ISSN 2279-9362

Collegio Carlo Alberto

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No. 569
December 2018

Carlo Alberto Notebooks

www.carloalberto.org/research/working-papers

Italian Economic Journal
https://doi.org/10.1007/s40797-019-00083-2

RESEARCH PAPER

Is Long-Term Non-employment a Lifetime Disease?

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Received: 8 February 2018 / Accepted: 4 January 2019

Abstract

Long-term non-employment (which is not long-term unemployment) has been almost neglected in the academic literature, long term here implying up to 15–25 years of absence from the labour market, let alone full and definitive exit. This study takes the lead from a previous paper (2017) in which the magnitude of long term non-employment (LTNE) and its duration are estimated from administrative databases of Italy, Germany and Spain (Contini B, et al., IZA discussion papers, no.11167, 2017). In all three countries long-term nonemployment appears to be a lifetime disease for many workers who drop out of the (official) labour market and never return, left unsheltered from the welfare institutions. The main task of this work is an analytical exploration of the factors leading to LTNE development in Italy, estimated at almost 1.3 million male individuals (about as many as the officially unemployed), average duration exceeding 12 years. An econometric exploration indicates that it is often more profitable for employers to hire new unexperienced young workers in place of confirming individuals already onthe-job, leading to excessive turnover, long-term non-employment and waste of human capital. There are strong policy implications of this result as the EU Commission has for many years advocated low wages for new entrants and high contract flexibility as major instruments to promote youth employment.

Keywords Labour markets · Participation · Non-employment · Duration

JEL classification J00 · J01 · J08 · J1 · J6 · J64

This paper has been in the pipeline for many years. It has benefited from numerous insightful suggestions of two excellent referees. The authors also wish to thank the Editor for guidance in a lengthy submission process. D. Card read an earlier version of this work and offered useful comments.

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Journal: 40797 Article No.: 0083 TYPESET DISK LE CP Disp.:2019/1/24 Pages: 24 Layout: Small-Ex

1 Introduction

Long-term non-employment (LTNE) has been widely neglected in the academic literature, with "long-term" referring to up to 15–25 years of absence from the labour market, as well as full and definitive exit for people in prime age.[1]

Many European economies suffer from this dramatic disease: a vast number of young men who lose their job only a few months or years after their first hire enter the ranks of the unemployed or leave the workforce altogether, never to regain regular employment for the rest of their life. Many may turn to the irregular economy, presumably for want of better opportunities.

LTNE has made the object of preliminary estimation in few countries: first in Italy (2007 and 2013), and more recently in Spain and Germany (Contini et al. 2017). A quick assessment of the extent of LTNE is provided by the ratio of the LTNE vis-à-vis the male population in working age: 6.5% in Italy, with average LTNE duration of 12 years, and as long as 25–30 years for LTNE individuals in their fifties.

After a short review of the estimation procedure and the presentation of several significant descriptive statistics, this paper investigates the Italian case through an econometric analysis aimed at explaining the factors behind the development of LTNE between the late 80s and the early 2000s. In addition to the impact of a number of structural factors and initial conditions, the paper will also highlight the impact of a distorted structure of incentives, as the one advocated by the EU Commission in order to boost youth employment. In the vast majority of cases, LTNE is a prelude to lifelong non-employment, unsheltered from the safety nets offered by welfare institutions. Some evidence (from the EHCP—European Household Community Panel) suggests that the majority of LTNE's find themselves in difficult economic conditions compared to non-LTNE's of the same age. The irregular economy appears to be an important alternative for many LTNE's.

The paper is organized as follows: Sect. 1 contains an general overview of the study; Sect. 2 provides a short survey of the relevant literature; Sect. 3 describes the basic methodology used to measure LTNE; Sect. 4 presents LTNE duration estimates. The pieces of the puzzle are assembled together in Sect. 5.1. Section 5.2 illustrates the exploratory model and the main results are discussed in Sect. 5.3. Section 6 explores the destination of LTNE-workers: do they join the irregular economy? Policy implications and conclusions follow in Sects. 7 and 8.

2 A Short Overview of Literature

The countless academic studies investigating the consequences of long-term unemployment are only modestly relevant to this paper. All make use of official statistics

[1] Definitions:

(i) "OLF" = out of the labour force (inactive), but willing to work if given the chance;
(ii) "long-term unemployment" = unemployment lasting more than 1 year, according to almost all official sources. Occasionally it is indicated as "lasting more than 2 years";
(iii) "LTNE = long-term non-employment" (our) estimate relating to individuals in working age who lose their job (in the official economy) and no longer find a new one.

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where "long-term unemployment" is defined as one-year or longer (seldom reported as more than 2 years). This is hardly sufficient to investigate the long-term problems affecting the labour market and society at large. Administrative longitudinal databases provide a more comprehensive perspective.[2]

The non-employed willing to work appear to have been disregarded in most of the academic literature. It is only in 2015 that A. B. Krueger tackled the problem in the U.S. from an adequately deep perspective. His conclusion, to which we shall return later, is rather dramatic: "…once a person leaves the labour force, he or she is extremely unlikely to return *(to work)*." Our findings are in line with Krueger's, both in Italy and in Spain.

The studies on long-term unemployment emphasize the issue of deteriorating employability as joblessness persists due to obsolescence of human capital, stigma and signalling of "bad" performance, all of which result in wage loss at the time of re-employment (Blanchard and Summers 1986; Nickell and Layard 1999; Machin and Manning 1999; Farber 1993; Güell and Petrongolo 2007): all important problems but less dramatic compared to the lifelong impact of very long-term joblessness.[3]

The negative relation between the duration of joblessness and the probability of being rehired is an important and relevant issue in this study: here too, however, the duration of joblessness is seldom stretched to the level analysed in this work. Torelli and Trivellato (1993) studied the duration of youth unemployment in Italy, confirming state dependence; their results were replicated by Addison, Centeno and Portugal (2004). Some years earlier, Van den Berg and Van Ours (1994 and 1996) had indicated that state dependence persists also when selection issues related to workers' heterogeneity are included in the analysis. However, according to Machin and Manning (1999), state dependence and workers' heterogeneity can only be identified separately on the basis of untenable assumptions. Very recently Abraham et al. (2018) addressed the same issue in their analysis of unemployment in the U.S. during the 2007–2009 recession: they control for heterogeneity using information on individual employment experiences prior to becoming unemployed, but find that unemployment duration is strongly duration-dependent and reject the "bad apple" (heterogeneity) explanation.

The crucial issue of the effective length of unemployment/non-employment spells is seldom documented. Mroz and Savage (2006) report re-employment probabilities for youth in the U.S. who experienced unemployment spells of 10 years or more; evidence of the same order of magnitude is provided by Gomes (2012) in his study of the U.K.; Mussida and Sciulli (2015) explore the Italian case and provide estimates of re-employment probabilities after layoff which are consistent with our findings.

The works of Krueger (2014, 2015) delivers, instead, an important perspective on the problem of unemployment duration. While not denying the well-known issues of skill obsolescence and discrimination on the part of the employers, Krueger strongly emphasizes the social problems associated to very long non-employment duration:

[2] The paper does not report country-based studies loosely related to the rest of the literature, that document a positive, although modest frequency of transformations of temporary contracts into open-ended contracts: Berton et al. (2011, 2012), Bentolila et al. (2010, Bonnal et al. (1997), Booth et al. (2002), Bover and Gomez (2004), Dolado et al. (2002), Ichino et al. (2008), Picchio (2008).

[3] For instance, Tatsiramos estimates unemployment duration for a number of EU countries based on official LFS data (2010) and reports durations of 1–2 years.

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changes of individual lifestyles, family and childbearing projects, increasing poverty and welfare at large.

Studies on the dualisation of the labour market are also relevant for the purpose of this paper, and more in line with Krueger's recent work. Warnings about the long-term dangers of dualisation were voiced by Blanchard (2006) and Saint-Paul (2004): while *insider* workers with permanent open-ended contracts are sheltered by welfare institutions, the protection afforded to *outsiders* is almost nil. Persistent dualisation may undermine cohesion, leading to social dumping and political unrest. Needless to say, the so-called "disposed" individuals of this paper are *outsiders* in every respect.

3 Measuring Non-employment and Its Duration

The estimation of the magnitude of non-employment is calculated using the methodology adopted to calculate "workforce disposal". Our analysis (limited to male workers) uses longitudinal employer-employee databases originating from administrative records. The observation period ranges between 1987 and 2012.[4] In this paper the terms "disposed individuals", "premature exits", "definitive or ultimate dropouts" are used interchangeably.

The basic statistic used in this exploration is a particular notion of labour market survival. Survival is estimated by counting each individual since first entry in the labour market and still present in the database at the end of a given observation period. All forms of dependent work and self-employment are observed in our database (including temporary and apprentice contracts). Non-survivors are individuals who have dropped out, i.e. who have left regular employment and no longer reappear at work in the administrative data. If an individual is missing from the employment records for a period of time however long (additional schooling periods, sickness leaves, military service, all observable in the INPS archives) and then shows up again in the records, he is counted as a survivor. Transitions from work into registered unemployment,[5]

[4] WHIP is Italy's longitudinal database originating from Social Security records. It is a large random sample representative of the universe of employees in the private sector, of the non-tenured employees in the public sector, the self-employed and the professionals, as well as all workers covered by atypical (non-standard) contracts. WHIP also contains information on unemployment and *Cassa Integrazione Guadagni* (CIG) episodes. It is integrated by the INPS-*Casellario degli Archivi* containing the working careers of individuals who moved from dependent work into the public sector. A *caveat* is necessary on this point: some transitions from private to public employment of individuals with special university training may have eluded the linkage: these individuals will appear as non survivors, downward biasing the relative survival rate. Data on educational attainment are unrecorded in the WHIP database. The sampling design consists of selecting all individuals aged 18-30 at their first labour market entry, born on the 10th of each month, leading to a 1:90 sample/population ratio. For the time being, data on workers' injuries and professional diseases contained in the INAIL databases are not available in WHIP, but related temporary absence from work is observed. The WHIP database is available to interested researchers who will apply to the INPS, Social Security Administration and guarantee to comply with their standards.

[5] Registered unemployment is recorded in the INPS databases, and refers to individuals who report to the Employment Agencies (Centri per l'Impiego) and may, if strict requirements allow, draw unemployment benefits. The unemployment figures reported by ISTAT are estimated instead from the Labour Force Survey, based on individual interviews: these will usually be much higher than the officially registered ones.

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from employment in the private sector to the public sector, as well as transitions into retirement for whatever reason (and the event of death) are observed in our database.[6]

Foreign workers are left out of the count as they may depart the host country without leaving traces in the administrative archives. Our focus concerns individuals who are still a long way from retirement age and drop out of the labour market after a regular job spell.

We restrict detailed analysis to male workers aged 18–30 at the time of their first job and track their careers in the "regular" labour market for up to 32 years. Definitive exit is very high: out of 100 new male entries in 1987, only 79% survived in 2012, that is to say 25 years after starting their career. The analysis of survival is performed on cells defined by cohorts of young male employees observed at one-year intervals between 1987 and 2012 and after adjustment for censoring bias.[7] Cells combine the following dimensions at the time of first entry in the labour market[8]: calendar year, age, initial wage, skill level, contract typology, geographical area, firm size and other observables in the course of one's career (mobility, duration of first employment spell). Personal characteristics potentially relevant to the explanation of survival are not observed in the INPS databases (most notably, schooling degree).

The first schedule, particularly relevant for this paper, is the one showing Italy's regional divide: survival in the period 1987–2012 reaches 83% in the North, but only 72% in the South (FIg. 1).

The timing of labour market entry matters according to two different factors: (1) the timing itself—survival of late entrants who have a shorter time horizon (12 years for entrants in 2000) is higher than survival of early entrants (1987); (2) the business cycle—entrants in years of deep recession (1992) survive less than entrants during expansionary periods (1987) despite their shorter time horizon (Fig. 2).

The following is a short schematic discussion of the main survival schedules. (1) The length of the first employment spell is a reasonable proxy of unobserved ability. It indicates how employers evaluate the ability of the prospective recruit: a promising young person will be offered a relatively longer starting contract than a less interesting candidate. The longer the first job spell, the higher the individual's survival: 87% for those whose first job spell is 12 months or longer, only 68% for those with initial spells of less than 3 months. (2) An additional indicator of individual unobserved ability is one's starting salary: a promising worker will presumably be offered a higher wage than a less promising one and his survival is likely to be higher. The survival differential between workers (here, blue collars) with starting salary in the upper quartile (Q4) of the distribution and those in the lowest quartile (Q1) is remarkable. Also of interest is the survival of those who are likely to be the very least endowed, namely with starting wages in Q1 *cum* initial job spell < 3 months. Overall and not surprisingly, bad starts have a strong and persistent effect on future labour market outcomes, even when the future extends for the next 15–20 years. (3) Age at the time of first labour

[6] Men (age 15–65) drawing disability pensions are about 0.7% of overall employment. Temporary illness and disabilities amount to 3–4% of male population in working age (from INPS Database—Archive O1 M, basis for WHIP).

[7] see Contini et al. (2017).

[8] All these characteristics are available since 1987. Entrants in previous years (starting in 1980) can be observed, but some detailed information is missing.

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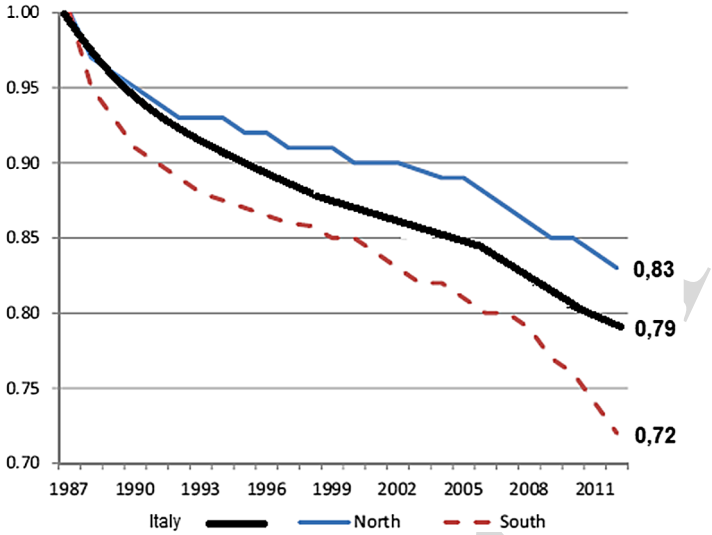

Fig. 1 Italy's regional divide 1987–2012

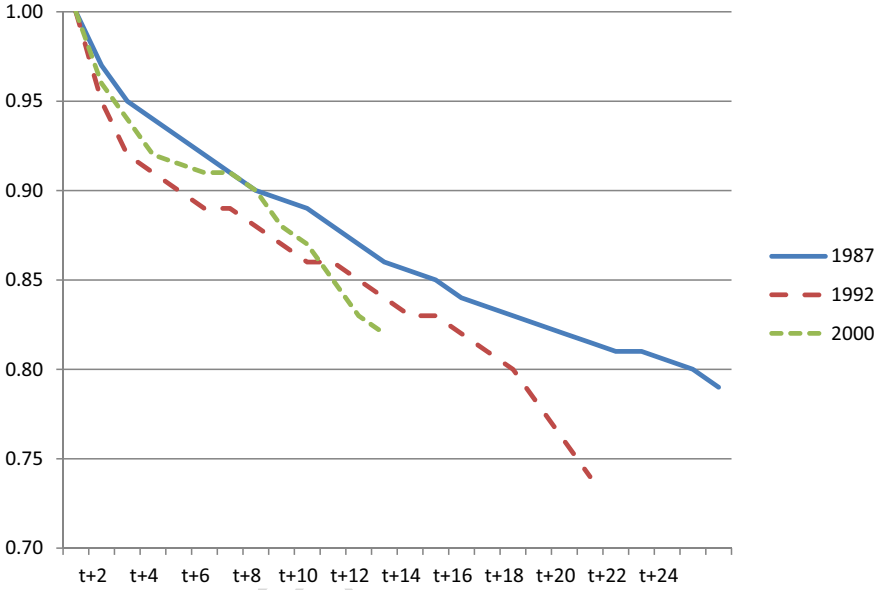

Fig. 2 Survival depends on the timing of labour market entry

market entry: entrants at very young age survive longer than those who start working later (and who may have unobservable higher education). The difference is partially built in as a young man starting his career at 20 has a 10-year longer working career than one starting at age 30. On the other hand, people who retire do not enter the count of early disposal as retirement is observed in WHIP. It is, therefore, all the more

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surprising to find the survival rate of people hired at age 26–30 to be so much lower than the younger entrants (a similar result has been found also in German and Spanish data; see Contini et al. (2017) on that). A partial control is provided by the European Community Household Panel, but this too fails to explain how this may come about. The transitions between work in the private sector and public employment could be the culprits: in principle all such transitions are observed in our database (via an ad hoc linkage procedure implemented by the Social Security Administration, INPS). If, however, a number of transitions have eluded the linkage, the workers involved in such job changes will appear as non-survivors, and survival will be downward biased.[9] The linkage procedure may, therefore, require additional adjustments. (4) Skill level at entry: blue collars survive slightly less than white-collars, possibly due to the impact of the skill differential. (5) Geographical area: geographical differences are substantial but not unexpected. Survival in the North and Centre is about 10 p.p. higher than in the South. (6) The impact of mobility (geographical and/or job-to-job, often with intervening unemployment spells between job switches) on survival is remarkable. Workers who perceive their job to be at risk start searching for more solid positions, and many appear to be successful. The stayers (no moves) display a much lower survival than their moving colleagues. Individuals who have moved up to 3 or 5 times in their career survive much longer, and very frequent movers (10+ times) survive even longer. (7) Nationality: survival of Italian citizens is, not unexpectedly, quite higher than that of foreign workers (Table 1).

4 The Duration of Long-Term Non-employment (LTNE)

The duration of long-term non-employment can be directly estimated from the survival schedules. Table 2[10] displays the estimated magnitude of uninterrupted long-term non-employment, the average LTNE duration and the ratio of the number of LTNE individuals to the male population of working age (MPWA) (see footnote 9). The latter provides a better assessment of the relative magnitude of LTNE than its ratio to the total workforce, which may have margins of ambiguity. Italy's unemployment calculated as a percentage of the same denominator yields 7.2% (while the official 2012 male unemployment rate was 5.7%).

Interestingly, the figures for OLF's (LFS estimates) and LTNE's are quite close: this is reassuring as many individuals self-reporting as OLF are likely to be found among the LTNE. The LFS (Labour Force Survey) estimates of OLF's have no upper age limit, and therefore it is not surprising that the latter are somewhat more numerous than the LTNE's.

[9] The survival rate of the two youngest cohorts is 80%. The frequency of entrants in 1987 at age 26++ is about 20% of the sample. The EHCP suggests that about 30% of the late entrants have university degrees, while there is no indication of employment in the public sector. The university graduates are the most likely to have joined the public sector after an initial working episode in private employment. Surprisingly, however, many report to be in difficult economic conditions. See also footnote (21).

[10] The WHIP observation window is 1987–2012 (25 years), but INPS provided some additional information on the previous working history of all sampled individuals who were at least 55 years old in 2012. The resulting observation window covers 1980–2012, except for the *caveats* mentioned in footnote 5.

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Table 1 Survival (entrants in 1987) according to different characteristics of working careers

Duration of first employment spell	
< 3 months	68
> 12 months	87
Initial wage quartiles	
Q1 (cum short duration of first employment spell)	61
Q1	71
Q4	82
Age at entry	
19–21	82
22–25	75
26–30	60
Skill level at entry	
Blue collars	78
White collars	80
Geographical area	
North	84
Centre	83
South	74
Mobility	
Stayers (0 moves)	49
Movers (1–5 moves)	80
Movers (10+ moves)	86
Nationality	
Italian	80
Foreign	60

Table 2 Long-term non-employment magnitude and duration in 2012 (in parenthesis the share of LTNE in each age group)

Age group	LTNE duration (years)	LTNE (000)
53++	25–32	91 (7)
47–53	21–24	99 (8)
38–46	16–20	260 (21)
32–37	10–15	361 (28)
26–31	5–9	405 (32)
16–25	0–4	45 (3)
Total		1260
average LTNE duration (years)	11.6	
LTNE/male working age pop. (%)	6.5%	
male UN/male working pop. (%)	7.2%	
OLF = "out of the labour force, but willing to take a job" (LFS estimate)		1.421

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The average duration of LTNE is to some extent *built-in* in the definition of survival, as the full length of our observation window is 32 years. It is not, therefore, surprising to find LTNE durations as long as 25–32 years among the older cohorts. The age group 57–66 is relatively small as many individuals have retired before the end of the observation period. The 32–46 age groups are very numerous, with average LTNE durations of 10–20 years. The dramatic aspect of the duration lies in the fact that the majority of these people are prime-age adults who have spent most of their life outside the labour market, probably not as a result of spontaneous decisions.

5 Explaining the Italian Puzzle

5.1 The Italian Labour Market

Italy's unemployment rate hovered around 7–9% from the mid-90s to 2007, rapidly increasing thereafter above 12%. In the early 2000s youth unemployment was about 20%, the second highest in the European Union, and then hiked to 40% and over in 2013. Youth employment steadily increased from 4.0 million in 1968 to slightly less than 5.0 million in 1990, a consequence of the baby boom and of the increased participation of young women. However, prior to the 1993 recession and in the aftermath of the baby boom, the trend had already sharply reversed, and as of 2008 only 3.4 million young people were in employment.[11] The youth participation rate steadily dropped from 45% of the 80s to 27% in 2013. Policy measures aimed at increasing youth employment opportunities were implemented starting in the late 70s: the CFL contract ("work and training contract") was introduced in 1985 and provided employers with generous tax rebates and a full exemption from firing costs. The CFL contract was progressively phased out as new instruments were implemented: a proliferation of different tax rebates and exemption schemes for the employers and the introduction of increasingly flexible labour contracts and agency work that rendered contract termination almost costless. Many workers were left unsheltered from any form of welfare coverage. In 2000 the implementation of two EU directives on part-time work and on fixed-term contracts added new elements of flexibility to the system. The share of hires via non-standard (open-ended) contracts, relatively stable at around 50% till the mid 90s, picked up thereafter reaching 65% of all initial hires in 2000, and 80% by 2015. The new legislation merely legalized practices that were already widely used.

An overview of Italy's labour market is not complete without mentioning the irregular/parallel/unobserved economy. Based on a variety of coarse macroeconomic indicators, ISTAT (Italian Statistical Institute) puts the number of irregular workers in 2009 at about 3 million, 2 million of which completely submerged and 1 million double-job holders.[12] The large majority of double-job holders are men, while the

[11] The decline in male and, more generally, youth participation is a long-term phenomenon dating to the mid Seventies and common to all the EU countries, a consequence of increased schooling age and women's participation. It was the object of investigation in Contini (2011).

[12] Reliable micro-data are inexistent. Battistin and Rettore (2008) indicate that people who work in the irregular economy are unlikely to reveal their status in the LFS interviews for fear of being disclosed.

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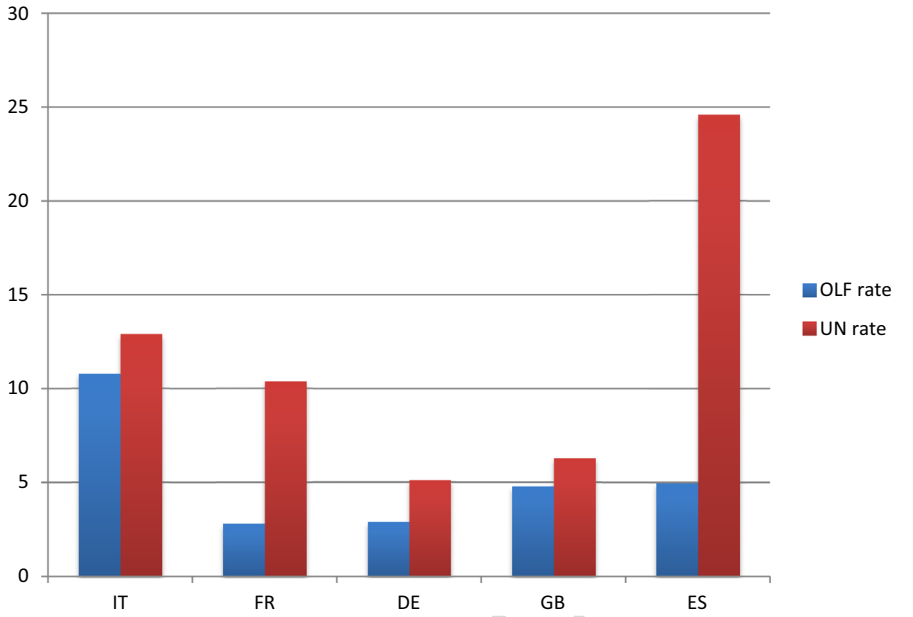

Fig. 3 Unemployment and out-of-labour force (2014)

fully irregular women are about half the number of men. In addition, about half of the young school leavers (15–24) searching for their first job may also be active at least part-time in the unobserved economy.

In 2015 the EU Labour Force Survey reported the following comparative data (Fig. 3): Italy's share of "inactives but willing to work" was almost three times the EU average and far above all the larger EU countries, including Spain whose unemployment rate was much higher than Italy's.[13] Many of the "inactive" are presumably discouraged unemployed who have had regular working activities in the past. Many may be working part- or full time in the irregular economy for lack of better opportunities.

Footnote 12 continued
More generally, according to these authors, the likelihood of misclassification among the unemployed, the inactives and the irregulars is always extremely high.

[13] A plausible, yet untested, explanation for the Italian OLF-exception is that only a small proportion of Italy's working population is eligible for unemployment benefits: Italy's recipiency rate is 32%, against 50% in the UK, 60% in France, 65% in Denmark, 73% in Spain, 94% in Austria and 100% in Germany (OECD figures, although these rates do not imply the same degree of generosity). In Italy there is little incentive to self-report one's true employment status because the opportunity cost is often close to zero. Where unemployment benefits are generously available, as in Germany, the opportunity cost of misreporting is high because the perceived risk of losing the benefits is high as well. If only half of the Italians classified as inactive but willing to work, were (conservatively) counted among the unemployed—as would be the case anywhere else in the EU—Italy's unemployment rate would be well above the optimistic 13% reported by official sources in 2013. This question will make the object of a separate paper.

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5.2 The Determinants of LTNE

The overall state of the Italian economy, in prolonged stagnation since the early 90s, is the natural long-run factor behind all labour market developments, including survival. A strong and durable recovery would reduce survival and the number of LTNE's. The observation period for the following econometric exploration is reduced to 1987–2003 as a number of variables were not yet available through 2012 (notably labour costs).

Our focus is on the short-medium run determinants of the ultimate exit probability from the labour market. We expect the results to be delivered by a Cox proportional hazard model.

An important qualification is necessary. In principle the determinants of ultimate dropout from the labour market follow from the full explanation of the in-and-out transitions across jobs and across employment states (employment and non-employment): the higher the frequency of successful matches between workers and firms, the lower the probability of definitive dropout. A full exploration of these phenomena requires a comprehensive model based on multiple-spell analysis that includes many covariates entering the Cox model, but also additional ones (including but not limited to vacancies), that were not available at this stage.

The Cox proportional hazard model is a shortcut that provides second-best answers at the cost of accepting the idea that ultimate exit from the labour market is the final outcome of a process whose complete explanation is, for the time being, out of reach (Fig. 4).

Relative labour costs affect the quantity as well as the quality and mix of labour market entrants. The impact comes about through a substitution effect: retaining a worker at the end of a one-year employment spell is often more expensive than replacing him with a new unexperienced person, even considering the (modest) layoff costs associated with the latter. The replacing option generates a match that may have an indirect negative impact on premature exit, increasing the ultimate exit probability.

Flexibility is an indirect component of labour cost via a variety of composite factors: strict or loose hiring and firing rules, contract typologies regulating pay, working hours, overtime, holidays and night shifts. Its impact on ultimate exit pulls in opposite directions: on the one hand, high flexibility increases the employers' incentive to make use of turnover, accelerating premature exit and leading to shorter survival during recessionary times. On the other hand, a high degree of contract flexibility with costless dismissal—a de facto reduction of labour cost—could have a positive impact on the hiring rate and reduce early exit. A sound empirical test of flexibility cannot be

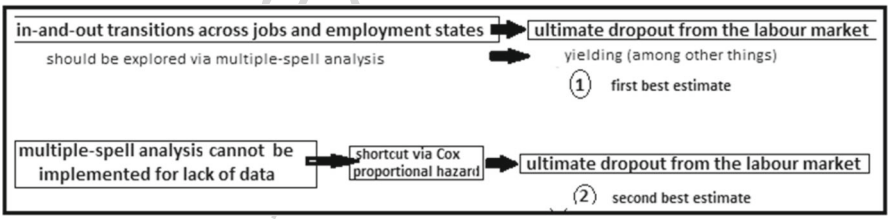

Fig. 4 First best and second best estimates of ultimate exit probability

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performed as the mere number of contract typologies defies measurement (in the early 2000s ISTAT counted 42 different typologies). A rough aggregate indicator based on the observed frequency of short term contracts on all new hires is used here as a proxy of flexibility. The progressively higher utilization of short-term contracts (from 50% in the 80s to almost 80% nowadays) is also the result of policy measures advocated also by the EU Commission.

One additional important factor affecting survival is mobility. Mobility (item 6 Table 1) reflects geographical mobility across jobs and regions, but in most cases it refers to local or quasi-local switches. Empirical evidence suggests that mobility is pro-cyclical: with tight markets and high worker turnover the frequency of successful matches between labour demand and supply is high, and opportunities for successful job search increase, reducing the risk of exit and increasing survival. Under slack markets the risk of prolonged joblessness is greater, and survival is lower. About two-thirds of the workers engage in job changing once or more in the course of their careers. In this exploration, mobility is measured by a 0–1 dummy activated only once, at the time of the first job change. Mobility as measured here is basically exogenous, but retains also some features of a pre-determined endogenous variable, and will be appropriately instrumented.[14]

Individual characteristics: while skills are unobservable beyond the white-collar/blue-collar distinction, initial pay and the duration of a new entrant's first job reflect individual characteristics as perceived by employers. They will, to some extent, proxy such unobservables.

Geographical differences and firm size (three groups: up to 20 employees; 21–200; 200 plus) may deliver additional insight. The industrial structure of Southern Italy is more fragmented and based on small firms than in the rest of the country, providing a fertile ground for tax evasion and illegal labour practices.

Labour market tightness is measured by worker turnover. Gross and net measures of worker turnover may be equally appropriate: our choice goes to the pro-cyclical net worker turnover rate (NWT = [hirings − separations]/employment stock) as it matches quite closely the ups-and-downs of the business cycle.

Cohort dummies corresponding to the year of one's first job are introduced, aimed at catching the impact of the timing of labour market entry reflecting the business cycle.

5.3 Econometric Explorations

A simple reduced form of survival is estimated by a Cox proportional hazard model. The hazard ratios are computed according to the formula *HR=exp* [*sum b*ˆ(*x*–*x**)], where *b* are maximum-likelihood estimates of

$$h(t|X) = h(t)\, exp\big(X_1 b_1 + \cdots + X_p b_p\big),$$

[14] In a multiple-spell setting mobility is fully endogenous as it is activated at each job change.

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h(t) is the (usually unknown) benchmark probability,[15] and x^* are the predicted values of the covariates for which the (relative) exit probabilities are estimated.

We estimate the following reduced form equation of the hazard function, complement of survival (survival = 1 − hazard):

$$\begin{aligned}(1)\text{HAZARD}(i,j,t) = {} & k + \alpha_1(\text{MED - RATIO}) - 1(i,j,t) \\ & + \alpha_2(\text{MED - RATIO}) - 2(i,j,t) \\ & + \alpha_3(\text{MED - RATIO}) - 3(i,j,t) \\ & + \beta_1 lcost(i,j,t) + \beta_2 flex(t) + hdur(i,j) \\ & + \xi mob(i,j,t) + \tau cohort(i,j) + \mu nwt(t) \\ & + \rho geo(i) + \omega size(i,j,t) \\ & + \varphi age(i,j) + zskill(i,j) \\ & + \omega(W\_\text{INITIAL})(i,j,t) + \xi\text{GNP}(t) + u(i,j,t).\end{aligned}$$

The estimated hazard model estimates the impact of various covariates on the probability of ultimate dropout. More specifically, each estimated hazard ratio is the marginal difference in exit probability with respect to a given benchmark x^* (Table 3).

In order to deal with the possible endogeneity of MOB we apply two different instruments: the popular linear two-stage least squares (2SLS) estimator of MOB and the 2SRI instrument. The 2SRI estimator (two-stage residual inclusion) was introduced by Hausman (1978) to deal with non-linear models. It is similar to 2SLS except that in the second stage regression, the first-stage residuals of the endogenous predictors are included as regressors together with the predicted MOB variable. In a generic parametric framework, including duration models and hazard regression models, Terza et al. (2008) show that 2SRI is consistent and 2SLS is not.

Hiring and firing decisions are driven by the employers' ex-ante expectations of the cost of a new hire against the retention cost of workers already on the job, where both belong to the same skill group (i.e. the model does not explain "investment" decisions, such as would be the choice between a skilled and an unskilled worker). The retention cost of the *i-th* employee with one additional year of tenure is known by the employer ($lcost(i, t+1)$). Instead the cost of a new hire is not known a priori. The new hire will be the result of the employer's selection within a group of perspective candidates, whose initial pay exhibits some variability.

A reasonable proxy of the prospective hiring cost in year (t) is the median of the distribution of labour costs of all the new initial hires in year (t) of given age, skill group, industry, geographical location and firm size (18 cells: $j = 1, 2, \ldots 18$).[16] Firstly, we calculate the group medians of the real labour costs distributions (inclusive of social security contributions) for each year in the 1990–2003 window, denominated *lcost_median(i,j,t)* where each individual *i* belongs to one of the 18 j-cells. In addition,

[15] Unless the complete parametrization of the survival function is known (and estimable), Cox's regression methods do not provide estimates of the benchmark exit probability, but only hazard ratios indicating the distance from the benchmark.

[16] As usual, medians are preferable to means in order to avoid the influence of outliers.

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Table 3 Variables

HAZARD	hazard function (= exit probability, complement of survival)
LCOST	Labour cost (annual growth rate)
FLEX	Labour market flexibility
DUR	Duration of first job spell (one dummy for each of three spell length)
MOB	Mobility (a dummy 0, 1 activated at first job switch)
MFG	Manufacturing vs. services at entry (dummy)
AGE	Age at entry (one dummy for each of three age groups)
GEO	Geography at entry (one dummy for each of three regional groups)
SIZE	Firm size (one dummy for each of three size groups)
SKILL	Skill level at entrance: white vs. blue collars (dummy)
MED-RATIO	[Median labour cost of new entrants at (t)] + [firing cost of i-th worker already on-the-job, candidate for dismissal]/[labour cost of retaining the i-th worker already on-the-job]
W_INITIAL	Initial wage at labour market entry
COHORT	Year of each cohort's entry in labour market (dummy)
NWT	Labour market TIGHTNESS: NWT = net worker turnover rate (macro variable, region-specific)
GNP	GNP growth rate (macro variable for each of three regions)

the cost of a new hire must include the firing cost roughly equal to two months of pay for each year of the employee's tenure *layoff_c(i,t)*.

The relevant median ratio is:

MED-RATIO(i,j,t) = [median labour cost of a new entrant at (t) + firing cost of i-th worker already on-the-job]/(labour cost at (t+ 1) of retaining the i-th worker) = = [*lcost_median*(i,j,t) + *layoff_c*(i,t)]/*lcost*(i, t+ 1).

The employers' option depends also on the time elapsed since the employee's first hire: generally speaking, it is likely to be a more difficult decision the longer the employee has been on the job, regardless of the higher cost associated to the job termination. These differences are caught by three versions of MED-RATIO: MED-RATIO-1 if the new option between hiring or firing occurs less than 3 years since the past first hire; MED-RATIO-2 if the new option between hiring or firing occurs between 3 and 6 years since the past first hire; MED-RATIO-3 if the new option between hiring or firing occurs after 6 years since the past first hire.

Finally, each MED-RATIO(i,j,t) is interacted with dummies of skill qualification (blue vs white collars) and firm size (small vs. non-small).

The smaller the coefficient of MED-RATIO(i,j,t)— i.e., estimated hazard < 1—the higher the incentive to lay off the i-th previously hired individual and replace him with a new one. Hence hazard < 1 implies a higher probability of exit (and lower survival).

The HAZARD (= 1 − SURV) specification includes all the covariates that describe the individual's characteristics [AGE, SKILL, DUR, INITIAL-WAGE], those of their employer (MFG, SIZE, GEO), as well potentially informative macro variables (FLEX, NWT, area-GNP, cohort dummies), aimed at capturing the impact of the business cycle (Tables 3).

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We present the results of the Cox equation in three versions (Table 4): the first one is the standard Cox equation with MOB non instrumented; the second includes the instrumented 2SLS version of MOB; the third one is the 2SRI instrumented version, inclusive of both covariates MOB-PRED[17] and MOB-2SRI. The results are quite similar, except for the mobility covariate, which is illustrated separately. In addition it should to be noted that in all versions of the Cox model the MED-RATIO-1 and MED-RATIO-2 covariates are much more significant than all the other covariates ($p < 0.001$), while the same does not apply to MED-RATIO-3.

The calculation yielding the estimated exit probabilities is illustrated by the following example (Table 5) and the results (i)–(ix) follow.

(i) Mobility: the first comment relates to the impact of mobility. It is very significant with a large negative impact on the exit probability of the movers in the version with MOB non-instrumented (col.1). While it loses all significance with the instrumented MOB-2SRL (col.2), it is highly significant—$p < 0.0001$—in the MOB-2SRI version (col.3). The exit probability of the movers is much lower than the stayers': between 5% (attributable to the 2SRI-residuals) and 21% (the sum of the latter with the less significant 16% attributable to MOB-PRED).

(ii) MED-RATIO-1 and MED-RATIO-2: the hazards are very significant in all three versions of the Cox model (less so MED-RATIO-3). The results are important as they confirm that the comparative cost of retaining vs. replacing on-the-job workers plays a major role in determining the status of LTNE's. Table 6 shows that the impact of a 1 st.dev. increase of MED-RATIO-1 leads to 3–4.7% reduction of the exit probability among blue collars of any size-firms, and 1.9–3% among white collars. If the time elapsed since the hire is longer (between 3 and 6 years, impact caught by MED-RATIO-2), the reduction is slightly larger among blue-collars and among small-size firms.[18] The hazard coefficients of MED-RATIO-3 lead to a much larger reduction of the exit probability compared to the MED-RATIO 1 and MED-RATIO 2 cases (although the coefficients are less significant). This is a reasonable result: when the new option between hiring and firing is exercised after many years since an employee's first hire, retaining him increases survival more than if the new option occurs shortly after his hire.

Other results of interest displayed by Table 4 are those indirectly reflecting the employer's evaluation of each worker at the time of first entry (duration of first job spell, and entry wage).

[17] MOB-PRED is the OLS first stage predictor of MOB necessary to compute MOB-2SLS. In addition RESIDUALS = MOB − MOB-PRED.

[18] This result recalls a similar one obtained in a model of labour demand with permanent and temporary contracts (Contini 2011): small firms hire permanent workers more frequently than larger ones as the investment spent for the enhancement of their employees' specific human capital and loyalty is often high.

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Table 4 The (1 – SURV) equation = hazard function

	HAZARD RATIOS		
	col.1 MOB non-instrumented	col.2 MOB-instrum. 2SLS	col.3 MOB instrum.- 2SRI (res)
White collar	0.74*	0.92 n.s.	0.77*
North	0.85*	0.70**	0.80*
Centre	0.74*	0.68*	0.74*
First job duration 3–12 months	0.80***	0.85**	0.80***
First job duration 12 + months	0.07*****	0.26***	0.10***
Age	1.04***	1.07***	1.05***
MOB	0.05*****	–	–
MOB-2SLS	–	0.62 n.s.	
MOB –PRED			0.16*
MOB-2SRI (res)	–		0.05*****
FLEX	2.15*	2.71*	2.15*
Wage_initial	0.99*	1.0**	0.99*
MED-RATIO-1*blue *SM	0.22****	0.15****	0.22****
MED-RATIO-1*blue *ML	0.20****	0.11****	0.20****
MED-RATIO-1*white *SM	0.24****	0.12****	0.24***
MED-RATIO-1*white *ML	0.18****	0.07****	0.18****
MED-RATIO-2*blue *SM	0.35****	0.26***	0.35***
MED-RATIO-2*blue *ML	0.22****	0.21***	0.22****
MED-RATIO-2*white *SM	0.28****	0.19***	0.28***
MED-RATIO-2*white *ML	0.18****	0.15***	0.18***
MED-RATIO-3*blue *SM	0.93 n.s.	0.69*	0.93 n.s.
MED-RATIO-3*blue *ML	0.79*	0.73*	0.80*
MED-RATIO-3*white *SM	1.01 n.s.	0.67*	1.01 n.s.
MED-RATIO-3*white *ML	0.59*	0.52*	0.59**
Cohort 1987	1.12 n.s.	0.95 n.s.	0.78 n.s.
Cohort 1988	1.11 n.s	1.0 n.s.	0.81 n.s.
Cohort 1989	1.16 n.s	1.03 n.s.	0.83 n.s.

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Table 4 continued

	HAZARD RATIOS		
	col.1 MOB non-instrumented	col.2 MOB-instrum. 2SLS	col.3 MOB instrum.- 2SRI (res)
Cohort 1990	1.20 n.s	1.08 n.s.	0.87 n.s.
Cohort 1991	1.31*	1.23*	0.95 n.s.
Cohort 1992	1.35*	1.30*	1.0 n.s.
Cohort 1993	1.27*	1.22 n.s.	0.95 n.s.
Cohort 1994	1.21 n.s	1.11 n.s.	0.91 n.s.
Cohort 1995	1.09 n.s	0.98 n.s.	0.82 n.s.
Cohort 1996	1.29*	1.16 n.s.	0.96 n.s.
Cohort 1997	1.12 n.s	1.04 n.s.	0.88 n.s.
Cohort 1998	1.02 n.s	0.86 n.s.	0.83 n.s.
Cohort 1999	1.0 n.s	0.93 n.s.	084 n.s.
Cohort 2000	1.13 n.s	1.0 n.s.	1.0 n.s.
Cohort 2001	1.0 n.s	1.0 n.s.	1.0 n.s.
GNP-North	2.4 n.s.	2.9 n.s.	2.9 n.s.
GNP-Centre	11.05 n.s.	11.88 n.s.	12.81 n.s.
GNP-South	1.07 n.s.	1.35 n.s.	1.07 n.s.
L-COST	1 n.s.	1 n.s.	1 n.s.
Size	0.97 n.s.	0.98 n.s.	0.97 n.s.
NWT	0.74 n.s.	0.77 n.s.	0.84 n.s.
MFG	1.16 n.s.	0.84 n.s.	1.08 n.s.
Likelihood ratio	− 37840	1.08 n.s.	− 37848
LR chi2 (42)	8011	2781	8021

*****$p < 0.0001$, ****$p < 0.001$; ***; $p < 0.005$; **$p < 0.01$; *$p < 0.05$

Table 5 An illustrative example of the impact of MED-RATIO

The 1987–2012 survival schedule of blue-collar workers employed by small firms is 0.72 implying an exit probability of 1 – 0.72 = 0.28
Table 6 indicates that, if the new option occurs less than 3 years after one's hire the predicted reduction of the exit probability is 4.7%
The sample mean of MED-RATIO-1 is 0.95 (benchmark *), with standard deviation of 0.04
Hence MED-RATIO-1* + 1 st.dev. = 0.95 + 0.04 = 0.99
Estimated lower exit probability due to an increase of MED-RATIO-1 by 1 standard deviation is = 0.28 – (0.99 × 0.047) = 0.28 – 0.045 = 0.235 which leads to a higher survival: 1 – 0.235 = 0.765

(iii) A first job duration exceeding 12 months (DUR 12 +) reduces the exit probability by 10–26% of that expected for the benchmark duration of less than 3 months. A long initial spell is a proxy of recognized ability and indicates a reasonable guarantee of survival. It should be emphasized that throughout the

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Table 6 Predicted % reduction of exit probability = estimates delivered by the non-instrumented Cox by the 2SRI Cox

Interactions	Med-ratio-1 New option occurring less than 3 years after entry	Med-ratio-2 New option occurring 3–6 years after entry	Med-ratio-3 New option occurring after 6 years since entry
Blue collars and small firms	(**3.0**)*4.7*	(**3.7**)*4.7*	(**n.s**)*12.6*
Blue collars and medium-large firms	(**3.1**)*4.4*	(**3.8**)*3.1*	(**17.8**)*14.3*
White collars and small firms	(**2.5**)*2.4*	(**3.9**)*3.0*	(**n.s.**)*11.3*
White collars and medium-large firms	(**3.0**)*1.9*	(**3.0**)*2.5*	(**9.0**)*7.2*

observation period, especially towards its end, the number of very short initial hires is about three time as large as those lasting more than 12 months.

(iv) A first job duration between 3 and 12 months (DUR 3–12) reduces the exit probability to 80% that expected for the benchmark duration of less than 3 months.

(v) The entry wage is significant but has no impact on the exit probability, defeating our expectation that it might perform as an additional indicator of individual ability upon entry.

(vi) Age at entry matters: entering at age 20 increases the exit probability by 18% relative to entering at 35.

(vii) The exit probability of white collars (entering at average age 24) is 74–77% that of blue collars (entering at average age 20). The hazards of WHITE and BLUE (BLUE is the benchmark) are relative to the average entry age of each skill group. The effect of a different age *cum* skill group can be evaluated: for instance, a blue worker entering at 30 has a marginally higher exit risk than a white collar entering at the same age (0.773 vs. 0.770).

(viii) A 10% increase of the flexibility indicator above its mean (FLEX) increases the exit probability by 11%. The a priori uncertainty expressed about the sign of the impact of flexibility (measured by the incidence of temporary contracts on all hires) finds its answer here: higher flexibility leads to higher turnover.

(ix) The exit probabilities of workers operating in the North and in the Centre are lower than in the South (between 65 and 80%). This is not surprising: as shown in Fig. 1 survival in the South is lower than elsewhere in Italy. Instead, a composition effect due to the higher presence of micro-firms in Southern Italy is unwarranted as firm size dummies are non-significant.

(x) Cohort dummies are below significance except for the recessionary years 1991–93, with a slightly higher exit probability.

We present also the first-stage OLS regression of MOB, the prerequisite for both MOB instruments (Table 7). The covariates are the individuals' characteristics at the

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Table 7 The OLS equation of MOB

MOB	Coefficient
White-collars	0.031****
North	0.054****
Centre	0.049****
Dur 3–12	0.002 n.s.
Dur 12 +	0.291****
Age	0.005****
Cohort 1987	0.000*****
Cohort 1988	0.483****
Cohort 1989	0.441****
Cohort 1990	0.445****
Cohort 1991	0.457****
Cohort 1992	0.450****
Cohort 1993	0.441****
Cohort 1994	0.414****
Cohort 1995	0.426****
Cohort 1996	0.424****
Cohort 1997	0.380****
Cohort 1998	0.348****
Cohort 1999	0.310****
Cohort 2000	0.276****
Cohort 2001	0.141****
Constant	0.652****

time of first hire, and the cohorts of entry that catch the business cycle. With the exception of dur 3–12, all are extremely significant.[19]

6 Where Do the "Disposed" Workers End Up?

The crucial question "where do all the long-time jobless individuals end up after being 'disposed'?" remains unanswered. Discovering their end destination is a difficult task as no specific micro-data are available to help. Reasonable comparisons between our LTNE estimates and aggregate indicators are the only available second best (Fig. 3).

A few relevant observations are in order: (i) only a minority of the LTNE's have retired as almost all entrants are too young to have reached retirement age; (ii) few workers expatriated before the 2008 crisis, although in its aftermath the number of young high-skilled expatriates has rapidly increased; (iii) foreign workers are excluded from our sample as their return to their home country is unobservable and may bias our survival estimates.

[19] An alternative predictor MOB^^^ has been estimated using all the exogenous covariates of the HAZARD equation with the addition of a new exogenous covariate—a string<0, 1, 2, 0, 1, 2, 0, 1, 2 ……>. The correlation between MOB^^ and MOB^^^ is 0.982. The results of the 2SRI estimation are unchanged.

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The irregular economy is a likely candidate as the end destination for workers in working age who become long-term non-employed. Irregular work needs not imply a condition of poverty for the family (especially if there is another component at work). But the EHCP (European Household Community Panel) suggests that the presumably LTNE individuals report poorer economic conditions than the rest of the sample.[20]

Is LTNE a choice? There are no data hinting at this possibility. It could be the case, but it is very unlikely, perhaps as a choice for few sufficiently wealthy people. At any rate it seems reasonable to assume that a healthy LTNE man in working age might prefer to engage in irregular activities rather than remaining idle.

Indirect evidence from a variety of sources allows a coarse estimation of the magnitude of irregular work. ISTAT puts the number of irregular workers in 2009 at about 3 million, 2 million of which completely submerged and 1 million double-job holders, the latter regularly employed and working extra-time in the black.[21] No gender-based breakdown is available, but feeble evidence (Lucifora 2005) seems to suggest that the large majority of double-job holders are men, while the fully irregular women are about half the number of men. In addition, half of the young school leavers (15–24) searching for their first job may also be active in the unobserved economy. Altogether the number of men working in the irregular economy according to ISTAT is in the order of 2.0 million individuals—12.2% of total employment (including 250 thousand students or school leavers unobservable in the WHIP database). ISTAT provides estimates of the age distribution and of the regional presence of irregular workers (Table 7).

The comparisons of our estimates of premature exit with ISTAT/LFS aggregates indicate that many of the dropouts are active full- or part-time in the irregular sectors of the economy.[22]

Firstly consider the age distributions (Table 8). The LFS-2010 indicates about 2.3 million male individuals self-reporting as either unemployed or "inactive but willing to work", across all ages. The age distribution of the two aggregates is close for the age groups 25–34 and 35–54; less so among the over 55 and, not surprisingly,

[20] The European Household Community Panel (EHCP) provides some information on the workers' personal characteristics, unavailable in the administrative data (Contini et al. 2017). The EHCP indicates that the survivors are often better off than the non-survivors on all the items related to one's wellbeing, education and past unemployment experience. This holds also for the entrants of age 26–30 whose survival rates appeared suspiciously low in ch.3. In addition, there are strong hints of a relatively high participation (not necessarily full-time) to the irregular economy, both among those who report to have worked without a contract, and also among those who do not indicate any contract typology.

[21] The relative weight of the black/irregular economy on Italy's GNP is estimated at 24% by ISTAT National Accounts. Alternative methods of estimation make use of different macroeconomic hypotheses Feige (1979). Schneider (2011) estimates the share of irregular activities on GNP for several OECD countries: Italy ranks among the highest at 21.5% and Germany, among the lowest, at 13.5%. The share of irregular employment on overall employment in Italy is estimated at around 16%. Ardizzi et al. (2013) indicate 16.5% of Italy's GNP as attributable to irregular work in legitimate activities and 21.6% inclusive of all criminal activities. The same authors estimate the share of irregular activities in GNP at 19.2% in Spain, 13.5% in Germany and 11% in France.

[22] Battistin and Rettore (2008) indicate that people who work full time in the irregular economy are unlikely to reveal their status in the course of LFS interviews for fear of being disclosed. More generally, the likelihood of misclassification among the unemployed, the inactives and the irregulars is often very high.

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Table 8 Age distribution in WHIP and LFS indicators (male only, in 000)

Age	LTNE's 2012 (000-our estimates)	LFS-2010: Unemployed and OLF available to take a job	Average joblessness duration of LTNE's (years)
55+	140 (*)	320 (*)	17
35-54	575	690	10
25-34	500	585	5
15-24	45 (**)	725 (**)	2
All	1260	2320	9.7

*No upper age limit in LFS
**At least 500 thousand school leavers in search of first job, unobservable in WHIP

Table 9 Geographical disaggregation in 2010 (male only, in 000)

	North	Centre	South	Italy
LTNE's (*)	380	240	640	1260
Irregulars (**)	600	350	800	1750

*WHIP, our calculations
**ISTAT estimates: no upper age limit among the irregulars

among the young. The reason for the first difference is that the LFS covers individuals without any age limit while in our WHIP count maximum age is 62. Among the young ones (15–24), the LFS includes all individuals aged 15+ who have never been in regular employment—about 0.5 million youth in search of their first job unobserved in WHIP—but also all the students who report some availability without being officially in search of a job.

A quick glance at the geographical distribution (Table 9) is also fairly reassuring, considering the differences indicated above and the number of irregulars, higher than our LTNE's (also because they may be older than 62).[23]

The match between age and geographical distribution cannot be the result of mere coincidence and suggests instead that a vast majority of LTNE individuals may have joined the irregular economy, many self-reporting in the LFS as inactive but available to work.

Statistical tests of these hypotheses cannot be performed due to the lack of micro-data.

7 Policy Implications

Prolonged stagnation played an important role in explaining premature and definitive exit from the labour market. Needless to say, a sound recovery of the economy would have beneficial effects on employment and on labour market survival.

[23] The collective layoffs from the industrial sectors in the 80s and 90s involved mainly blue collar workers in their 60s by 2012, who could easily find niches in the irregular sectors (construction, maintenance, small trades and public services).

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Our econometric exploration provides various short-medium run explanations for "worker disposal". While it does not extend beyond 2003 for lack of adequate data, specific policy implications are still valid today as the incentive structure has remained virtually unchanged.

Measures aimed at reducing labour costs across the board are not promising in addition to being very expensive. Instead, increasing the relative cost of replacement vs. retention would lead in the appropriate direction. Recent measures (Legge Fornero 2013 and Jobs Act 2015) suggest that policy makers are aware of the problem, but the magnitude of the proposed differential is much too small to generate the desired effects. A simulation exercise indicates that a generalized 3 p.p. decrease of MED-RATIO would reduce the distortion of the incentive structure and prevent ultimate exit from the labour market for about 100 thousand individuals over a 10-year horizon.[24]

Movers have higher chances of avoiding premature exit than stayers. The macroeconomic implication is straightforward: a strong upturn of the economy would have a positive impact on employment and, indirectly, a beneficial impact on survival. The immediate policy implication is also clear, but not easy to implement under tight budget constraints: increasing the efficiency of placement agencies (hiring new trained personnel[25] but also increasing training-on-the-job opportunities) would improve the likelihood of successful matching between supply and demand, reduce the risk of dropping out of the labour market and the consequent dramatic length of non-employment spells.

Our exploration suggests the need to increase the cost of early layoff in order to mitigate ultimate exit from the labour market and many of its negative consequences.

Many workers, "irregular" by Italian standards, would be legal in most EU countries where regulation is less invasive and/or may be exempt from social security contributions. This is the case for low-pay, often part-time or temporary jobs in the service sectors: waiters, janitors, salespeople, domestic helpers and caregivers. A less restrictive legislation would reduce the incentive to join the irregular economy, while it might also have a mitigating impact on early exit. And a drastic reduction of the excessive number of contract typologies would dissipate the legislative confusion and reduce the number of ensuing litigations as well as their associated transaction costs.

A tempting "work less, work all" hypothesis is at times put forward and it is perhaps not completely unfounded. But, at least to our knowledge, no sound elaboration has ever been offered as to how it could be implemented.[26]

[24] The simulation exercise—based on a pseudo-Markovian process with state dependence due to long-term joblessness—provides a rough estimate of the long-run impact of policy changes. Today's overall employment rate is about 69%, the remaining 31% including unemployment and non-employment. If the annual transition probability from unemployment/non-employment to employment increases by 10%, the long-term (steady state) employment rate is estimated to reach 71% in about 10 years. The *ceteris paribus* assumption implicit in this simulation is, obviously, very restrictive. Only a general equilibrium approach would improve the credibility of this exploration.

[25] The quest for new personnel is well founded: the employment of Italy's public placement agencies is one tenth that of Germany, with France and the UK not far behind. On the other hand, the impact of a tenfold multiplication of placement agencies is impossible to ascertain via a model like the one implemented here.

[26] It is sometimes based on a very rough comparison of average yearly working hours: 1377 in Germany and 1725 in Italy. If Italy were to reach the German level, it would imply a 25% addition to overall employment.

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At least two official estimates on the Italian labour market should be the object of important review:

(i) Italy's real employment/population rate is substantially higher than the official one based on LFS estimates (55.5% in 2013, against 64% in France and above 70% in Germany and the UK).
(ii) A realistic estimate of Italy's unemployment rate is much higher than the official 12%—in the order of at least 4–5 p.p.—as a large number of individuals self-reporting as "inactive but available to work" are either LTNE's or reporting to be inactive (or both).

8 Conclusions

In Italy a vast number of individuals who lose their jobs enter the ranks of the non-employed, never to regain regular employment. The magnitude of LTNE is dramatic: more than 20% of all workers who entered in the official economy at young age dropout from regular employment by the time they reach their 40 s and early 50 s. Average non-employment duration for almost 1.3 million workers is a frightful 11.6 years, with peaks of 20–30 years for people in their early fifties, and 9–20 years for mature but still very healthy individuals in their forties.

Premature and definitive labour market exit was already under way in the Eighties. The reforms of the mid Nineties, strongly advocated by the EU Commission—low entry wages and high flexibility—added strength to its development. And the prolonged, negative state of the economy worsened the job crisis.

Many LTNE's workers join the black/irregular economy; many remain long-term unemployed and/or leave the workforce altogether, unsheltered by welfare institutions, and many are at risk of never re-entering the labour market again in whatever form. This entails dramatic consequences on their lifestyles and expectations, and ultimately on family formation and delayed fertility.

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