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Estimating Workforce Disposal in the Italian Labour Market

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ABSTRACT

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Italy's labour market suffers from a serious pathology, in addition to the increasing precariousness of the young workforce common to all EU member countries: flows from regular employment to non-employment are very often dead-ends. A vast number of young individuals who lose their job only a few months or years after their first hire enter the ranks of the long-term unemployed or leave the workforce altogether, never to regain regular employment even after as long as twenty years. Many join the ranks of the irregular economy, many drop out of the labour force.

"Workforce disposal" refers to the process generating this pathology. Prolonged stagnation of the Italian economy is an important long run macroeconomic determinant of workforce disposal. But there are several factors that have an important impact in the short and medium run. In this study we set out to investigate such determinants.

Workforce disposal is present also in Spain, though to a lesser extent than Italy. Informed media report that similar developments are taking place also in countries of Eastern Europe, although no scientific evidence is yet available. And it would be surprising if the economies of Portugal and Greece were immune from the disease.

Our exploration of the Italian case makes use of the WHIP longitudinal database originating from Social Security records.

JEL Classification: J, J2, J08, J20, J6, J63, J64

Keywords: unemployment, youth employment and participation, mobility, workforce

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1. Introduction

At the eve of the 2008 recession, Italy's unemployment reached 2 million individuals, inactivity (but willing to work) 3 million, and irregular employment 3 million. Official statistics provide a fuzzy picture of these categories. This paper adds a fourth dimension that may yield additional insight to this seemingly inextricable mix: "disposed workforce", i.e. people who lose their regular job without ever re-entering regular employment.

Increasing job precariousness, especially among the younger workforce, is a widespread phenomenon that affects all the EU member countries. Precarious employment typically involves a series of contingent short-term employment relationships providing low wages and little or no social security coverage, and leads to feelings of insecurity and difficulty of lifetime planning. The careers of precarious workers are characterized by frequent in and out from employment.

Italy's labour market is also plagued by another serious pathology: flows from official employment to non-employment are often a dead-end. Many whose jobs are terminated enter the ranks of the long-term unemployed and/or abandon the workforce and/or join Italy's thriving black/irregular economy.

"Workforce disposal" refers to the process generating this pathology: labour inputs are "used" by the employers for a brief period of months or years, after which the workers are "disposed of" or thrown away as if they were worn-out and useless commodities. Workforce disposal was already well under way before the cyclical down-turn in the 90s. Subsequent reforms aimed at enhancing youth employment opportunities gave employers additional incentives for pursuing the strategy of turnover and nearly systematic replacement of young people on the same job.

The denomination "workforce disposal" may sound politically biased as it contains value judgements that academics usually dislike. In our view the social consequences associated to the long-term loss of human capabilities are conspicuously absent from mainstream economics, and justify this denomination. Economic theory explains that low productivity is the cause of early job termination. But the vast majority of low productivity workers would be expected to re-enter the labour market sometime after job loss, eventually after a period of re-training. As a matter of fact, while we observe about two thirds of all hires aged 19-30 leaving their first job within two years since entry, about 40% are back at work within 4 years, and another 40% within 8 years. Aside from the excessive length of joblessness duration, the real problem is that the remaining 20% who disappear altogether is a huge number. Official statistics on long-term unemployment are based on a strict definition that makes them unfit for comparison. A relatively close category for which data are available is that of the "inactives, but willing to work if given the option". The comparison with the Eurostat estimates of these rates (tab.1) explain our concern. Italy's rate is almost three times the EU average and far above all the larger EU countries, including Spain. The comparison evokes also the fact that the Italian institutions for worker re-training are far less effective than in the rest of the EU.

We use the WHIP longitudinal database originating from Social Security records, a large sample representative of the universe of "regularly working" Italian people. While prevalent among youth, disposal takes place at all ages, and young disposed individuals will no longer be young as time elapses. We observe male workers[1] aged 19-30 at the time of their first job and track their careers in the regular" labor market for up to twenty years or more. Many hold jobs for just a few years or even months before disappearing altogether from the database. "Workforce disposal" is dramatic: out of 100 new male entries - aged 19-30 at the start of their careers – only 86% "survive" in regular employment after 10 years, and 81% after 16 years in 2002. Estimates of "workforce disposal" in other countries are not yet available, although two preliminary explorations using our methodology on administrative data similar to WHIP are currently being conducted in Spain and Norway[2]. In Spain young male survival after 20 years (1987-2007) ranges between 83 and 87%

[1] This exploration is performed on male employment only simply to avoid the additional difficulties associated to the analysis of women's careers, like marriage, maternity and child-bearing, housework, etc.

[2] J. Ignacio Garcia Perez (2013) on Spain, and S. Strom et al. (2012) for Norway.

depending on educational attainment. In Norway it reaches about 97% over a 15-year window ending in 2005. Italy's poor performance compared to Norway is unsurprising, given the strong tradition of the welfare state in Scandinavian countries. Less clear is why it also lags behind Spain, the reasons for which are being investigated at the time of this writing.

Tab. 1. Unemployment and out-of-labour force (OLF) in OECD Statistics Database 2011.

	Unemployed 2010 (000)	*Unempl. Rate 2010*	*OLF- 2010 not searching, but willing to work*	*OLF Rate (M+F) 2010*	*Empl. rate 2010 (M)*	*Empl. rate 2010 (F)*	*Youth unempl. rate 2010 (15-24)*
Italy	2102	8.4	**2764**	**11.6**	56.9	46.1	27.9
France	2653	9.4	**309**	**1.1**	64.0	59.9	22.5
Germany	2946	7.1	**530**	**1.3**	71.2	66.1	9.7
UK	2440	7.8	**837**	**2.7**	70.3	65.3	19.1
Spain	4632	20.1	**973**	**4.2**	59.4	53.0	41.6
EU	22906	9.6	**8250**	**3.5**			

2.2 Related literature

Countless studies on long-term unemployment touch upon issues closely related to "workforce disposal": duration, stigma and state dependence, labour market segmentation. Nearly all investigate the consequences of long-term unemployment, and more specifically, 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,1989; Layard and Nickell, 1987; Machin and Manning, 1999). The negative relationship between the duration of joblessness and the probability of being rehired persists also when selection issues related to workers' heterogeneity are included in the analysis (Van den Berg and Van Ours, 1994 and 1996). Torelli and Trivellato (1989) study youth unemployment duration in Italy, confirming state dependence. Recently, Addison, Centeno and Portugal (2004) offer new evidence that the hazard function exhibits strong negative dependence in the EU15.

Few studies document the length of unemployment spells, one exception being Mroz and Savage (2006) who report re-employment probabilities for US youth who experienced unemployment spells of 10 years or more. K. Tatsiramos' (2010) estimates of unemployment duration for a number of EU countries (including Italy) based on ECHP data, are much more optimistic than our findings suggest[3]. The negative consequences of long-term unemployment apply more forcefully to workforce disposal, as well as additional ones that are probably even more dramatic.

While from a macro perspective long-term unemployment is a direct consequence of prolonged slowdowns of aggregate demand, none of the micro-based analyses above deals explicitly with the actual process that drive people into long-term unemployment. This is, instead, the very object of our investigation.

2.3 Italy's labour market and the main reforms

Italy's unemployment rate hovered around 7-9% from the mid 90s to 2007, rapidly increasing thereafter above 12%. In the early 2000's youth unemployment was about 20%, the second highest in the European Union, and hiked to 40% and over in 2013.

Youth employment had 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 had jobs. Notice that between 1985 and 2002 overall dependent employment (male and female) increased by 37 p.p.;

[3] K. Tatsiramos uses the Eurostat definition of long-term unemployment duration (12 months +) and estimates it at 13 months for Italy, applying to about half of all the unemployed in 2009.

men's employment by 25 p.p. against 66 p.p. of women's. In the same period the employment of young males (<30) gained a mere 13 p.p., less than half that of older counterparts. In fact, on-the-job-ageing of cohorts born during the baby boom coincided with the decline of new young hires necessary to replace the retirees. In addition, the youth participation rate steadily dropped from 45% of the Eighties to 27% in 2013 (fig. 1). Fig, (2) depicts the growth rates of employment and GDP since the early Nineties. GDP growth exceeded employment growth until 2001, leading to a slight increase of average labour productivity. The pattern changed drastically ever since: labour productivity shrank by 6 p.p. between 2001 and 2012. Additional evidence of Italy's weak position vis-à-vis the rest of its direct EU competitors is signaled by the pattern of real wages which have been stagnant since the early 90s, while in the rest of Europe they were increasing by 10% in the market sectors and by 20% or more in manufacturing.

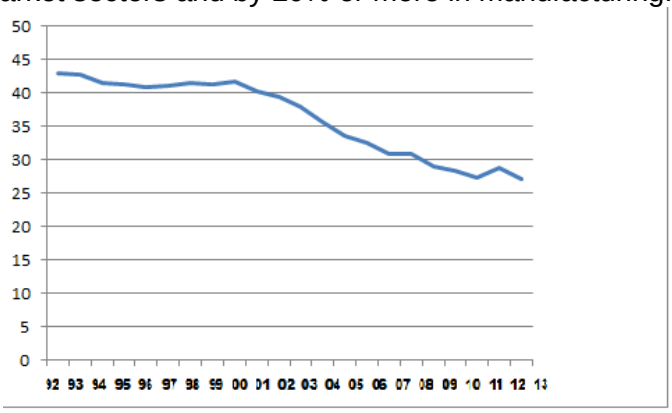


Fig.1 – Youth participation rate

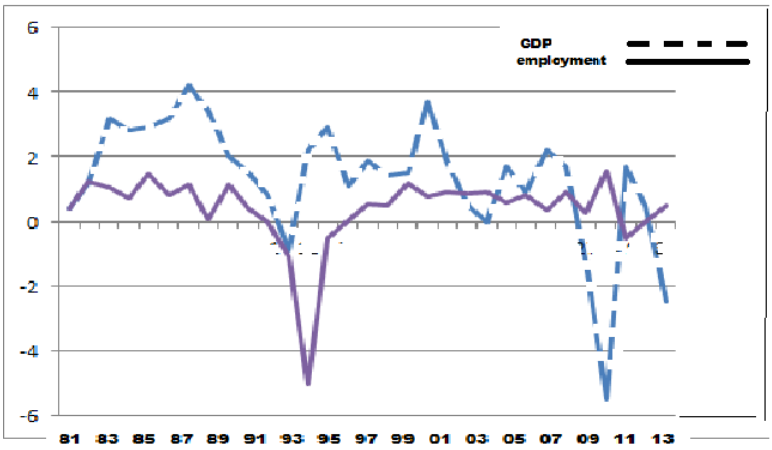


Fig.2 – Growth rates of employment and GDP

Labour market flexibility was *de facto* already high throughout the Eighties, with almost 50% of the new hires lasting less than one year. Since the late Seventies a generalized generous tax exemption scheme was in place in Southern Italy, phased out in the mid Nineties. The main instrument aimed at enhancing youth employability was the CFL (contratto di formazione-lavoro, work and training contract), introduced in 1985. Eligible people were workers younger than 30. The program provided employers with two key benefits: (i) a 30% rebate on labour cost via a reduction of Social Security contributions; (ii) a full exemption from firing costs. In principle, the program featured also an off-the-job training component that was, however, seldom implemented. Several reforms of the program took place over time: in 1988 the tax rebate was reduced; in 1991 a second reduction applied only to the Centre-North of the country, and the eligibility rules were made stricter. The CFL contract, although never eliminated, became progressively less important as new instruments were implemented. The last 20 years led to a new proliferation of tax rebates and exemption schemes for the employers and the introduction of increasingly flexible working

arrangements and new rules governing the labour contracts. In 1996 the Treu Reform Package completed the liberalization of temporary contracts and introduced forms of contract work (referred to as "co.co.co." contracts), *de-facto* disguised dependent work, exempt from firing costs and subject to very low social security contributions. The latter left workers almost completely unsheltered from any form of welfare coverage. The share of short temporary contracts picked up after the Treu Reform Package, reaching 65% of all hires in 2000, and 70% by 2008. It is fair to say, however, that the new legislation merely sanctioned and legalized practices that were already widely used. According to shared opinions, one of the underlying causes of the fall of labour productivity in Italy is the excessive utilization of temporary, low-pay and high-turnover working contracts described in this paper.

An overview of Italy's labour market is not complete without mentioning the irregular/ parallel/hidden economy. Based on a variety of coarse macroeconomic indicators, ISTAT put the number of irregular workers in 2009 at about 3 million, 2 million of which completely submerged and 1 million double-job holders[4]. The large majority of double-job holders are men, while the fully irregular women are about one 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 in the unobserved economy. The irregular economy has largely negative implications which affect macro-economic objectives as well as the quality and productivity at work and social cohesion. From a macroeconomic perspective, while it leads to a net addition to GNP, it drastically reduces tax revenues and undermines the financing of social security systems, paving the way for social dumping. From a microeconomic perspective the irregular economy distorts fair competition and seriously hinders productivity growth.

3. The WHIP database and the measurement of survival

The WHIP longitudinal database is a representative sample of the population of Italian employees of the private sector, of the public, non-tenured employees, the self-employed, as well as those covered by atypical (non-standard) contracts.[5] The sample-population ratio is 1:90. WHIP covers individual working careers from entry to retirement at monthly frequency, with data on skill level, wage, industrial sector, firm size and geographical location, including spells of temporary layoff subsidized by Earning Funds (C.I.G., Cassa Integrazione Guadagni). In addition it provides detailed information on workforce dynamics, composition and relative wages. Data on educational attainment are, instead, unrecorded in the WHIP database.

The WHIP database is the ideal instrument for the study of mobility. It provides much richer detail than LFS-type data, as it captures all employment and non-employment spells at monthly frequency, regardless of their duration[6]. We can thus observe young people entering the "official" labour market and track their entire careers. School leavers in search of first job are instead unobservable as they enter the Social Security records only upon being officially hired. Many of the "disposed" people may have become inactive by discouragement after a long time in joblessness; some are unemployed, but not eligible for unemployment benefits[7]; and a few may have reached retirement age at the time of observation. Many have joined the irregular economy. Some may have left the country[8] and there may be a few who are of independent means.

[4] E. Battistin and E. 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 extremely high.

[5] The Social Security Administration has kindly provided an independent database (drawn from the Casellario degli Archivi) which integrates the original WHIP sample with the working careers of those who move to tenured positions in the public sector after initial jobs in sectors observed in WHIP.

[6] The sampling design of LFS does not allow to observe short spells of employment and unemployment.

[7] The unemployed non eligible-for-benefits are not identified in the WHIP database.

[8] Foreign workers have been deleted from the database: those who return to their home-country after leaving a position in Italy would be counted as non-survivors, which would be a mistaken inference. We miss instead, at least for the time being, Italian citizens, mostly University graduates, who find a job abroad and leave the country. Their number is rapidly increasing in recent years, but it was relatively small throughout the period of this investigation.

The basic statistic used in this exploration is labour market survival. Survival is estimated by counting the number of individuals employed since a given starting year and who are still present in the database at the end of any given observation period, whether or not they have had unemployment spells in the course of their career. The non-survivors are the individuals who have been disposed, i.e. who have left regular employment and no longer reappeared in the administrative data. If anyone is unobservable for a period of time and then shows up again in the records, the missing period is considered to be an unemployment spell. Such spells may last for few months or two, three, four years (additional schooling is, obviously, a likely possibility for young men), but they should ultimately lead to re-entry in employment or self-employment.

Fig. 3 exemplifies the counting method for one cohort of 8 individuals - A, B,…H - whose work histories are observed between 1986 (the year of entry for all) and 2008. Let the survival count take place in 2008. In 1993 we count the following survivors: A, B, C, D, F, G and H (yielding a survival rate in 1993 of 7/8 = 0.875), as E exited two years after entry and does not reappear. In the year 2000 the following have survived: A, B, C, D, G and H, yielding a survival in 2000 of 6/8 = 0.75. This method may be the cause of some problems of truncation that will be discussed in section 10.

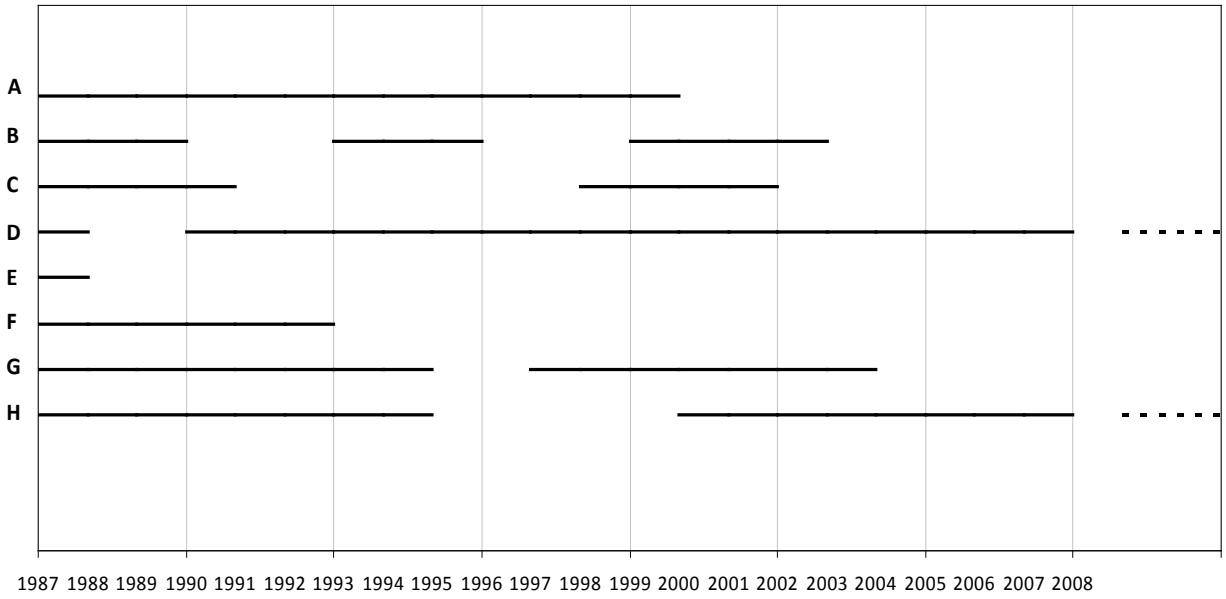


Fig. 3. Counting survival.

The survival function is downward sloping and the average duration of "long-term non-employment" (LTNE) is easily obtained. Consider the exemplified survival function for a given cohort (fig. 4). Survival at (t+13) is S = 0.68, implying that at the date of (t+13) the non-employment rate specific of that cohort is 32%. Of the 32% non-employed at (t+13), a few have left the job for the full period of 13 years; 16% (= 100-84) for 5 years; and very few, less than 1%, for 1 year between years 12 and 13. In this example the average LTNE is approximately equal to 6.5 years.[9]

[9] Let s(t) be the downward sloping survival function. Average LTNE duration is given by:

$$average\ LTNE = \int_0^T tf(t)dt$$

where f(t) = s(t) / K is the p.d.f. subsumed by the survival function s(t). Average LTNE is a lower bound: workers who have survived through T may have had interrupted unemployment spells of any length in the course of their career, that get left out of this calculation. Survival implies only that they have reappeared in the database before T.
Notice that while s(t) is seldom known, LTNE can be easily calculated from the empirical survival curve. A quick and approximate estimate of LTNE is one half the length of the observation period, its precision being highest when survival is a straight down-sloping schedule. When it is upward concave, the LTNE estimate is downward biased.

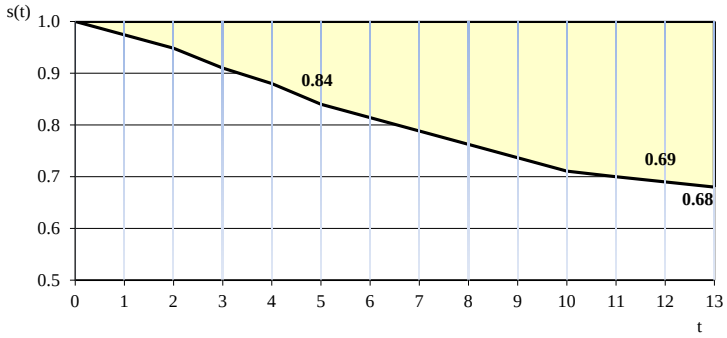


Fig.4 Survival and "long-term-non-employment" duration (LTNE).

3.1 Survival: empirical estimates

Preliminary graphical analysis of survival is performed on cells defined by cohorts of young male employees observed at one-year intervals between 1986 and 2003, along several dimensions. A few selected survival curves are displayed in the figures 5-9 below, calculated on the basis of the WHIP database, adjusted for employment in the public sector after integration with a different INPS database (Casellario degli Archivi) through 2009. Our exploration on a variety of dimensions ends in 2002 because the relevant data covering the 2003-2009 period are still unavailable in the INPS-Casellario database.[10]

The magnitude of workforce disposal is dramatic: out of 100 new young entrants - aged 19-30 at the start of their working career - between 90 and 92 % are still at regular work ("survive") 2 years after entry, 79 to 86% after 10 years, 81% in 2002 after 15 years, and only 78 to 83% by 2009, after 17-22 years, depending on the timing of their initial employment. The data do not allow the elaboration of developments related to the post-2008 recession, therefore our 2009 estimate is a simple extrapolation from the trend 1999-2003, and therefore quite optimistic.

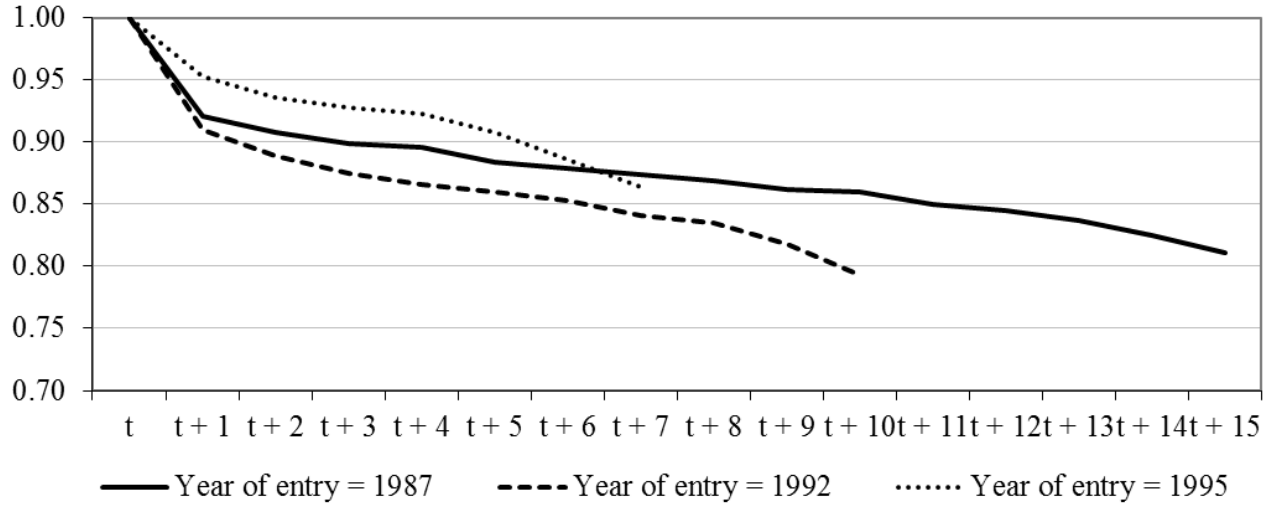


Fig. 5. Survival curves by three years of entry (1987 is near the peak of expansion, 1992 is the beginning of recession; 1995 is the start of recovery.

[10] The additional information available in the linked WHIP-Casellario database is age at entry, year of entry and employers' geographical location. Survival through 2009 is obtained by extrapolations of the 1986-2003 schedules.

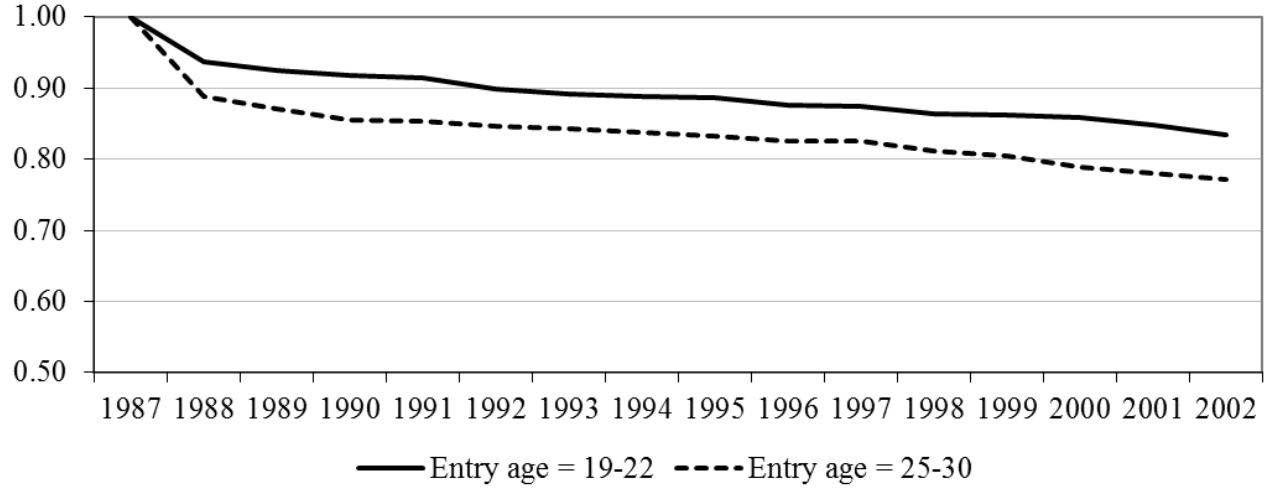


Fig. 6. Survival curves by age at entry.

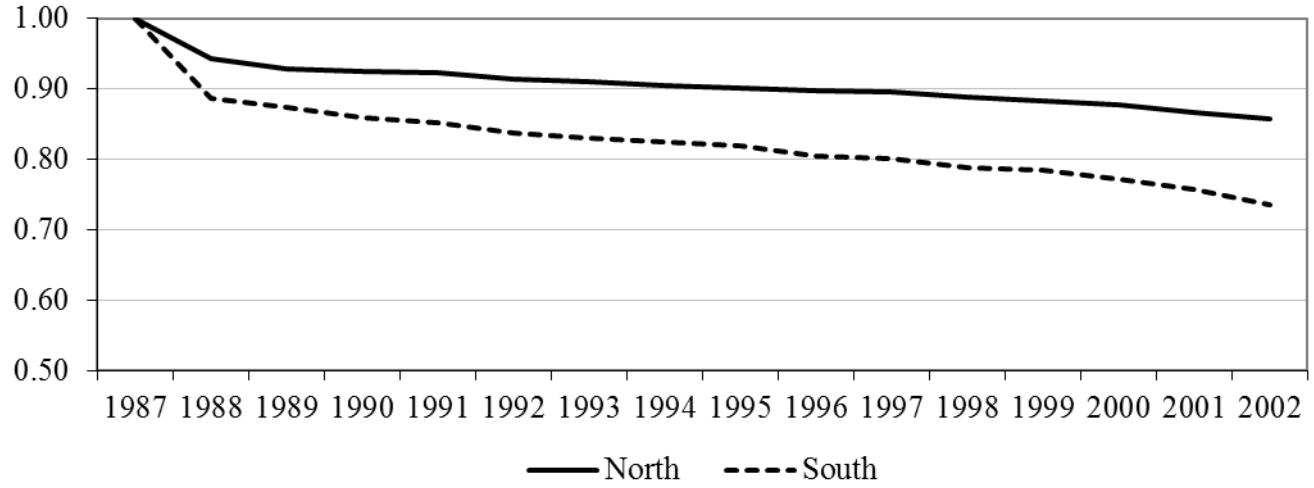


Fig. 7. Survival curves by geographical area.

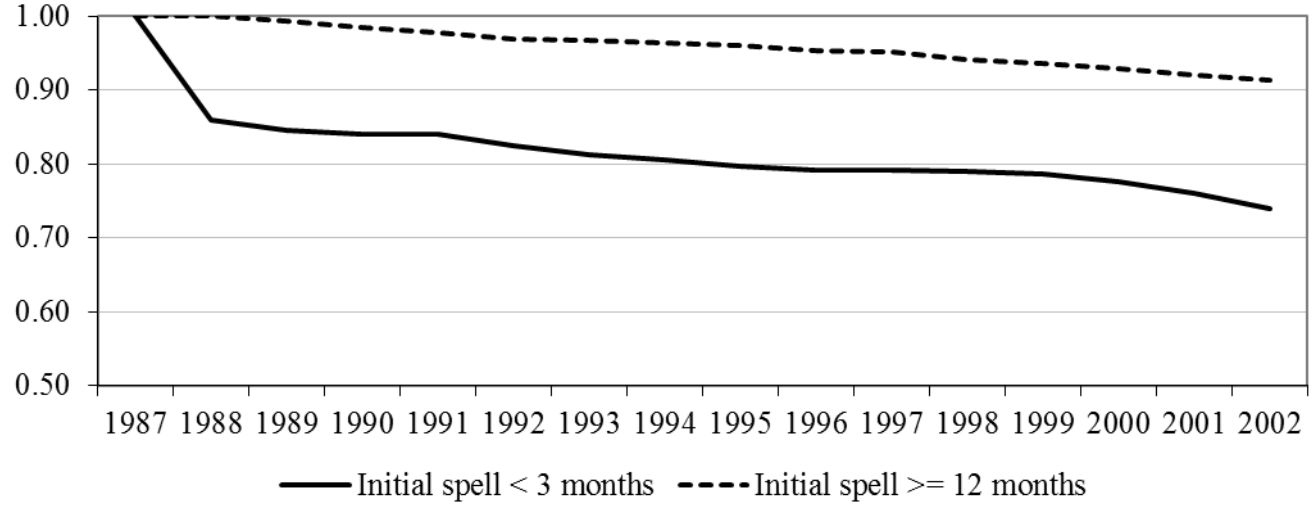


Fig. 8. Survival curves by duration of first spell.

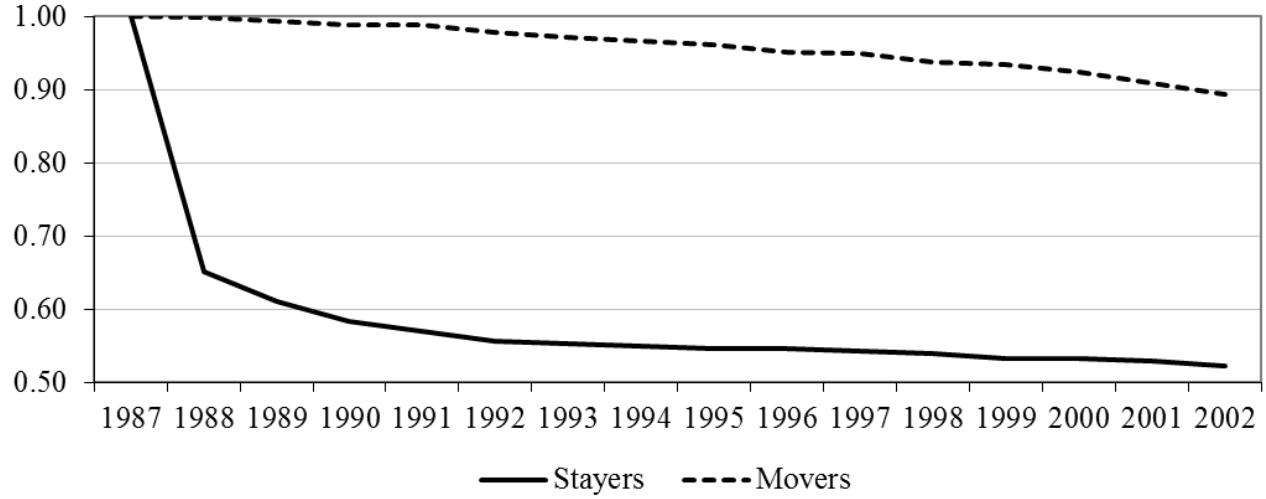


Fig. 9. Survival curves by mobility following the initial job

The timing of labour market entry reflects the impact of the business cycle (fig. 5): if one's first hire occurs in expansionary years (1987), survival is higher than if the working career commences during recession times (1992 is the beginning of a three-year downturn of the economy); it is also higher than 1995, when recovery takes off. At (t+6) survival of the cohort entering in 1987 is 88%; 89% of the 1995 cohort, 85% of the 1992-cohort. At (t+10) survival of the 1987-cohort is 86% and 79% for the 1992-cohort. In 2002, at (t+15), survival of the 1987-cohort is 81%. Fig. 6 shows the impact of age at entry: very young entrants (19-22) do better than the less young (25-30), with survival of the former at 83% as opposed to 77% for the latter in the same time span (1987-2002). Workers of Northern Italy survive longer than their counterparts of the South: 86% vs. 74% in 2002 (fig. 7). Fig. 8 shows the impact of the duration of the first employment spell. Survival of workers with a long initial spell (12 months +) after 15 years is about 91%, whereas it drops to 74% for those whose first employment spell - three times as numerous - lasted less than 3 months. The latter are characterized by an abrupt drop of survival in (t+1) and (t+2), followed by a steady decline thereafter. A remarkable number of people – about 80% of all entrants, including those hired via standard open-end contracts[11] - leave their job or are dismissed within two years of initial hire; the majority will re-enter after one or more spells of unemployment. The last and most important additional factor is mobility (fig. 9): survival of the movers is much higher than the stayers'. Interestingly, the difference is large at the very beginning of one's career, while two years later the decline of survival is about the same. As will be seen in the course of the econometric exploration, the surviving stayers hold a wage advantage over the movers, which compensates the higher risk of disposal.

Initial wages are also good predictors of survival: the probability of surviving after a bad start (first job spell < 3 months *cum* wage in first quartile of the distribution) is about four times as low as that following a good start.[12] Overall, bad starts have a strong and persistent effect on future labour market outcomes, even when the future lies 15-20 years ahead. This finding is in line with the literature on long-term unemployment. Survival in 2009, 22 years after entry, is estimated at about 80% depending on the timing of initial employment.

As previously explained, the survivors have not necessarily been at work for many consecutive years: they may have had several employment spells (possibly in different firms), and may have moved into unemployment during the observation period, having, however, re-entered official employment before the end of 2002.

The distribution of non-employment durations is easily obtained for each entering cohort, and displayed in tab. 2: the average non-employment duration of more than one million people in their

[11] B. Contini and E. Grand (2012).

[12] A similar finding on UK data is reported in Stewart, Mark B & Swaffield, Joanna K, 1999. "Low Pay Dynamics and Transition Probabilities," Economica, vol. 66(261), pages 23-42.

40's and 50's in 2009 is between 13 and 18 years.[13] The average duration of half a million in their late 30's and early 40's is 6-8 years; the average LTNE for all disposed individuals in 2009 is 9.6 years. The magnitude of average LTNE is confirmed by the ISTAT-LFS estimate of the annual transition probability from unemployment/non-employment to employment in 2008, equal to 0.12.[14] Under reasonable statistical hypotheses the expected duration of non-employment is given by 1/0.12 = 8.5 years, which is quite close to our expected LTNE of 9.6 years. Our estimates of the duration of long-term non-employment are many times larger than the estimates of long-term unemployment provided by official statistics based on LFS-type microdata (Tatsiramos, 2012). The number of disposed male individuals in 2009 is almost 2 million, not far from the combined sum of the official data on male unemployed and inactives available to work. And, undoubtedly, a large number of disposed individuals are active in the irregular economy.

Tab. 2. Long-term non-employment durations by age groups in 2009

Age groups	*"Disposed" workers since last separation (000)*	**Average LTNE (years)**
57-60	46	**18**
52-57	91	**17**
48-52	325	**15**
43-51	237	**13**
41-47	361	**10**
38-43	220	**8**
35-40	127	**7**
31-37	153	**6**
28-34	187	**4**
25-31	73	**3**
24-28	50	**2**
22-26	34	**1**
19-23	27	**0,5**
ALL	**1931**	**9.6**

Discovering the end destination of almost two million "disposed individuals" (as of 2009) is a difficult task as no specific micro-data are available to help with the answer. In a different paper we propose rough estimates after benchmarking our WHIP data with the ECHP survey and a variety of aggregate ISTAT sources (LFS and national accounting).[15] We find reasonable evidence that about 80% of disposed individuals join the ranks of the parallel/irregular economy of Italy, while self-reporting as inactive or unemployed in the LFS.

6. Preliminary questions and model hypotheses

Workforce disposal is not obvious from an economists' standpoint. Economic theory explains that low productivity is the cause of early job termination. But the vast majority of low productivity workers would be expected to re-enter the labour market sometime after job loss, eventually after a period of re-training. This is not the case with workforce disposal.

A variety of long run developments related to the supply side would suggest different, more favorable outcomes for youth employability: (i) the size of the demographic decline: today's cohorts entering the labour market are almost half those born during the baby-boom. There is no reason to expect that the demographic decline should lead to a reduction of the youth participation rate, in addition to the direct impact on the size of youth labour supply. On the contrary, if aggregate

[13] Workers aged 55+ (but not yet in retirement age) are unobserved in our data as their labor market entry is prior to 1987: their LTNE is estimated at 15 years under the assumption that worker disposal between the mid Seventies and Eighties may have been less intense than in the years that followed.
[14] ISTAT, Rapporto 2012.
[15] B. Contini and E. Grand (2013).

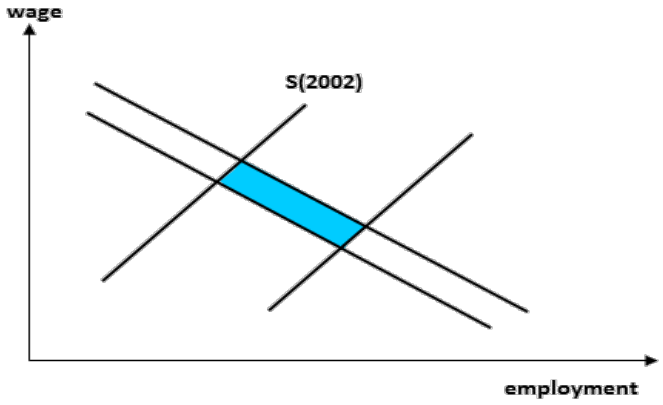
demand and productivity remain constant, there would be more young people at work; (ii) the impact of early retirement practices of people in their early 50's, erroneously defended by the social partners on the grounds that it would make room for new young entrants; (iii) the low unionization of young workers; (iv) the rapid increase in schooling attainment achieved in the course of the last forty years. Furthermore, two medium run factors, potentially beneficial to youth employment, are simultaneously underway from the demand side: (v) decreasing labour costs of young people relative to the adults', resulting from the generous implementation of wage subsidies to enhance youth employment[16]; (vi) increasing flexibility of contract terms.

In a long run perspective workforce disposal is demand driven. The downturn of aggregate demand - nearly flat for the last two decades – appears to be a major factor in explaining the negative outcomes of youth employment and, as a consequence, of workforce disposal between the mid 80s and the early 2000's. Numerous additional factors have an important impact in the short and medium run. People who get a bad start in the labour market are heavily affected by workforce disposal. These individuals could be the least endowed in terms of education and family background. While no such data are available in the WHIP database, we find some indirect support for skill mismatch and the endowment hypothesis from the analysis of the European Household Community Panel.[17]

Recall that our focus is the pathology of "workforce disposal". We therefore leave aside the physiological behaviour of individuals who engage in job shopping and are observed in-and-out of employment and unemployment. Survival analysis is the appropriate methodology to deal with the process of disposal. Multiple spell analysis would be feasible if our focus were the in-and-outs between employment and unemployment independently from the end result. But such a pathological end result is the main object of our exploration.

6.1 Attempting to explain the puzzle: model structure and identification

A meta-model of labour demand and supply helps to clarify an important issue of identification (fig. 8). Our data cover a period when a big downward shift of young labour supply was taking place. New entrants of the 80s belonged to the cohorts of the baby boom; in the mid 90s instead, fifteen years later, new entrants were born in the years of declining fertility. Prolonged school attendance added to the downward shift. The demand schedule is subject to shifts of smaller entity, at least prior to the 2008 world recession. Therefore our observables identify the demand schedule. We estimate a model of demand-driven workforce disposal, identifiable in its medium and short run characteristics.



[16] Youth average wages were about 71% of adult wages of similar skill level in 1985; 10 years later they were down to 60% and dropped to 56% in 2003. These patterns are attributable to policies aimed at enhancing the employability of young people by granting reduced social security contributions and allowing hires at lower skill level than the appropriate one.

[17] Survival on the EHCP database has been estimated in B. Contini and E. Grand (2013). Skill mismatch is difficult to assess with the WHIP database for the lack of data on educational attainment. Some support is provided comparing survival between skill groups and pay levels. Data are available on request.

Fig. 8. A meta-model of labour demand and supply, with a large (demographic) supply shift that identifies the demand schedule which is subject to shifts of smaller entity.

Tab. 10. Variable denominationSURV(i,t)	= survival
LCOST(i, t)	= labour cost [18]
WAGE(i, t)	= wages
FLEX(t)	= labour market flexibility [19]
DUR(i)	= duration of first job spell (one dummy for each of three spell lengh
MOB(i, t)	= mobility (a dummy 0,1 activated only once at the first job switch)
MFG(i)	= manufacturing vs. services (dummy)
AGE(i)	= age at entry (one dummy for each of three age groups)
GEO(i)	= geography (one dummy for each of three regional groups)
SIZE(i)	= firm size (one dummy for each of three size groups)
SKILL(i)	= skill level: white vs. blue collars (dummy)
CPI(t)	= consumer price index
UNEMPL(t)	= unemployment rate (regional)
CFL-NORTH(i, t)	= dummy (for CFL-contract in the North, activated until 1990)
CFL-SOUTH(i, t)	= dummy (for CFL-contract in the South, activated until 1990)
TAXRED(i, t)	= generalized tax reduction in the South (dummy = 1, through 1994)
W_INITIAL(i)	= initial wages
ENT-YR(i)	= year of labour market first entry (dummy)
IV(i, t)	= various instrumental variables; i = cohort/individual; t = observatio
TIGHT(t)	= labour market tightness (macro variable for each of three regions)
GNP(t)	= GNP growth rate (macro variable for each of three regions)

The specification derives from a simple model of labour demand in a tier labour market with exogenous wages (see Appendix 1). The model delivers several testable hypotheses, helpful to improve identification. Restricting the model to the one equation of survival would preclude developments in this direction.

The structure of the model is as follows (endogenous variables are underlined):

(1) $\underline{SURV} = k_1 + \alpha \underline{LCOST} + \beta FLEX + \eta DUR + \theta_1 ENT\text{-}YR + \lambda_1 \underline{MOB} + \gamma_1 MFG + \mu_1 TIGHT + \delta_1 GEO + \zeta_1 AGE + z_1 SKILL + \varphi_1 [W\text{-}INITIAL] + \omega_1 GNP + interactions + u_1$

(2) $\underline{WAGE} = k_2 + + \lambda_2 \underline{MOB} + \gamma_2 MFG + \delta_2 GEO + \varepsilon SIZE + \zeta_2 AGE + \pi CPI + \rho UNEMPL + z_2 SKILL + \omega_2 IV + u_2$

[18] The measurement of employers' labour cost is the end result of a detailed protocol (E.Grand and R. Quaranta, 2013), based on the scrutiny of a myriad of normative texts and bylaws, covering also social security contributions, health insurance, maternity leaves and *ad hoc* rebates granted to firms of different sectors, size, geographical areas and labor contracts. The protocol is applied to individual wages and provides estimates of each individual's labour cost.

[19] In this study we use a rough macro-measure of flexibility (the annual share of very short initial job spells (< 3 months) on all hires in three geographical areas). While flexibility vastly increased after the Eighties, it is impossible to measure it at the micro-level: ISTAT, the National Statistical Institute, counted 48 different typologies of "atypical" working contracts utilized in the early 2000's, and no such data are available in our or any other existing dataset.

(3) $\underline{LCOST} = k_3 + \varphi\, \underline{WAGE} + \gamma_3 MFG + \delta_3 GEO + \zeta_3 AGE + \chi TAXRED + \omega_3 IV + \psi_n CFL\text{-}NORTH + \psi_s CFL\text{-}SOUTH + z_3 SKILL + u_3$

(4) $\underline{MOB} = k_4 + \beta_4\, FLEX + \varphi_4\, [WAGE\ (-1)] + \gamma_4\, MFG + \delta_4\, GEO + \zeta_4\, AGE + u_4$

The model includes three endogenous, jointly determined variables: survival (SURV), labour cost (LCOST), wages (WAGE) and the lagged endogenous mobility (MOB). All are estimated on individual working histories, The covariates include characteristics of the individual workers [AGE, SKILL, DUR, ENT-YR, WAGE(-1)] as well as their employers' (MFG, SIZE, GEO), and macro variables (FLEX, GNP, CPI, UNEMPL, TIGHT, TAXRED, CFL-NORTH, CFL-SOUTH). The impact of the business cycle is captured by regional GNP-growth (GNP) and is present also via the year of labour market entry, specific of each individual (ENT_YR). To some extent, it is also embodied by macro-type covariates like flexibility (FLEX), labour market tightness (TIGHT)[20], regional unemployment (UNEMPL) and consumer price index (CPI).

In the next section 7 we explain the role of instrumental variables corresponding to various features of legislative reforms intended to enhance the employment opportunities of young people. Such programs have an impact on the dynamics of wages, labour costs and workforce disposal, and have an important role for identification.

7. Identification

Workforce flexibility and labour costs are the main explanations of hiring and firing decisions, and therefore of turnover and worker disposal itself. The link between worker turnover and disposal is ambiguous and depends on the degree of tightness of the labour market. 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 arise, reducing the risk of disposal and increasing survival. Under slack markets the risk of prolonged joblessness is much larger, and survival will be lower.

Flexibility can be viewed as a component of labour cost. Its impact on workforce disposal may be twofold and pull in opposite directions: on the one hand, high flexibility increases the employers' incentive to make use of high turnover, accelerating "disposal" and leading to a reduction of survival. 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 overall hiring rate, possibly decreasing worker disposal.

The influence of labour costs works along similar lines, but more subtly. Labour costs are not the same for different kind of workers, and will have an impact on the quantity as well as the quality and mix of the new recruits. Higher labour costs across the board will reduce the overall number of new hires, but employers may find it profitable to substitute high quality/permanent workers with low-cost temporary/less skilled types, affecting worker turnover and increasing disposal. There is, however, another side of the coin: augmenting labour costs (for instance, by reducing subsidies) could also lead to increasing survival if the relative cost of retaining young employees at the end of the contract rather than replacing them with new ones is sufficiently high. The retaining option implies an investment in the worker's human capital, more likely to be preferred by small-size employers. In this case, disposal will be lower and survival prolonged. No specific data are available to observe when this option is adopted, nor the extent to which retention is more expensive relative to new hires. As with flexibility, the impact of labour cost is *a priori* ambiguous, but an appropriate use of interaction dummies help the answer.

The ability argument provides additional insight. Ability and skills are unobservable beyond the white-collar / blue-collar distinction, but current pay can be used as a proxy for ability, conditional on skill level. Large pay differentials between skill levels suggest that the white-collars' survival

[20] TIGHT is measured by the ratio between net and gross worker turnover, as in B. Contini, R. Revelli (1996). The (inverse) tightness indicator is also denominated "churning rate" in S. Burgess (2000). TIGHT declined from the expansionary late 80s to the 1992-93 recession, and increased thereafter until the beginning of the new millennium.

should be higher than the blue-collars'. Initial wages also reflect the employer's assessment of a new hire's ability, yielding some control over worker heterogeneity,

Geographical differences and firm size may be used to improve identification. 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. Sanctions are difficult to impose and the irregular economy is more pervasive. Therefore additional "legally recognized" flexibility of the labour market is likely to be less valued in the South than in the rest of the country, and by small firms compared to larger ones: labour costs will lose importance due to the availability of illegal or semi-illegal practices (pay-under-the-table, tax evasion, free layoffs). The differential impact can be tested via interaction dummies between labour cost, the South and small-firm size.

Legislative reforms have an important impact on worker disposal. Changes in employment policies (tax rebates and flexibility clauses) have a direct influence on wages and labour costs. Dummies on the timing and features of program changes (*TAXRED*, *CFL-NORTH* and *CFL-SOUTH*) are in the r.h.s. of the *LCOST* and *WAGE* equations.

The exogenous duration of one's first job spell (DUR) is also influenced by current legislation and practice. As with initial wages, it may also reflect individual characteristics at the beginning of a career: it is, in fact, reasonable to assume that employers who assign a newly hired youth to a job of "long" duration (12 months +), may have sorted him according to recognizable ability.

Mobility is the only direct supply-side co-determinant of survival. Mobility is measured by the first job change occurred after entry[21], and must therefore be treated as a lagged endogenous variable. It is influenced by the arrival rate of new job offers (including those from the irregular economy) as well as by the generosity of unemployment benefits that help during the transition. None of these data, however, are either available or helpful for this exploration. On the one hand, while data on vacancies of the large firms are published, they are scarcely relevant as the share of employment in Italy's large firm sector has progressively shrunk in the last three decades. In addition to the fact that microeconomic indicators on the irregular economy are inexistent altogether. On the other hand unemployment compensations were unavailable for the great majority of Italian workers throughout the observation period.[22] We have no choice other than assigning to the business cycle the task of capturing the impact of vacancies on mobility. This is reasonable, but leaves us with a problem of omitted variables in the mobility equation.

The model is robustly over-identified.

Eq. 1 = <*SURV*> includes one endogenous variable and a lagged one in the r.h.s. (*LCOST* and *MOB*). Many restrictions are available: three regressors reflecting policy changes appearing in eq. (3), and two additional exogenous variables <*CPI*> and <*UNEMPL*> appearing only in eq. (2). *LCOST(-1)* is lagged endogenous labour cost, while *FLEX*, *DUR*, *AGE*, *SKILL*, *ENT-YR*, *MFG*, *GEO, TIGHT* and *GNP* are the relevant pre-determined variables. *W-INITIAL* is intended to capture individual heterogeneity. The endogeneity of *LCOST* and *MOB* is handled using the 2SRI estimator (discussed below). In addition, we make use of three interactions: *LCOST*SKILL-WHITE*; *LCOST*SOUTH* and *LCOST*SMALL-FIRMS* to identify the joint impact of labour cost and flexibility.

Eq. 2 = <*WAGE*> is in reduced form, posing no problems of identification. It includes one lagged endogenous regressor *MOB,* appropriately instrumented, and exogenous covariates, *MFG*, *GEO*, *SIZE*, *AGE* and *SKILL,* all self-explanatory. Three additional covariates describe policy variables (*TAXRED*, *CFL-NORTH*, *CFL-SOUTH*) that affect wages as well as labour costs. As in all classical specifications of wage equations, consumer price index <*CPI*> and local unemployment

[21] This assumption may be open to criticism, but considerably simplifies the econometric modelling of workforce disposal. Fig.7 suggests that the largest impact on survival is attributable to the first job change. Inverse causality, i.e. people initiating new job search after observing their peers being dismissed, is more difficult to test in this model, a consequence of our decision to measure mobility by the first job change only.

[22] Details are provided in par. 2 and footnote 5. Recall also that workers in temporary layoff (receipients of CIG benefits) are retained on their employer' payroll, and not be counted as "disposed-of"

rate <*UNEMPL*> are included in the r.h.s. It should be recalled, however, that the wage subsidies and loose pay rules for new young entrants reduce the classical direct link between wages and prices, possibly affecting the relevance of *CPI* in the *WAGE* equation.

Eq. 3 = <*LCOST*> includes one endogenous regressor, *WAGE*, in the r.h.s. *MFG*, *GEO*, *SIZE* and *AGE* are exogenous and catch the different impact on labour cost of various dimensions (industry, geographical area, firm size and age), all of which have been object of policy decisions during the observation period. Additional explanatory power is provided by the introduction of dummies corresponding to the timing of changes in the programs aimed at enhancing youth employment (*TAXRED*, *CFL-NORTH* and *CFL-SOUTH*). <*LCOST*> is estimated by 2SLS.

Eq. 4 = <*MOB*> is a (0,1) dummy activated at the time of the first job switch, and is estimated by a probit model. The specification includes all the worker's observed characteristics and one lagged endogenous variable <*WAGE-1*>, capturing the incentive to move provided by the level of past earnings. The type of contract and timing of the job change are in the r.h.s. of the equation, and capture the influence of the business cycle on mobility. As already explained, the timing of job change reflects also the pro-cyclical impact of job offers. Other covariates are self-explanatory.

8. Econometric explorations and discussion

The 2SRI method is the extension to nonlinear models of the popular linear two-stage least squares (2SLS) estimator. The 2SRI estimator (two-stage residual inclusion), introduced by J. Hausman (1978) as a means for testing regressor endogeneity in non-linear models, is similar to 2SLS except that in the second stage regression, the endogenous variables are not replaced by first-stage predictors. Instead, first-stage residuals are included as additional regressors. 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.

The hazard ratios are computed according to the formula *HR =exp [sum b^(x-x*)]=* where b^ are the maximum-likelihood estimates of the Cox proportional hazard model

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

where h(t) is the (usually unknown) benchmark probability[23], and x* are the predicted values of the covariates for which the (relative) exit probabilities are estimated.

The 2SRI estimator is applied to the Cox Hazard model in the SURV equation, and to the probit specification of MOB. Standard IV estimation is applied to the linear equation of WAGE and 2SLS to LCOST.

Table 4 displays the relevant results.

Eq. (2): It is convenient to discuss firstly the <*WAGE*> equation: it is a linear function of exogenous regressors and of the lagged endogenous *MOB. MOB* is instrumented by the standard deviation of wages in 576 cells defined by the intersection of industry, firm size, geographical location and skill level.[24] Not surprisingly, white-collars have a considerable wage advantage over manual workers. Older age at entry usually implies higher education attainment and, hence; higher wages. Firm size confirms a positive impact on earnings, in line with standard priors[25]. *UNEMPL* is negative as expected in wage equations, while the price index *CPI* is also negative, reverting – as hinted in the previous section - the positive coefficient that links wages to consumer prices. *MOB* yields a very significant negative and large coefficient hinting at the fact that movers are penalized to compensate the lower risk of disposal. The three dummies associated to changes in policy instruments before the early 90's – the CFL contract in the North (<*CFL-NORTH*>) and in the South (<*CFL-SOUTH*>), and the generalized tax reduction in favor of employers located in the

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

[24] The validity of the instrument corresponding to the within-cell wage standard deviation is tested by estimating the wage equation with its inclusion among the regressors. The null hypothesis stating that the relative coefficient is zero cannot be rejected (chi2(1) = 3.34; Prob > chi2 = 0.13).

[25] In studies on mobility, higher age at entry is interpreted as embodying previous working experience as well as higher educational attainment. Positive wage differentials in large firms are also reported. See: Stewart, M.B. and Swaffield, J.K. (1999) and B. Contini and C. Villosio (2005).

South (*TAXRED*) - are highly significant with the expected negative sign, reflecting their impact on wages (and labour costs). The impact of the CFL contract in the South is smaller than in the North, due to the simultaneous availability of the generalized tax rebate for Southern Italy.

Eq. (3) *LCOST*: estimation is performed by 2SLS. The explanation of labour costs rests heavily on the predicted values of <*WAGE*> from eq.2, yielding a regression coefficient equal to 1.31 - 0.31 being the average rate of social security contributions on gross wages in the observation period. The impact of age on labour cost is smaller than on wages, a consequence of policies aimed at favouring younger entrants. The same applies to geography and especially skill level: one aim of public policy was, in fact, the reduction of the cost gap between manual workers and white-collars, holders of higher educational degrees. As in the WAGE equation, all three dummies associated to policy changes – the CFL contract in the North (<*CFL-NORTH*>) and in the South (<*CFL-SOUTH*>), and the generalized tax reduction in the South (*TAXRED*)- are highly significant with the expected negative sign, reflecting their contribution to the reduction of labour costs before the early 90s when the reform changes were implemented. As in the *WAGE* equation, the impact of the CFL contract in the South is smaller than in the North, due to the simultaneous availability of the generalized tax rebatey that reduced the advantage offered by the CFL contract.

Tab. 4. Model estimates.

	SURVIVAL (1) |		*WAGE (2)*		*LCOST (3)* |		*MOB (4)*	
	2SRI |		2SLS		2SLS		2SRI probit	
	Hazard Ratio	***z***	**Coef.**	***t***	**Coef.**	***t***	**Coef.**	***z***
White-collars ***	**0.368**	***-8.72***	**115.28**	***45.05***	**9.13**	***30.28***	**-0.183**	***-17.07***
Mfg **	**0.841**	***-4.03***	**-5.37**	***-3.26***	**-1.47**	***-5.72***	**-0.091**	***-9.91***
North *	**0.787**	***-1.78***	**14.60**	***8.19***	**4.10**	***12.09***	**0.245**	***1.91***
Centre	0.835	*-1.13*					0.108	*0.83*
Dur3-12 **	**0.814**	***-5.8***						
Dur12 ***	**0.282**	***-32.37***						
Age ***	**1.059**	***8.04***					**-0.015**	***-11.03***
Age22_25			**6.22**	***3.63***	**2.04**	***6.57***		
Age25_30 *			**26.11**	***16.27***	**5.91**	***19.68***		
Firm size*medium *			**16.58**	***10.86***				
Firm size*big			**54.72**	***24.22***				
E1988	1.086	*1.18*						
E1989	1.130	*1.73*						
E1990*	**1.162**	***1.92***						
E1991 **	**1.377**	***3.67***						
E1992 **	**1.473**	***3.80***						
E1993 **	**1.421**	***3.34***						
E1994 *	**1.287**	***2.20***						
E1995	1.124	*1.00*						
E1996 *	**1.305**	***2.06***						
E1997 *	**1.293**	***1.81***						
E1998	1.134	*0.75*						
E1999	1.199	*1.11*						
E2000	1.300	*1.63*						
E2001	1.405	*1.82*						
1989							0.013	*0.27*
1990							0.002	*0.05*

1991							0.001	*0.02*
1992							-0.078	*-1.78*
1993 **							**-0.219**	***-4.96***
1994 **							**-0.159**	***-3.62***
1995 *							**-0.098**	***-2.23***
1996 *							**-0.124**	***-2.85***
1997							**-0.094**	***-2.19***
1998							-0.066	*-1.54*
1999							-0.008	*-0.17*
2000							0.042	*0.93*
2001							0.054	*1.22*
2002							0.021	*0.47*
Mob ^^*	**0.038**	***-2.71***	**-229,66**	***-7.32***				
Flex *	**4.408**	***2.97***					*0.102*	*0.69*
GNP north	5.878\	*1.11*						
GNP centre	5.388	*0.76*						
GNP south	0.482	*0.4*						
Lcost (t) **	1.000	*-0.34*						
Lcost (t-1) **	**0.998**	***-9.06***						
Lcost(t)*small **	**1.000**	***3.18***						
Lcost(t-1)*small **	1.000	*-0.38*						
Lcost(t)*south **	1.000	*-0,23*						
Lcost (t-1)*south *	1.000	*0.98*						
Lcost(t)*white **	**0.999**	***-1.84***						
Lcost (t-1)*white**	**1.002**	***9.80***						
Wage(t) ^^^***					**1.31**	***2566.7***		
Wage(t-1) ***							**-0.00057**	***-19.82***
Wage-initial	1.000	*1.57*						
Tight	0.657	*-0.48*						
CPI ***			**-0.30**	***-9.83***				
Unemployment **			**-48.27**	***-7.40***				
Cfl **							**0.057**	***6.46***
Cfl Centre-North *			**-170.99**	***-55.53***	**-23.67**	***-39.35***		
Cfl South *			**-147.75**	***-33.60***	**-14.54**	***-10.03***		
Taxred ***			**-24.54**	***-12.36***	**-28.73**	***-75.74***		
Constant			39.453	*0.2*	**-10.959**	***-5.30***	**-0.524**	***-4.15***
No. observations	109480		153170		153170		134433	

(^^) instrumented by IV; (^^^) OLS-predictors

MOB (eq. 4) is estimated as a linear probit regression. The single, most significant covariate is one's past earnings before the job change [WAGE(t-1)]: low wages lead people toward searching for better opportunities. The predicted probability of a job switch given a past wage of 1000 eu/month is 15 p.p. higher than given a past wage of 1300 eu/month. Young age favours mobility: the probability of a job switch by a 20-year old is 29 p.p. higher than that by a 40-year old worker. White-collars are less likely to move than blue-collars, an expected consequence of their higher skills. Job switches in manufacturing are less frequent than in the services, where worker turnover is traditionally higher especially among the least skillled. A worker holding a CFL contract is more likely to move (by 6 p.p.) than a colleague hired with a standard contract, a consequence of the

statutory CFL contract termination. The business cycle carries a substantial weight in the move-stay decision, in line with our assumption that it is a reasonable proxy of job offers: in the course of recession (1993-94) the probability of mobility is between 16 and 22 p.p. lower than during an upturn (1987 being the benchmark). The macro-variable <*FLEX*> (flexibility) is, instead, not significant.

SURV (eq.1) is estimated via a Cox proportional hazard model, accounting for the endogeneity of *WAGE* and *MOB* via the 2SRI method. The main hazard ratios are summarized in tab. 5. Some confirm the intuitions suggested by graphical analysis, with orders of magnitude that are often surprisingly large**:** in first place, the exit probability of the movers which is less than 4% that of the stayers, as indicated by HR= 0.036 (row F). The HR of a 30-year old worker is 2.46 times that of a 20-year old (row I). The first contract duration (*DUR*) may catch initial heterogeneity: individuals starting with an employment spell lasting more than 12 months face an exit probability which is only 28% that of individuals with an initial 3-month working spell (row J). The HR of workers located in the North is 79% of those working in the South (row G); the exit probability of manufacturing workers is smaller than their colleagues in the service industries (HR= 0.84; row H).

It has been argued that from the employer's perspective, flexibility is an additional element of labour cost, but that the expected impact of flexibility on survival could pull in opposite directions. Our macro-measure of flexibility belittles its specificity in relation to age and contract typology. Estimation suggests that *FLEX* exerts a negative influence on survival: a 10% increase of flexibility augments the exit probability by one fourth (row D; HR=1.26).

The overall impact of labour cost is modest but not negligible: a 5% across-the-board increase of labour cost augments the exit probability (i.e. reduces survival) by 2.5 p.p. with respect to its mean (row A). In Southern Italy, at odds with our prior, its impact is not different from the general case, the interaction *LC*SOUTH* being below significance. The interaction with small-firm size, instead, is quite significant and suggestive: a 5% increase of labour cost increases survival by 3 p.p. (row B: HR = 0,97), indicating that the option of upgrading young employees to permanent positions is relatively frequent among small firms. This result confirms the theory according to which investment in the employees' human capital is particularly high among small firms. Things are different among the white-collars: a 5% increase of the white-collars' labour cost reduces survival of this group by 10 p.p. (row C). If, however, the same increase is counterbalanced by a modest 2% reduction of flexibility, the joint impact is almost nil (row E; HR=1.01). *W-INITIAL*, which, in principle, should account for initial skill mismatch, is below significance.

The influence of the business cycle is depicted in row K: in the course of deep recession – in 1993 and 1994 – the exit probabilities are more than 40% higher than during the up-cycle (benchmark = 1987). *GNP* and labour market tightness *TIGHT* are, instead, below significance.

Tab. 5. Cox hazard ratios (estimated from eq. 1)

		HR =exp [sum b^(x-x*)] = impact on exit probability = (1 – survival probability)	***Significance (*)***
A	Labour cost increase: +5% from average	**1.025**	Moderate
B	LC + 5% in SMALL firms:	**0.97**	High
C	LC + 5% for WHITE-collar Employees	**1.10**	High
D	Flexibility: increase by 10% above average	**1.26**	High
E	LC +5% for WHITE *cum* FLEX decrease by 5%	**1.01**	Moderate
F	Mobility = 1 vs. benchmark (stayer=0)	**0.038**	High
G	North vs. South	**0.79**	Moderate
H	Manufacturing vs. Service Industries	**0.84**	High
I	Age 30 vs. age 20 at entry	**2.46**	Very high
J	First job DUR 12+ vs. DUR < 3 months	**0.28**	Very high
K	Business cycle: recession years		
	1992	**1.47**	High
	1993	**1.42**	
	vs. expansionary benchmark 1987		

(*) Very high => z > 5; high => 5 < z > 2.5 ; moderate => 2.5 < z > 1.7

10. Truncation

Truncation at the end of the observation period may bias the estimate of survival both upwards and downwards. Downward bias occurs if many short non-employment spells initiate before the end of the observation period, and terminate shortly afterwards. Upward bias will arise in the opposite case, with employment spells that may be interrupted before the end of the observation period, but will promptly reopen after. If the end of observation falls in recessionary years, with frequent hires lasting only a few months, downward bias of survival may prevail. The evidence is not compelling in either direction (tab. 6). Survival in the first 2 - 4 - 7 years of career of those who entered the labour market in the mid Eighites is similar to that observed for the younger entrants that follow up to 1997. Slight evidence of downward bias appears for entrants in 1999. The impact of the recession is evident: individuals hired in 1992, at the start of the downturn, have a lower survival rate than all the others. On the other hand, entrants in 1995, the recovery after the 1992-94 recession, survive longer than their predecessors as well as their followers. Similar patterns are observed as we disaggregate the data by age at entry, industry and geographical location.

Tab. 6. Survival 2, 4, 7, 10, 12 years since labour market entry. All ages.

Year of entry	*T+2*	*t+4*	*t+7*	*T+10*	*t+12*
1987	.91	.90	.87	.86	.84
1989	.90	.88	.87	.84	.82
1992	***.89***	***.87***	***.84***	***-***	***-***
1995	.94	.92	.86	-	-
1996	.91	.87	-	-	-
1997	.90	.85	-	-	-
1999	.87				

11. Conclusion

Italy's labour market suffers from a serious pathology, in addition to the increasing precariousness of the young workforce common to all EU member countries. A vast number of individuals who lose their jobs enter the ranks of the unemployed, never to regain regular

employment. Many join the black/irregular economy which is particularly thriving in Italy; many remain long-term unemployed and/or leave the workforce altogether. Workforce disposal was already under way in the expansionary Eighties. The reforms of the mid Nineties provided untimely additional instruments to the employers for systematically replacing young people with even younger colleagues on the same jobs, thus consolidating "worker disposal".

The magnitude of "workforce disposal" is dramatic: out of 100 new entrants - aged 19-30 at the start of their working career - 86 % are still at regular work ("survive") after 10 years, and only 78 to 83% by 2009, after 17-22 years, depending on age, industry, skill level, type of contract and cyclical phase of labour market entry. About 20% of all workers entered at young age in the official economy are "disposed" by the time they reach their 40s and early 50s.

Discovering the end destination of the "disposed individuals" is a difficult task as no specific micro-data are available to help with the answer. Rough estimates after benchmarking our WHIP data with the ECHP survey and ISTAT sources suggest that a large majority of disposed individuals join the ranks of the irregular economy, while self-reporting as inactive or unemployed in the LFS.

Workforce disposal has dire consequences on individual lifestyles and on society as a whole. Demographic trends in coming decades may, however, improve the job prospects for younger generations: the baby-boomers will begin to retire by 2020-25, and their replacement ought to increase the demand of young workers. A labour shortage may be behind the corner, and it will spur a new and massive migration influx of migrants from non EU-countries with high fertility rates and from Eastern Europe. This will be a source of additional governance problems for Italy and the European Union, as social unrest will not cease lurking outside the door.

Workforce disposal is present also in Spain, though to a lesser extent than Italy. Informed media report that similar developments are taking place also in countries of Eastern Europe, although no scientific evidence is yet available. And it would be surprising if other economies of Southern Europe were immune from the disease.

APPENDIX 1 - A sketch of a nutshell model of labor demand with permanent and short-term contracts [26]

A simple nutshell two-period model explains the composition of labour demand when the labour market is dualistic and workers are hired via permanent **(*P*)** or temporary ***(T)*** contracts. The model does not explain the level of labor demand, nor the wage of permanent workers, assumed to be exogenous. This is the main difference with more sophisticated structural models, where employment and wages are jointly determined[27]. The nuthsell model delivers, however, a number of hypotheses very relevant for policy that the structural models do not handle and that can be easily tested. Moreover they help identification in models of workforce disposal.

In this model the firm faces a vacancy which may be filled by two alternative contracts: (1) a permanent working contract (**P**) with an experienced worker; (2) a subsidized temporary contract (**T**) for unskilled young people. The permanent contract (**P**) pays a wage **w** and carries a firing cost equal to **FC**. **FC =0** denotes full contract flexibility. The temporary contract (**T**) is a one-year contract, that can be interrupted at no cost at the end of year 1. It pays a lower wage **s w**, where **[1 – s]** is the subsidized fraction of total wage, and requires a training at a cost of **f** per year. At the beginning of year 2 the temporary contract must be renewed as a **P**-contract.

Nature has two states: a "good" state, with probability **g**; and a "bad" state with probability **(1-g).** If "good" occurs, the firm's revenue is **R**, otherwise it is **0**. At the end of period 1 the firm assesses the performance of her worker: the worker is "able" with probability **p** and "unable" with probability **(1 –p).** Only if nature is "good" will the firm continue operations in period 2. If year 1 is "bad", the firm will fire her worker (at cost **FC** if the contract is permanent, **0** if

[26] The nutshell model was originally developed for the evaluation of the long-term impact of the CFL-contractin. See B.Contini, C. Malpede and E. Rettore (2005), unpublished paper.
[27] For all, see S. Bentolila, P. Cahuc, J. Dolado and F.Le Barbanchon (2010).

temporary), no matter how "able" he/she is. If the worker turns out to be "able" he is retained; otherwise he is fired. V is the value of each of the two contracts.

The solution yields the basic inequality

$$V(P) > V(T) \quad iff \quad w(1-s) + (1 - gp) + FC < f$$

that delivers several testable hypotheses:

(i) the permanent **P**-contract will be preferred in positions that require skills, i.e. where **f** (training cost or foregone productivity) is high and the opportunity loss associated to the subsidy is low;

(ii) the permanent **P**-contract will be preferred by firms where training costs (**f**) are high, and human capital is highly valued (especially small-size firms);

(iii) the higher the "quality" of the candidate recruits (**p -> 1**), the higher the advantage of hiring via permanent **P**-contracts;

(iv) the higher the opportunity cost **(1-s)** of not using **P**-contracts, the higher the employers' preference for **T**- hires;

(v) in times of recession **(g → 0)** – i.e. low labour demand - **T**-hires will be preferred to **P** hires, thus changing the workforce composition in favour of **T**-contracts. As a consequence, job destruction in the course of recessions will mainly hit **T**-jobs;

(vi) firms with low firing costs (mainly the small ones and those located in Southern Italy) will have a relative preference for **P**-workers, and will be less sensitive to the fiscal rebate (i.e. less wage-cost elastic) than firms with high firing costs;

(vii) high growth firms / industries will have a preference for **P**-contracts.

(viii) the higher the presence of **P**-workers in the economy, the lower workforce disposal.

Appendix 2 Labour supply in a dual economy

Fig. A/1 depicts how the labour market operates when, in addition to the regular (official) economy that includes permanent and temporary jobs (there is no need here to keep the two types separate), there is a parallel irregular economy, black or grey, which is undetected in labour force surveys. D-reg is the demand schedule of regular jobs (permanent and/or temporary), w* being a minimum wage-equivalent negotiated at the institutional level (in Italy there is no mandated minimum wage); D-irr is a very elastic demand schedule of the irregular economy. LS is labour supply (total labour supply = OD). OB are the regularly employed individuals. Those who do not get hired in the regular sector at a wage equal to w*, can find a job in the irregular economy at lower pay (w**), up to the intersection of demand and supply (BC is the irregular employment); the remaining CD represent the unemployed.

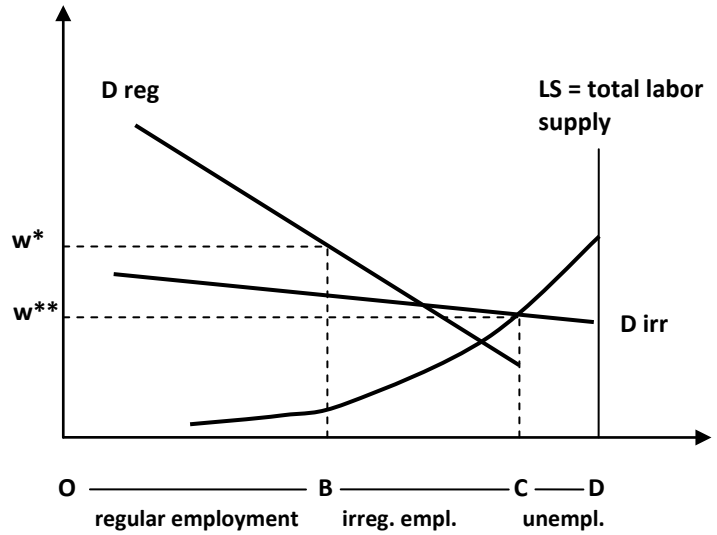


Fig. A/1. Labour demand and supply with regular and irregular economies.

Bibliography

Aralampulam, W., Booth, A.L. and Taylor, M. (2000), "Unemployment persistence", *Oxford Economic Papers*, n. 52.

Ardizzi,G., C. Petraglia, M. Piacenza, G.Turati (2012), "Measuring the underground economy with the currency demand approach: a reinterpretation of the methodology, with an application to Italy", *Journal of Income and Wealth (forthcoming 2013)*

Battistin, E. and E. Rettore (2008), "Ineligibles and eligible non-participants as a double comparison group in regression-discontinuity designs", *Journal of Econometrics*, n. 142.

Bentolila, S., P. Cahuc, J. Dolado and T. Le Barbanchon (2010), "*Two-tier labor markets in the great recession: France vs. Spain*", CEMFI, W.P. 1009.

Berton, F., M. Richiardi, S. Sacchi (2008), *Flex-insecurity:perchè in Italia la flessibilità diventa precarietà*, Il Mulino (2009)

Burgess, S. (2000), " Job flows, worker flows and churning", Journal of Labor Economics, vol.18, 3.

Blanchard, O. and P. Landier (2001), "The perverse effect of partial labor market reforms: fixed duration contracts in France", *NBER W.P. 8219.*

Blanchard, O. (2006), "European unemployment", *Economic Policy*, n. 45.

Contini, B. and R. Revelli (1996), "Gross flows vs. net flows in the labour market. What is there to be learned?", *Labour Economics*, vol.

Contini, B., F. Cornaglia, C. Malpede and E. Rettore (2003), "Measuring the impact of the Italian CFL programme on job opportunities for young people", in O. Castellino and E: Fornero (eds.), *Pension policy in an integrating Europe,* E. Elgar Publ.

Contini, B. and U. Trivellato (eds.) (2005), Eppur si muove: mobilità e dinamiche del mercato del lavoro, Il Mulino.

Contini, B. and C. Villosio (2005), "Worker mobility, displacement, redeployment and wage dynamics in Italy", *in B. Contini and U. Trivellato (2005).*

Contini, B. and A. Poggi (2012), "Employability of young Italian males after a jobless period 1989-98", *Labour and Industrial Relations Review, vol. 26 (1).*

Contini, B. and E. Grand (2012), “Lavoro “usa e getta”, disoccupazione e inoccupazione: novità importanti dai dati WHIP”, *Rivista di Politica Economica, vol. 28, no.2*

Feige E.L. (1979), «How Big is the Irregular Economy?», *Challenge*, no.12, pp.5-13.

Grand, E. and R. Quaranta (2013), “La ricostruzione delle informazioni sugli oneri sociali obbligatori e sul costo del lavoro a partire dai dati individuali e di impresa di fonte Inps”, *ISTAT Working Papers n. 7/2013.*

Giannelli, G., U. Jaenichen and C. Villosio (2009), ““Have labour market reforms at the turn of the millennium changed job durations of the new entrants?”, *W.P. LABOR.* Hausman JA. (1978), “ Specification Tests in Econometrics”, *Econometrica*, 46:1 pp. 251–1271.

Mroz, P. and Savage (2006), “The Long-Term Effects of Youth Unemployment”, *J. Human Resources*; XLI: 259-293

Peichl, A. and S. Siegloch (2010), “Accounting for labor demand effects in structural labor supply models”, IZA DP. 5350.

Saint-Paul, G. (2004), *Dual labour markets*, MIT Press.

Stewart, M.B. and Swaffield, J.K. (1999). ““Low Pay Dynamics and Transition Probabilities,”” *Economica*, vol. 66 (261), pages 23-42.

Terza, J.V., Basu, A., Rathouz, P.J. (2008), “Two-Stage Residual Inclusion Estimation: Addressing Endogeneity in Health Econometric Modeling”, *J. Health Economics*, vol. 27, 3, pp. 531-543