $\lambda_0(t,\alpha)$ is the baseline hazard, and is a function of t alone, and $\phi(x,\beta)$ is a function of the individual characteristics, x, alone. The baseline hazard is flexibly specified with different exponential distributions within each time-interval of the unemployment duration, allowing a constant hazard in each specified time-piece. This means that $\lambda_0(t)$ is a step function with k segments.

To estimate a piecewise constant baseline hazard, time intervals covering the range from 0 to the maximum duration observed are defined:

$$\lambda_0(t,\alpha) = e^{\alpha_j}, c_{j\text{-}1} \le t < c_j, \ j=1,...,k,$$

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[19] A similar formalisation has been employed by Contini and Trivellato (2005, chapter 8). But they expressed the likelihood function in terms of survivor function and not in terms of hazard as we do in this paper. That particular specification has been justified as a matter of caution with respect to measurement errors of the Italian unemployment duration.

where $c_0 = 0, c_k = \infty$, the other breakpoints $c_1,...,c_{k-1}$ are specified, and the parameters $\alpha_1,...,\alpha_k$ are to be estimated. These parameters are exponentiated to ensure $\lambda_0(t,\alpha) > 0$.

The identification of the number of segments primarily refers to the relative data frequencies (durations, in months), but a precise econometrics identification is recommended.[20] This procedure will be clarified below. The Italian LFS data indicate if a transition occurred within a precise k-months interval (that ranges from 1 to 12 months), and it is conditional on the unemployment duration observed in the first survey. The PCHM is estimated using the maximum likelihood procedure. And the covariates relate to sex, age, marital status, family size, educational attainment, geographical location of residence, work experience, but also to structural indicators, such as the regional unemployment rates, the regional gdp growth rates, and the change of the industrial labour units.

One of the most relevant issues to address to obtain a proper model specification relates to the choice of the time pieces for the hazard function. The first insight, as briefly mentioned, comes from the relative frequencies of our unemployment durations. Even in this kind of application, the choice should be determined, as much as possible, by goodness-of-fit criteria. Starting from a fairly general set of pieces, it is necessary to test down to see if certain categories can be conflated or not. The correct perception of this comes also through inspecting the graphs of the pieces to see whether the segments are really strongly different. This can be - and has been - done more formally through simple t-tests on the pieces. It is usually better to have more sub-intervals than necessary than too few, since this allows the use of the personal judgement on this matter in determining the number of pieces. Duration models of this type, unfortunately, do not offer specific goodness-of-fit criteria, with the partial exception of the LogL. This statement comes from the issues around the use of this criterion.

The Akaike information criterion (AIC) helps to overcome those problems. It corrects for the number of parameters, and it can be used as an illustrative tool. The use of the AIC helps, therefore, also on the relevant side of over-parameterisation with respect to the number of pieces used. A good compromise between the number

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[20] The PCHM is described in Cameron and Trivedi (2005, section 17.7).

of parameters and the quality of model prediction is reached. Information criteria such as the AIC are log-likelihood criterion with degrees of freedom adjustment, and the model with the lowest AIC preferred.[21]

The PCHM is parameterized in such a way that the baseline hazard (the constant) changes over time. It is one the most relevant peculiarities of this parameterization, since in this case we do not have a unique constant for the overall period analysed, but i.e. the constant for the first period is the coefficient of tp1, in the second time piece the coefficient of tp2 (estimates table), and so forward. This implies a punctual and specific interpretation for each time piece, since the piecewise-constant hazard corresponds to an exponential distribution within each interval. For each time-piece a parameter is estimated, which indicates how likely exit is in that particular interval compared to exit in the other intervals. The advantage is that a researcher can start with a large number of intervals and reduce their amount by merging intervals, when parameters (indicating the level of the exit rate) for adjoining time intervals are not significantly different from each other.

The first econometrics part of this paper shows the unemployment duration estimates for Italy related to two time spans, to capture feasible changes within the overall period covered by our data (1993-2003). The 1993-1994 and 2002-2003 dynamics will be investigated with a particular emphasis on what happened in between, mainly looking at the feasible impacts of the labour market regulations introduced in this decade. The other estimates refer to the overall time span and will try to examine what the characteristics are (both individual and structural) which drive individuals out of a state of unemployment. Two main transitions will be analysed with our CRM: movement into employment (exit with success), and the individuals leaving the labour force. The likelihood function used in the CRM framework is similar to the one just introduced and used for the duration analysis. But this latter formalisation will allow precise identification of the transitions out of the unemployment (employment and inactivity), and the models will be estimated separately for each destination. This is implied by the assumption of independence of risks. This is a quite common assumption for these models.[22]

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[21] Additional details on the AIC and a description of the other IC penalized criterion is in Cameron and Trivedi (2005, section 8.5).
[22] In their work, Narendranathan and Stewart (1993), add details on this issue.

4.1 Unobserved Heterogeneity

Another important issue in the development of hazard rate models is related to the unobserved heterogeneity. It is unlikely that all differences between individuals are captured by the characteristics of a person that we observe in a dataset. In such circumstances it is said that there is unobserved heterogeneity. The potential effect of this both on the estimated duration dependence and on the estimated effects of the included explanatory variables has long been recognized.[23] However, in certain cases, this may not be particularly serious. Ridder (1987), for example, surveyed preceding research and concluded that the choice of the distribution of the unobserved heterogeneity may not be too important if a sufficiently flexible hazard specification of the baseline hazard is used.

The conventional procedure is to assume that the neglected heterogeneity enters the hazard rate functions in a multiplicative way. But separating duration dependence and unobserved heterogeneity is difficult to achieve. Identifying the effect that each has on the hazard rate often requires assumptions on the functional form of either duration dependence or unobserved heterogeneity.

This task is quite relevant also from a policy perspective. If duration dependence is the cause for LTU not exiting from unemployment, then the key to preventing this is to prevent people from becoming LTU. On the other hand, if unobserved heterogeneity is the cause of low exit rates, then it is important to identify these unemployed people early in their unemployment and target them with appropriate policies. In this case it would be important to find out what is underlying this unobserved heterogeneity that distinguishes these LTU from other unemployed people.

We assume the random variable regarded as a proxi for all unobservable exogenous variables to be distributed as Gamma. The PCHM with the inclusion of Gamma heterogeneity do not lead to dramatic change of the covariates' coefs. Further, the θ value capturing the variance is statistically insignificant, suggesting that our model is not strongly affected by unobserved heterogeneity or, most importantly, that it seems to be properly specified. We have then chosen to restrict

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[23] For details on the issue described see, *inter alia*, Lancaster (1985), Lancaster and Nickell (1980), and Ridder (1987).

our attention in this paper to models without allowance for omitted heterogeneity. It is therefore important to interpret the estimates in this light.

This result probably in part comes from the specification chosen for this analysis. A PCHM, indeed, allows a certain degree of flexibility in the specification of the baseline hazard, that it is assumed to vary within specified time pieces. [24]

4.2 Italian Unemployment Duration

The purpose of this section is to offer a proper description of the main features of the results obtained with our unemployment duration analysis. The estimates are shown in Table 3.

The model in the below scheme is the result of a punctual empirical investigation of the opportunity to estimate the same PCHM in each year of our time span. With specific equality tests between the parameters estimated for each year it has been possible to obtain quite restricted models. The table below, as already mentioned, contains the estimates related to only two years' data, at the beginning and at the end of the period analysed, to better infer if something changed in between, and to evaluate the impact of the new labour market regulations.

**Table 3: Unemployment Duration: Piecewise constant hazard models'
estimates, 1993-1994 and 2002-2003**

		1993-1994	2002-2003
tp1	0 months spell	-2.752	-3.469
		(12.67)**	(14.99)**
tp2	1-2 months	-2.480	-2.612
		(12.17)**	(13.75)**
tp3	3-6 months	-2.119	-2.327
		(10.60)**	(12.59)**
tp4	7- 12 months	-2.156	-2.380
		(10.57)**	(12.52)**
tp5	13-23 months	-2.523	-2.671
		(11.84)**	(13.33)**
tp6	24-29 months	-2.352	-2.807
		(10.83)**	(13.39)**
tp7	30-35 months	-2.522	-3.091
		(11.14)**	(13.76)**
tp8	36-89 months	-2.579	-2.925
		(12.16)**	(15.13)**
tp9	90-99 months	-1.182	-1.244
		(4.84)**	(5.99)**
sex		0.020	0.093
		(0.37)	(1.63)
age		-0.013	-0.028
		(3.79)**	(7.97)**

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[24] For details on this formulation see Han and Hausman (1990), and Meyer (1990).

married	0.097	0.155
	(1.54)	(2.29)*
famsize	0.057	0.088
	(1.13)	(1.62)
islands	-0.410	0.635
	(2.54)*	(4.03)**
south	-0.340	0.386
	(3.52)**	(2.69)**
centre	-0.325	-0.117
	(4.31)**	(1.20)
loweduc	-0.313	-0.302
	(2.34)*	(2.51)*
compulsory	-0.305	-0.483
	(2.46)*	(4.89)**
diploma	-0.403	-0.409
	(3.19)**	(4.04)**
urate	-0.063	-0.111
	(4.94)**	(8.54)**
experience	0.575	0.819
	(9.56)**	(12.79)**
partt	0.290	0.036
	(2.93)**	(0.33)
betterft	-0.125	-0.179
	(2.07)*	(2.64)**
betterpt	0.007	-0.089
	(0.08)	(0.93)
everytype	-0.257	-0.182
	(3.71)**	(2.30)*
gdpgrowth	-0.042	0.081
	(4.22)**	(2.08)*
ulatot	-0.053	0.002
	(2.75)**	(0.20)
Observations	3456	3209

Absolute value of z statistics in parentheses
* significant at 5%; ** significant at 1%
Source: Author's calculations using 1993/2003 LFS

The behaviour of the hazard of leaving unemployment in each time piece highlights the existence of strong negative duration dependence. And this effect is even more marked at the end of the decade examined (2002-2003). This is mainly due to the increased incidence of LTU in recent years, as inferred in section 3. The unemployed find it more difficult to leave their state of unemployment. This leads to the problem of unemployment persistence. The likelihood of leaving the state is sizeably reduced after only two months of unemployment duration, and this reduction reaches its maximum after almost 30 months of unemployment.

Individual characteristics do not seem to exert a sizeable impact on the hazard of exiting:

✓ sex and family size do not exert a significant impact on this probability.

Marital status is not relevant at the beginning of the time period, but it

becomes significant ten years later (5%), where we observed an increased incidence of married individuals in the unemployed sample;

✓ age, instead, maintains its relevance (significant at 1%, both in 1993/94, and in 2002/2003). Getting older, in both cases reduces the likelihood of leaving unemployment;

✓ as expected, somebody in a full time standard job is less at risk of unemployment.

The geographical partition of residence is quite relevant at the beginning of the period. The likelihood of exiting unemployment is lower for those resident in the centre, south, and the islands with respect to the north of Italy. Ten years later these tendencies are less marked. This is probably the consequence of strong internal labour force mobility. These movements have also changed the relative size of each partition. As a consequence of the former statement we find a higher probability of leaving the state in the south and on the islands with respect to the north. The changed sub-sample size, instead, leads to the non significance of the coefficient for the centre. Our statistics confirm a reduced sample size for this partition, which does not come out as significant in 2002-2003.

The role of education is confirmed for the two periods: having a degree increases the hazard of leaving unemployment with respect to somebody with a diploma or who only attended compulsory education. Labour experience is also important in increasing the opportunities of exiting joblessness (significant at 1% for both periods).

The structural indicators offer additional useful insights. An increased unemployment rate in both cases lead to a reduced likelihood of leaving unemployment. This is a quite intuitive result, and it confirms the need for additional policy interventions aimed at shrinking this indicator. A decreasing trend, as explained above, has been observed through the decade and is currently continuing.

On the one hand there is the sub-sample of the short term unemployed, towards which the recent labour market regulations have been directed. On the other hand, there is the already discussed problem of LTU, which has increased its incidence noticeably. This likely reflects the effectiveness of the recent labour market

regulations for reducing short term unemployment. The LTU, instead, remain locked in the state of unemployment. This highlights the necessity of specific policy interventions to increase the employment opportunities of the LTU.

The usefulness of the recent labour market regulations, as confirmed by specific empirical studies, was also related to the reduction of the incidence of the shadow economy. This emergence of undeclared or "black" employment pools will lead to more precise employment statistics, and likely to a reduction in the size of official unemployment. The estimates suggest that before these new regulations the proportion of irregular employment was higher in the south, and was considerable both for industry and agriculture.[25] At this stage, therefore, we can reasonably argue that the labour market regulations of the late nineties were effective for reasons other than labour market flexibility.

The gdp growth rate exerts significant impact. This highlights the necessity for proper policy interventions, too. This is confirmed by the different results obtained with the above estimates. While in 1993-1994 the indicator lessened the likelihood of leaving unemployment, the tendency is reversed ten years later. The former result is a consequence of the negative growth of the internal product for some Italian regions in 1993-1994. A positive growth, therefore, could surely improve the exit opportunities of the unemployed.

5 The Exit Routes from Unemployment: CRM Estimates

The competing causes for exiting unemployment examined here are quite dissimilar. We are going to analyse both the exits with success from the state (finding a job), and the transitions out of the labour force (toward inactivity).

Those movements are separately estimated, since we assume the independence of risks, as briefly explained above. The separate equations, therefore, refer to specific transitions.

Looking at some selected statistics for the CR examined (Table 4), we can infer interesting insights coming from the discrepancies between those two selected sub samples.

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[25] In their work, Bertola and Garibaldi (2002) offer a detailed description both of the features of the Italian shadow economy, and of the recent labour market regulations.

The unemployment duration expressed in months - the dependent variable employed in these analyses - shows a noticeable difference between the sub-samples, with an average spell length for individuals moving to employment shorter than the average duration for individuals leaving the labour force. This difference is of almost 7 months. Individuals which leave the labour force, thus, spent on average longer unemployment spells before exiting this state. This probably reflects the existence of a discouragement effect, since individuals become less willing to look for work as a spell of unemployment continues.

The time pieces (10 in our investigation) split the unemployment up by its duration. Their coefficients will indicate the likelihood of exiting unemployment in a particular interval compared to exit in the other intervals.

The role of education in facilitating the transition into employment is verified for this analysis. This tendency is confirmed also for graduates, even if they are quite a small proportion of the population in the decade.

From the statistics on the geographical location of residence of individuals making transitions, it is notable the north-east is not important for transitions out of the labour force, but has a high number of movements into employment. The south-islands is the partition with the highest relative sample size. This is observed both for individuals exiting with success (more than 48% resident in this partition), and to a greater extent for movements toward inactivity (over 63%).

The yearly binary variables try to capture the behaviour of our estimates within the time period analysed, in order to indicate if there exists any evidence of trend for the transition probabilities.

The last row of the table highlights the different sub-sample sizes. The individuals leaving the labour force strongly exceed the number of people exiting with success. This is also a consequence of the relative sample size of the two related labour market stocks, namely the unemployment and the inactivity.

Table 4: Selected Descriptive Statistics by Exit route (risk), 1993-2003

Variable Name	Variable Label	Employment Means	Inactivity Means
spell	unemployment duration in months	25.262	32.015
tp1-tp10	baseline hazards for the unemployment duration's time pieces		
sex	1 if male	0.587	0.360
age	individual age	30.934	31.588
agesq	individual age squared	1058.9	1127.1
married	1 if married (base category)	0.375	0.439
nomarried	1 if not married (single, separated, divorced, widowed)	0.625	0.561
experience	1 for unemployed with job experience	0.661	0.455
nodiploma	1 for not holding a diploma (omitted category)	0.538	0.576
diploma	1 for holding a diploma	0.374	0.378
degree	1 for holding a degree	0.088	0.045
nwest	1 for living in Piedmont, Aosta Valley, Lombardy, Liguria	0.185	0.123
neast	1 for living in Trentino, Veneto, Friuli,Emilia Romagna	0.158	0.088
centre	1 for living in Tuscany, Umbria, Marche, Latium	0.173	0.157
southislands	1 for living in Abruzzo, Molise, Campania, Apulia, Basilicata, Calabria, Sicily and Sardinia	0.484	0.631
1993-2002	yearly dummy variables (base category=1993)		
Observations	individuals making a transition from unemployment to employment and to inactivity, respectively	7578	10144

Source: Author's calculations using 1993/2003 LFS

Table 5 contains the estimates of our CRM for the movements toward employment by geographical location. The decision to estimate four separate models by geographical location is the result of preliminary tests and analyses which emphasized the existence of significant differences from a geographical point of view in the behaviour of individuals leaving unemployment.

The shape of the hazard is close to the one observed for unemployment duration. There is negative duration dependence for the overall period and across all the geographical partitions examined. This behaviour is stronger for the south-islands and weaker for the north-east. The former result confirms the higher amount of individuals unemployed in the south-islands and their greater difficulty exiting this state. The latter finding highlights that the north-east is the area with the fewest unemployment problems (confirmed by the basic stats indicators).

The coefficients of the covariates underline that in every area there is a higher probability of exiting with success for men, the younger, the better educated (holding a diploma or a degree), and for individuals with work experience.

Age squared has been introduced to allow a proper description of the behaviour of individuals experiencing unemployment. The inclusion of age squared in those models, indeed, makes it possible to explore the evolution of the hazard of leaving unemployment related to a specific transition. This explains why this covariate has not been introduced in the duration analysis, since in that case the destination state of

the unemployed is not specified. The signs of age and age squared suggest the existence of a U-shaped relationship (quadratic) between these variables. And this is confirmed by the significance of their coefficients (both significant at 1% significance level). This relation suggests both that getting older reduces the hazard of leaving with success – as mentioned above – and that this behaviour continues up to a certain age threshold (turning point). Thereafter a marginal decreasing likelihood of transiting to employment is inferred.

The variable related to the marital status, instead, does not seem to be relevant for this investigation.

Table 5: Piecewise constant CR hazard models by geographical location: Transitions from unemployment to employment, 1993-2003.

		nwest	neast	centre	southislands
tp1	0 months spell	-4.166	-3.416	-4.663	-6.489
		(11.92)***	(9.73)***	(11.78)***	(25.99)***
tp2	1-2 months	-3.534	-3.012	-3.908	-5.435
		(10.79)***	(8.89)***	(10.75)***	(24.85)***
tp3	3-5 months	-3.084	-2.431	-3.446	-4.849
		(9.53)***	(7.25)***	(9.61)***	(22.59)***
tp4	6- 8 months	-2.771	-2.261	-3.153	-4.707
		(8.59)***	(6.73)***	(8.83)***	(21.94)***
tp5	9-11 months	-2.505	-1.921	-2.880	-4.392
		(7.82)***	(5.75)***	(8.16)***	(20.79)***
tp6	12-17 months	-2.865	-2.487	-3.332	-4.919
		(8.75)***	(7.20)***	(9.24)***	(22.85)***
tp7	18-23 months	-3.078	-2.607	-3.229	-5.045
		(9.34)***	(7.47)***	(8.99)***	(23.47)***
tp8	24-35 months	-3.289	-2.809	-3.534	-5.286
		(9.78)***	(7.86)***	(9.65)***	(24.28)***
tp9	36-59 months	-3.421	-3.431	-3.621	-5.467
		(9.79)***	(8.68)***	(9.61)***	(24.51)***
tp10	60-99 months	-0.112	0.276	0.247	-1.419
		(0.28)	(0.63)	(0.63)	(6.28)***
sex		0.464	0.226	0.475	0.674
		(8.29)***	(3.68)***	(8.13)***	(17.98)***
age		-0.101	-0.122	-0.116	-0.065
		(5.63)***	(6.58)***	(5.93)***	(5.79)***
agesq		0.001	0.001	0.001	0.000
		(2.65)***	(4.58)***	(3.83)***	(3.20)***
nomarried		-0.074	0.100	-0.010	-0.160
		(0.98)	(1.27)	(0.13)	(3.70)***
experience		1.060	1.002	1.245	1.685
		(16.40)***	(12.68)***	(18.82)***	(40.77)***
diploma		0.410	0.213	0.354	0.099
		(7.08)***	(3.32)***	(5.72)***	(2.57)**
degree		0.985	0.749	1.022	1.057
		(9.36)***	(7.44)***	(10.27)***	(15.43)***
year==1994		-0.060	0.059	-0.152	-0.160
		(0.51)	(0.45)	(1.22)	(1.97)**
year==1995		-0.068	0.084	-0.208	-0.062
		(0.59)	(0.68)	(1.77)*	(0.83)
year==1996		-0.307	0.193	-0.093	-0.137
		(2.58)**	(1.56)	(0.78)	(1.82)*
year==1997		-0.156	0.119	-0.187	-0.164

		(1.27)	(0.91)	(1.55)	(2.15)**
year==1998		-0.097	0.129	-0.141	-0.100
		(0.83)	(1.03)	(1.18)	(1.37)
year==1999		-0.013	0.224	-0.361	-0.275
		(0.11)	(1.68)*	(2.98)***	(3.61)***
year==2000		0.021	0.245	-0.459	-0.257
		(0.17)	(1.86)*	(3.57)***	(3.38)***
year==2001		0.005	0.189	-0.065	-0.397
		(0.04)	(1.34)	(0.51)	(4.82)***
year==2002		-0.100	0.482	-0.088	-0.260
		(0.73)	(3.42)***	(0.65)	(3.33)***
Observations		1405	1199	1308	3666

Notes: Absolute value of z statistics in parentheses
*significant at 10%; ** significant at 5%; * significant at 1%**
Source: Author's calculations using 1993/2003 LFS

The dichotomous yearly variables do not reveal the existence of any trend for the transition probabilities analysed, despite some significant coefficients within the decade.

The estimates for the transitions out of the labour force - shown in Table 6 - emphasize the existence of strong negative duration dependence up to three years of unemployment duration. This tendency is less marked for unemployment durations exceeding that threshold. The absence of a trend within the decade is confirmed also for these estimates.

The individual characteristics indicate that being male reduces the probability of leaving the labour force, contrarily to what we observed for the exits with success. Getting older, also in this case, reduces the probability of leaving unemployment.

Table 6: Piecewise constant CR hazard models by geographical location: Transitions from unemployment to inactivity, 1993-2003.

		nwest	neast	centre	southislands
tp1	0 months spell	-2.708	-2.760	-2.006	-1.321
		(7.43)***	(6.86)***	(5.92)***	(8.37)***
tp2	1-2 months	-1.413	-1.631	-1.174	-0.946
		(4.34)***	(4.35)***	(3.72)***	(6.29)***
tp3	3-5 months	-1.390	-1.459	-1.086	-0.659
		(4.25)***	(3.89)***	(3.44)***	(4.42)***
tp4	6-8 months	-1.494	-1.839	-1.276	-0.921
		(4.53)***	(4.81)***	(3.99)***	(6.08)***
tp5	7-11 months	-1.345	-1.456	-0.986	-0.631
		(4.13)***	(3.87)***	(3.15)***	(4.28)***
tp6	12-17 months	-1.743	-1.993	-1.262	-1.149
		(5.21)***	(5.09)***	(3..96)***	(7.57)***
tp7	18-23 months	-1.500	-1.667	-1.108	-0.942
		(4.53)***	(4.30)***	(3..50)***	(6.31)***
tp8	24-35 months	-1.672	-1.957	-1.146	-0.905
		(4.97)***	(4.95)***	(3..58)***	(6.00)***
tp9	36-59 months	-1.480	-2.031	-1.004	-0.683
		(4.32)***	(4.94)***	(3.08)***	(4.46)***
tp10	60- 99 months	1.518	1.413	1..956	2.436
		(3.99)***	(3.09)***	(5.51)	(15.24)***

sex	-0.276	-0.380	-0.420	-0.572
	(4.34)***	(4.90)***	(7.36)***	(21.34)***
age	-0.144	-0.104	-0.168	-0.204
	(8.44)***	(5.21)***	(10.03)***	(26.37)***
agesq	0.002	0.001	0.002	0.002
	(8.33)***	(5.15)***	(9.26)***	(24.82)***
nomarried	-0.462	-0.414	-0.482	-0.353
	(6.16)***	(4.82)***	(7.11)***	(10.64)***
experience	0.283	0.115	0.418	0.710
	(4.06)***	(1.29)	(6.85)***	(22.57)***
diploma	0.117	-0.054	0.093	0.047
	(1.85)*	(0.72)	(1.69)*	(1.70)*
degree	0.150	-0.047	0.126	0.125
	(1.05)	(0.34)	(1.13)	(1.83)*
year==1994	-0.351	-0.438	-0.257	-0.167
	(2.89)***	(3.11)***	(2.32)**	(2.81)***
year==1995	-0.476	-0.305	-0.234	-0.072
	(3.95)***	(2.36)**	(2.32)*	(1.29)
year==1996	-0.321	-0.451	-0.188	-0.183
	(2.84)***	(3.22)***	(1.82)*	(3.26)***
year==1997	-0.362	-0.299	-0.284	-0.310
	(2.97)***	(2.15)**	(2.72)***	(5.33)***
year==1998	-0.599	-0.467	-0.398	-0.253
	(4.79)***	(3.35)***	(3.67)***	(4.60)***
year==1999	-0.584	-0.360	-0.383	-0.360
	(4.74)***	(2.46)**	(3.68)***	(6.40)***
year==2000	-0.296	-0.368	-0.442	-0.334
	(2.38)**	(2.52)**	(4.05)***	(5.99)***
year==2001	-0.523	-0.166	-0.376	-0.476
	(3.74)***	(1.12)	(3.15)***	(7.81)***
year==2002	-0.453	-0.138	-0.341	-0.373
	(3.32)***	(0.90)	(2.75)	(6.38)***
Observations	1248	896	1595	6405

Notes: Absolute value of z statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Author's calculations using 1993/2003 LFS

Age squared has been introduced as for the other CRM. The signs and the significance of age and age squared again seem to suggest the existence of a U-shaped relationship. And after a certain age threshold we find evidence of a marginally increasing likelihood of leaving the labour force. This result - as intuitively expected - is the opposite of the findings for the transition to employment.

An unmarried person has a lower likelihood of leaving the labour force with respect to a married individual. Education does not exert a significant impact on the probability of leaving the labour force, while work experience maintains its relevance in accelerating the probability of leaving unemployment (with the partial exception of the north-east).

6 Conclusions

The aim of this paper was to analyse the features of European unemployment, with particular emphasis on the Italian labour market. In industrialized Countries (OECD Member States) increased unemployment duration was observed. And this tendency was more severe for the States with higher unemployment rates, such as Italy. We have employed the individual-level data on unemployment spells from the 1993-2003 LFS to analyse unemployment duration and the CRM for Italy. These methodologies are becoming increasingly pervasive in applied research to explain factors determining both the time spent in a state and the exit route from this state.

It is worth underlining the main findings of the analyses applied, since these provide significant insights for policy analysis. These results, indeed, allow also evaluation of the impacts of the recent labour market regulations.

The duration analyses emphasize the existence of strong negative duration dependence. This leads to increased unemployment persistence and to the consequent increased incidence of LTU, as we showed with the basic statistics.

The individual characteristics do not exert a sizeable impact on the hazard of exiting, with the exception of the individual's age. Getting older, indeed, reduces the likelihood of leaving unemployment. The geographical partition of residence is quite relevant at the beginning of the decade examined. And the north-east of Italy is the area with the fewest unemployment problems. But these tendencies are less marked and quite different at the end of the period, reflecting the existence of strong internal labour force mobility. The role of education is confirmed in this study, since people who are better educated (holding a diploma or degree) have a greater likelihood of exiting unemployment. Labour experience also increases this probability.

The unemployment rate offers insights that are relevant also from a policy perspective. A decreasing trend has been observed in our country throughout the decade, and which is still continuing. But the incidence of LTU has increased. This likely reflects the effectiveness of the recent labour market regulations in reducing short term unemployment. The long-term unemployed, instead, remain locked in the condition. This highlights the need for proper policy interventions to increase the employment opportunities of the long-term unemployed. The usefulness of the recent

regulations was also related to the reduction of the incidence of the shadow economy.

At this stage, therefore, we can reasonably argue that the labour market regulations of the nineties were effective for reasons other than labour market flexibility.

The findings of the CR analysis are often extensions of that for duration. The shape of the hazard is close to the one observed for unemployment duration. There is negative duration dependence for the overall period and across all the geographical partitions.

The coefficients for the covariates of the exit with success highlight that in every area there is a higher probability of exiting with success for younger and better educated males, and for people with work experience.

Being male, instead, reduces the hazard of leaving the labour force. Females are more likely than males to become inactive after an unemployment experience. Marital status is relevant for this risk, since the unmarried have a lower probability of leaving the labour force with respect to married individuals. Level of education, instead, does not play a significant role.

References

Addison, J. T., and Portugal, P. (1998), *Some specification issues in unemployment duration analysis*, Labour Economics, Vol. 5, pp. 53-66.

Addison, J. T., and Welfens, P. J. J. (1998), *Labor Markets and Social Security, Issues and Policy Options in the U. S. and Europe*, Second Edition, Springer, pp. 101-117.

Arranz, J. M., Garcia-Serrano, C., and Toharia, L. (2007), *Unemployment Duration, Layoffs and Competing Risks*, Documentos de Trabajo FUNCAS, No. 327.

Bertola, G., Blau, F., and Kahn, L. (2005), *Labor market institutions and demographic employment patterns*, mimeo, Università di Torino and Cornell University.

Bertola, G., and Garibaldi, P. (2002), *The Structure and History of Italian Unemployment*, CESifo Working Paper Series No. 907, available on line at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=395420 .

Blanchard (2006), *European unemployment: the evolution of facts and ideas*, Economic Policy, Vol. 21,No 45, pp. 7-59.

Cameron, A. C., and Trivedi, P.K (2005), Microeconometrics: Methods and Applications, Cambridge University Press.

Clark, K. and Summers, L. (1979), *Labor Market Dynamics and Unemployment: A Reconsideration*, Brookings Papers on Economic Activity, No 1, pp. 13-60.

Contini, B., Leombruni, R.,Pacelli, L. and Villosio, C. (2007), *Wage Mobility and Dynamics in Italy in the 90's*, NBER Working Paper No. 13029, available on line at http://www.nber.org/papers/mail/w13029.

Contini, B. and Trivellato, U. (2005), *Eppur si muove. Dinamiche e persistenze nel mercato del lavoro italiano*, il Mulino (Bologna).

Han, A., and Hausman, J. A. (1990), *Flexible parametric estimation of duration and competing risk models*, Journal of Applied Econometrics, Vol. 5, pp. 1-28.

Horvath, F. W. (1982), *Forgotten unemployment: Recall bias and retrospective data*, Monthly Labor Review, Vol. 105, No 3, pp. 40-43.

Istat (2002), *Forze di Lavoro, Media 2001*, Annuario no. 7.

Lancaster, T. (1979), *Econometric Methods for the Duration of Unemployment*, Econometrica, Vol. 47, No 4, pp. 939-956.

Lancaster, T. (1985), *Generalised residuals and heterogeneous duration models: with application to the Weibull model*, Journal of Econometrics, Vol. 28, pp.155-169.

Lancaster, T. and Nickell, S. (1980), T*he analysis of re-employment probabilities for the unemployed*, Journal of the Royal. Statistics Society A, Vol. 143, pp. 141-165.

Layard, S., Nickell, S., and Jackman, R. (2005), *Unemployment: Macroeconomic performance and the labour market*, Oxford University Press.

Karr, W. (1997), *Conceptual Problems in the Understatement of Long-Term Unemployment*, Labour Market Research Topics no 21, Nürnberg, Iab.

Machado, J. A. F., Portugal, P., and Guimaraes, J. (2006), *U. S. Unemployment Duration: Has Long Become Longer or Short Become Shorter?*, IZA Discussion Paper No 2174.

Machin, S. and Manning, A. (1998), *The Causes and Consequences of Long-Term Unemployment in Europe*, in Ashenfelter, O. and Card, D. (1999), Handbook of labor Economics, Vol. 3C, pp.3085-3139.

Meyer, B. D. (1990), *Unemployment insurance and unemployment spells*, Econometrica, Vol. 58, pp. 757-782.

Murphy, A. (1996), *A piecewise-constant hazard-rate model for the duration of unemployment in single-interview samples of the stock of unemployed*, Economic Letters No 51, pp. 177-183.

Narendranathan, W., and Stewart, M. B. (1993), *Modelling the Probability of Leaving Unemployment: Competing Risk Models with Flexible Base-line Hazards*, Applied Statistics, Vol. 42, No 1, pp. 63-83.

Nickell, S. (1979), *Estimating the probability of leaving unemployment*, Econometrica, Vol. 47, pp. 1249-1266.

OECD (1994), *The OECD Jobs Study*, OECD Publications, Paris.

OECD (2002a), *Employment Outlook 2002*, Paris.

Paggiaro, A. and Trivellato, U. (2002), *Assessing the Effects of the Mobility Lists Programme by Flexible Duration Models*, in Labour, Vol. 16, No 2, pp. 235-266.

Payne, C. and Payne, J. (2000), *Early Identification of the Long-Term Unemployed*, PSI Research Discussion Paper No 4, London, PSI.

Ridder, G. (1987), *The sensitivity of duration models to misspecified unobserved heterogeneity and duration dependence*, Mimeo, University of Amsterdam.

Salant, S.W. (1977), *Search Theory and Duration Data: A Theory of Sorts*, The Quarterly Journal of Economics, Vol. 91, No 1, pp. 39-57.

Thomas, J.M. (1996), *On the interpretation of covariate estimates in independent competing-risks models*, Bulletin of Economic Research, Vol. 48, No 1, pp. 27-39.

Torelli, N. and Trivellato, U. (1993), *Modelling Inaccuracies in Job Search Duration Data*, Journal of Econometrics, Vol. 59, No 1-2, pp. 187-211.

Trivellato, U., Marliani, G., and Torelli, N. (1989), *Analysis of labour force dynamics from rotation panel survey data*, Bulletin of the International Statistical Institute, Vol. 53, No 2, pp. 425-444.