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Stability and instability of new jobs: an analysis based on work history data♣

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Abstract

This paper starts from the hypothesis that an effective measurement of the area stability and instability in the labour market cannot be based only on an indicator of labour *mobility* (number of job to job changes) but requires to take into consideration the actual amount of time worked by each individual (level of saturation of working time). The evidence presented confirms our hypothesis showing that, in the case of Italy, the level of mobility has only slightly changed over the last 15 years, and that the increasing instability in the labour market (in the entrance stage) is largely due to the growing difficulty of working on a continuous basis, as well as to the increasing time required to get a stable job. The evidence presented also shows that being an unstable worker has a negative impact on wages both in the short and in the long run. The exception is represented by those flexible workers, which are able to combine high levels of mobility with a full saturation of working time.

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1. Introduction[1]

The increasing level of *precariousness* in the labour market has become a topic of great political and social concern in most industrialized countries. The empirical literature on the quantitative dimension of this phenomenon and on its effects is still in a rather fluid state and this largely reflects the slippery and multidimensional nature of the concepts of job *precariousness, flexibility* and *instability* and the associated problems to find unambiguous definitions and appropriate indicators.
In the empirical literature the level of precariousness/instability in the labour market is (explicitly or, more often, implicitly) associated to two main dimensions:

a) the relevance of "typical" and "atypical" jobs. The most common distinction used is the literature is the one between fixed and permanent jobs as well as between standard and non-standard labour contracts (Alboni et al., 2008; Baru, 2001; Berton et al. 2001, 2003, 2005; Cox Edwards and Grobar, 2001; Farcomeni et al., 2008; OECD, 2008; Mandrone, 2008; Pacelli, 2002; Tronti et al., 2004; Vostko et al.,2003)[2];

b) the level of mobility in the labour market, based on the average number of job-to-job transitions occurred in a given period[3].

Both dimensions, although very relevant, tend to neglect the "time dimension" of job instability and in particular the level of job precariousness linked to the actual working time of any single work history[4]. In fact (both at an aggregate and a micro level) the nature of the labour contracts[5], as well as the number of job-to job transitions, say very little about the actual time worked by individuals. In fact, to any particular type of labour contract and to any level of labour mobility could be associated different levels of saturation of the total potential working time. The time/longitudinal dimension of job instability is particularly relevant also because it has direct implications on incomes. Income disparities within the labour force are likely to be determined more than by the types of labour contract, and the number of job-to-job transitions, first and foremost, to the cumulative amount of months or days actually worked in a given period (i.e., in a year).

[1] The evidence presented in this paper is a first research outcome of a broader research project carried out at the University of Camerino along with Roberto Schiattarella and Fabrizio Carmignani.
[2] Tronti et al. (2004) propose a new classification of atypical employment arrangements, based on the following dimensions: level of stability of the work relationship (permanent vs. temporary jobs); length of the working-time regime (fulltime vs. reduced time regimes); the degree of workers' entitlement to social rights; (i.e. full vs. partial or no entitlement at all); degree of atypicalness (strictly atypical vs partly atypical, depending on the extent to which the contract is far from the standard one, i.e. open ended full-time regular employment relationship).
[3] Despite it is not easy to found a single unambiguous definition of mobility this concept broadly refers to the extent to which workers change jobs or change their status (from employment to unemployment or vice versa). On this point see Davis and Haltywanger (1998) and Contini and Trivellato (2005b) which propose several measures of labour market mobility. See also Abowd et all. (1999), Akerolof et al. (1988), Albisinni and Discenza, (2004), Anastasia et al. (2004), Anderson and Meyer, (1994), Brandolini et al. (2004), Contini et al. (1996), Contini (2002), De Angelini, (2005), Devicienti, (2001), Geraldo et al. (2001), Leombruni and Quaranta (2005), Trivellato et al. (2005).
[4] The importance of the time/longitudinal dimension of work stability and instability has already been stressed and analysed, both on a conceptual and on an empirical ground, by Carmignani, (2008), Carmignani and Schiattarella (2003), Carmignani et al.(2007), Schiattarella (2007). See also de Angelini (2005), Anastasia et al.(2000), Blanchard and Landier, (2001).
[5] Anastasia et al. (2000) in their studies on Veneto Region, show that in 1995 50% of the open ended contracts terminate during the first year.

It should also be pointed out that the available data and statistics on the labour market are not properly fitted to grasp the intrinsic dynamic dimension of job (and income) instability. In the European context the main statistical source used to analyse the characteristics and dynamics of labour markets are the Labour Force Surveys. A major problem with this type of surveys is that the possibility of linking micro level data in a longitudinal frame is very limited. In fact, in most cases, the samples of people interviewed change over time and this prevents from tracking-down the long term "work history" of individuals, which, in our view, should represent a fundamental object of the analysis.[6]

The empirical evidence presented in this paper aims at making some steps ahead in this research area by proposing a measure of stability and instability of labour markets which takes explicitly into account the "time dimension". Along with the number of job-to-job transitions within each work history, we will take into account also the actual time length of employment arrangements. In synthesis, we identify two key dimensions defining the level of stability of any work history:

a) job-to-job mobility:
i.e. number of times an individual changes his/her job (different contracts) in a given time span;[7]

b) continuity of work:
actual number of days/weeks/months worked (also changing different jobs) in a given time span, to which could be in turn associated an "index of saturation" of working time (ratio between the actual working time and the potential one).

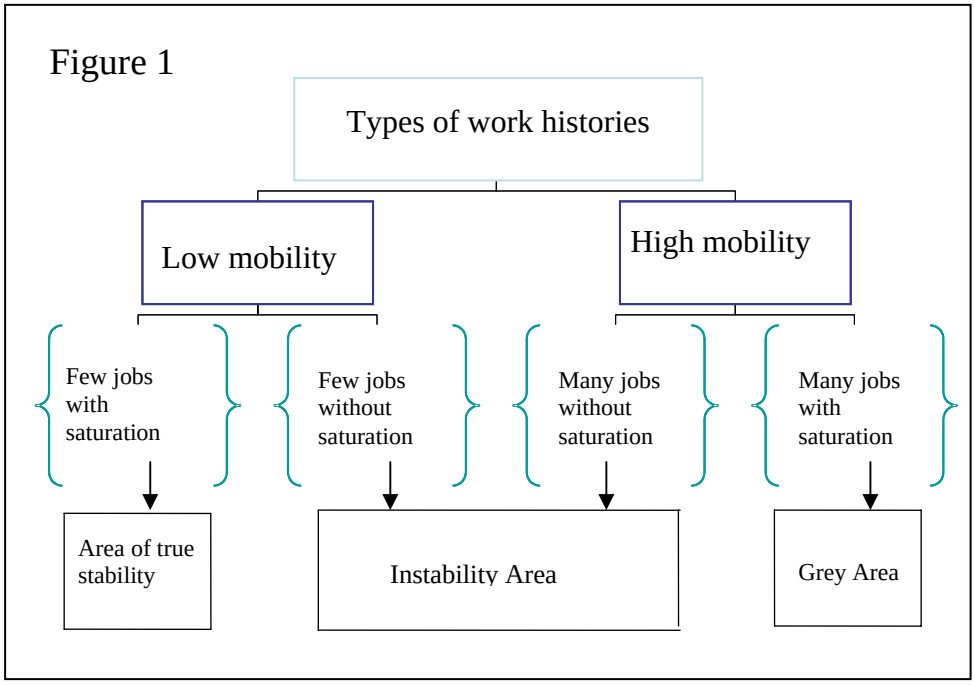
By distinguishing between *mobility* and *continuity* we want to stress the point that the former is not sufficient, taken separately from the latter, to define and measure the level/degree of stability of a work history. Furthermore, between the two, *continuity* is perhaps the most important (although neglected) dimension, being closely correlated with the overall income capacity (and, most likely, also to the professional up-skilling) of each work history. Of course the levels of mobility and continuity of the work history might be connected to each other and this represents a crucial aspect to be investigated. Both dimensions of work history are also likely to be related to the nature of the labour contracts (fixed term versus permanent jobs), a relationship that is however not explicitly investigated in this study due to data constraints.[8]

Figure 1 shows how different combinations of mobility and continuity of work history could lead to different outcomes in terms of stability/instability of working conditions. In the framework proposed in the figure it is possible to identify an area of *true stability*, represented by work history characterized by low mobility (few job-to-job transitions) combined with a full saturation of the potential working time. This area reflects the "old" model of accessing (and functioning of) the labour market (*one job for life*).
Specularly to the previous one, one can identify an area of *true work instability* made of work history in which (independently of the number of jobs) saturation of working time is not achieved. We also find a *grey area* represented by work history combining a high mobility

[6] See on this point note n. 9.
[7] This corresponds to the number of "associations" used in the empirical literature to compute (at an aggregate level) the labour market mobility index (i.e. the numerator of the association rate). The latter is usually computed as the number of "associations" (labour contracts) occurred in a given period divided by the stock of working population in the same period (Contini and Trivellato, 2005b)
[8] This is due to the fact that the WHIP data-set does not provide detailed information on the specific type of employment contract.

with a full saturation of the potential working time. How should these particular types of work history be labelled? The answer in this case is not so obvious, the choice depending on some kind of judgment values and more in particular on the extent to which mobility on its own is considered (or perceived) as synonymous of job instability. In our view the degree of stability of these work history should be assessed (in a more objective way) looking at the specific qualitative characteristics of these work history and at their long term outcome in terms of professional and wage up-grading (both factors revealing an increase of the bargaining power of the worker in the labour market). In other words, what is needed is the adoption of a more long term and dynamic perspective to the concept (and consequences) of stability and instability of working conditions.

Figure 1



The key issues addressed in the empirical analysis:

Starting from the assumptions and the conceptual framework sketched above, our contribution aims at empirically exploring the areas of stability and instability in the Italian labour market over the last fifteen years looking at the work history of young people accessing for the first time the labour market ("new entrants"). The rational behind our focus on the "new" and "young" entrants is that we expect that this is likely to be the most sensitive segment of the work force able to reveal both the emergence of new patterns in the labour market as well as the effects of the most recent reforms introduced in Italy in this market.

The key questions addressed are the following:

- How much has the level of labour market mobility (in the entrance stage) changed over the last two decades?

- What is the relationship between mobility and the cumulative amount of "working time"? How many flexible young workers succeed in saturating their working time?

- What is the relevance of the areas of stability and instability in the labour market and how has the situation changed over the last two decades?

- How long does it take to get a stable job and how stabilization patterns have changed over the last decade?

- What are the short and long term effects of labour instability on wages?

A proper answer to the questions listed above requires the availability of a longitudinal data-set needed to track-down the work history of a representative sample of individuals. As already mentioned, the "longitudinal requirement" rules out the possibility of using data provided by official statistical offices, and in our case by the "Rilevazione continua delle forze di lavoro" carried out by the Italian Statistical Office (Istat).[9]

In the Italian case, there are two other administrative statistical sources, which allow to build up a longitudinal data-set on work history: the "Agenzie per il lavoro", and the Inps (Italian Social Security Administration) archives. The first data source, although providing a very rich and detailed set of data, does not guarantee a complete regional coverage. As a consequence we have used INPS data and in particular the WHIP data-set (Work History Italian Panel) made available by the Laboratorio Revelli. A major limitation of this dataset is that it does not cover the most recent years. The data-set is updated until 2003. In addition, the data-set does not cover both the public and the agriculture sectors (where a large share of atypical jobs are found) and does not provide detailed information on provide detailed information on the nature of the employment contract.

[9] Labour surveys are nowadays carried out on a continuous basis in all European countries. However the possibility of linking longitudinally (at a micro level) labour surveys data differs country by country. In the Italian case 50% of each survey sample is interviewed a second and third time respectively after three and 12 months. Furthermore people are asked to provide some additional information on their work history. Despite this, the longitudinal dimension of the Italian data-set remains rather constrained, covering a limited time span. A methodological proposal to build a longitudinal data-set on work histories, using ISTAT labour survey data, is contained in Carmignani, (2008), and Beretta and Trivellato (2004). Trivellato et al. (2005), have explored the properties of Istat labour surveys data when the latter are re-organized in a longitudinal framework. The latter study shows that the Istat longitudinal data-set, if compared with Inps panel data, provides unbiased estimates on (short term) labour market mobility only at an aggregate level and in the case of low job-to-job transitions. See also De Angelini and Giraldo (2003), De Angelini (2006)..

2. Data and methodology

The WHIP data-set contains data referring to a large representative sample of all the people who have worked in Italy (in the private sector) in the period 1985-2003. As already mentioned, workers employed in the public sector, or having an autonomous social security fund, are not covered by the WHIP data-set. Our empirical analysis will consequently be focussed on employees working under the following types of contracts: traditional long term contracts, training on the job contracts (Contratti di formazione-lavoro), temporary work contracts, and apprenticeship. The WHIP sample is made up of more then 270,000 workers. For each worker we have detailed information regarding his work history (type and time length of the different contracts, wages). Our analysis will be focussed on the work history of young workers (16-30 years old) in the period following their first access to the labour market (i.e. first contract). This leads to a sub-sample of about 100,000 workers. The basic characteristics of the sample are described in Table 1. All in all, the sub-sample used in this empirical study appears rather balanced across time, gender and age.

3 Results of the empirical analysis

3.1 Changes in the stability and instability of work history

Figure 2 shows the long term dynamics of the average number labour contracts in the two years following the first entrance in the labour market. This indicator could be interpreted as a labour market mobility index (see note n. 7). In our case, however, the mobility indicator refers only to the sub-population of new entrants in the class age 16-30
The figure shows that the level of labour market mobility has only slightly increased over the period 1987-2003 passing from 1.5 contracts, at the beginning of the period, to 1.8 at the end of it. On the contrary, as shown in Figure 3, the average number of days worked has substantially decreased: young people entering the labour market in 1987 have worked on average (in the following two years period) about 500 days, 20% more than young people entering the labour market in 2001. The increasing level of labour market mobility and the decreasing level of saturation seem therefore to reveal the presence of a process of “job fragmentation” (at least in entrance stage).

Figure 2: Number of job-to-job transitions in a two years time period (average values)

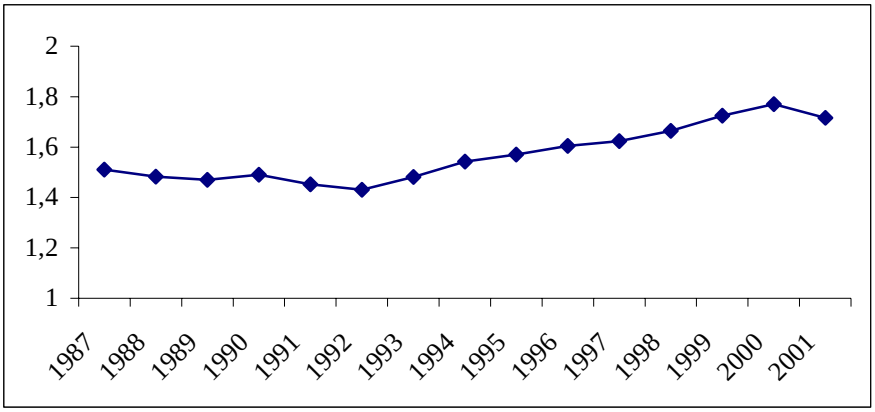
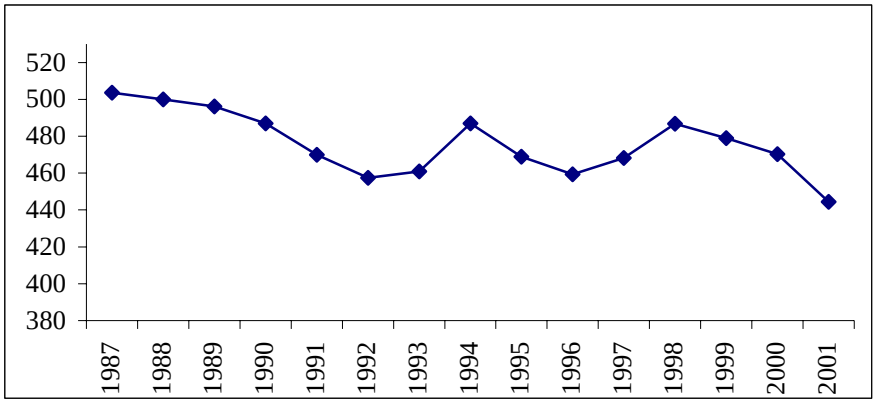


Figure 3: Number of days worked in a two years time period (average values)



One of the primary objectives of our empirical analysis is to combine data on mobility and continuity of work history in order to assess the relevance and the long term changes in the level of stability of working conditions (during the entrance stage). Following the conceptual framework sketched in Figure 1 we stylise three main types of work history (WH), each one characterized by different combinations of *mobility* and *continuity*.

Types of work history (reference period: two years following the first entrance to the market):

Stable:	WH of people who do not change their job and working for at least 84 weeks (above 80% of total potential working time).
Unstable:	WH of people who change their job at least once and that work less then 84 weeks (below 80% of total potential working time).
Unstable with saturation:	WH of people who change their job at least once and that work more then 84 weeks (above 80% of total potential working time).

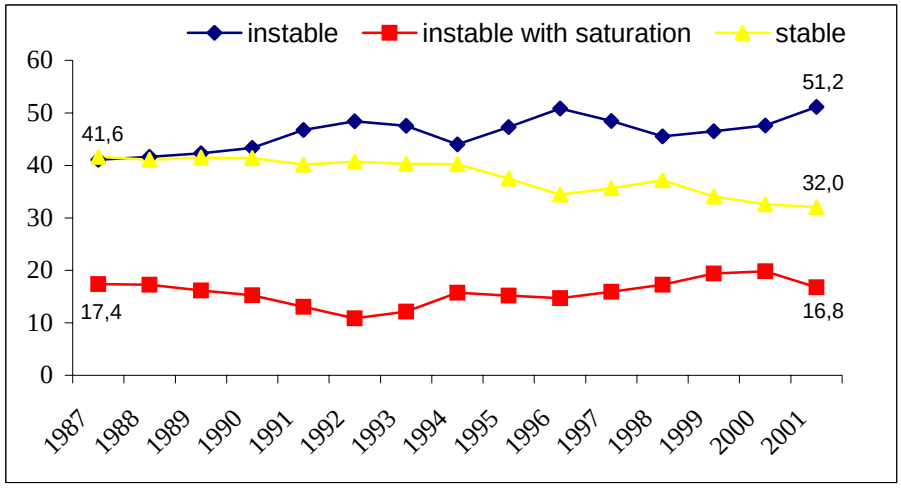
The criteria used to identify the three profiles of WH are obviously characterized by a high degree of discretionality. This (possible) discretional caveat is however less severe when data are analysed in a dynamic context (as proposed in this paper) that is if data are first and foremost used in order to highlight long term trends. In fact, minor changes in the criteria used to select stable and unstable WH have not significantly changed the relevance and long term dynamics of these categories.

Figure 4 shows the relevance of the three typologies of WH indicated above during the period 1987-2003. The figure shows that unstable WH have significantly increased in number over the last 15 years. Unstable WH account at the end of the period for more than 50% of the total. Such a sustained growth of unstable WH is counterbalanced by a sharp decline of stable WH, which, at the end of the period, account for only 30% of the total.

The relevance of WH combining high mobility and saturation of working times (unstable-with-saturation category) has remained rather limited all over the period, although the percentage of

these WH has slightly increased. Unfortunately it is not possible to explore the qualitative profile of the workers belonging to this category. However, it is likely that they are characterized by a medium-high qualification and scholarization. These WH are also the most consistent with the assumptions and hypotheses which can be found in the job-search literature.

Figure. 4 - % of stable and unstable of work history



Deeper analytical insights of the descriptive evidences presented in Figure 4 can be obtained applying a multivariate analysis to our data-set. It is interesting for instance to explore the factors influencing the probability to fall in each one of our three WH categories and, in particular, the probability for a young worker to access the labour market through a stable job. For this purpose we have run a logistic regression using a binary response model, where the response (Y) takes the value "1", if an employee enters into the labour market through a stable job, and "0", if the employee get access into the labour market through a series of unstable jobs[2]. The explanatory variables included in the regression are a gender variable, age (16-20, 21-25, 26-30) and the period of entrance into the labour market. The time periods taken into account in our analysis are the following: 1987-1989 (used as reference), 1990-1993, 1994-1997 and 1998-2001. The results of the logistic regression are shown in Table 2

The first important finding emerging from our estimates is that, ceteris paribus, the probability of entering the labour market with a stable job decreases over time (as shown by the decreasing levels of the odds ratios). It is interesting to point out that this trend starts before the 1997/1998 institutional break, that is the period when an important set of reforms aiming at removing the rigidities present in the Italian labour market has been introduced. Our results suggest that these reforms have probably “institutionalised” an undergoing long term process of structural change in the labour market, and in the industrial relations, started at least a decade before.

Table 2 shows also that elder people are more likely to enter the labour market with a stable job. The odds ratio associated to the third age class is 1.099 while odds ratio of the lower class

age is 0.751 (the intermediate age class is used as a reference). This result is likely to be explained by the positive relationship between age, scholarization and job opportunity as also supported by a vast literature. Finally, it seems that women are more likely than men to get stable jobs. This result is somewhat surprising (as well as contrasting with the findings of previous contributions) and would deserve further investigation.

3.2 Changes in the stabilization processes

Stability and instability of WH can be analysed also in a long-term perspective. In this perspective a crucial aspect to be investigated has to do with the patterns of stabilization. Three crucial aspects are worth to be explored: a) the time needed to a "new entrant" to get a stable job; b) whether stabilization times have changed over time; c) what factors affect stabilization processes.

To shed light on these aspects three different cohorts of young new entrants have been selected, that is those who have first entered the labour market respectively in 1990, 1994, 1998. The WH of these three cohorts have been analyses over the 5 following years. The "time to stabilization" has been computed as the time length between the first access to the labour market and the time the individual got a stable job (first job lasting at least 584 consecutive working days, corresponding to 80% of the potential working time in a two years time period).

Stabilization patterns have been analysed applying a *survival analysis* to our data-set. This statistical technique is typically used in medical studies, where the “event” is often something unpleasant, such as death. In our case it is possible to compute a random variable T, measuring the time length passing from the first entrance in the labour market and the time the individual gets a stable job (as defined above). We have then modelled a *Survivor function*, S(t)=Pr(T>t), which estimates the probability for each individual to get a stable job beyond time t. The survivor function is estimated using a Kaplan-Meier estimator.[10] This function has been estimated both for the all period 1990-2003 (Figure 5), and separately for each sub-period (Figure 6) in order to highlight possible long term changes in stabilization patterns. In both cases the steeper the curve is, the higher is the probability to reach an early stabilization.

Figure 5 shows that there is a high probability that stabilization occurs with the very first job. After the straight vertical line, the curve steps down regularly and slowly becoming almost horizontal after the fourth year. This implies that the probability to get a stable job is very high at the entrance stage but for people who do not get a stable job through the first contract, the probability to get a stable job does not increase significantly over time. From Figure 5 also emerges a certain level of polarization between people who immediately get a stable job (about 50%) and a significant fraction of people, who are likely to get trapped into a long lasting instability.[11]

The comparison of stabilization patterns across the three different periods taken into account in our analysis (Figure 6) shows that stabilization patterns have worsened over time. In particular, compared to the first two periods, in the last one there are less people who get an early stabilization. The differences observed across time periods are statistically significant as supported by the Tests of equality over strata as shown in Table 3.

[10] A formal definition of the Kaplan-Meier estimator can be found in Collect (2003).

[11] This is evident looking at the quartiles: the median value of the time occurring to get a stable work is about one month (30.42 days, with a 95-percent confidence interval of 0.00 to 60.83), while the value of the third quartile is 821.25 (with a 95-percent confidence interval of 790.83 to 851.67).

Along with time, it is likely that stabilization patterns are also affected by individual factors such as age and sex. The relevance of these factors has been estimated using a Cox regression model[12]. This model evaluates the risk (hazard) of stabilization at some time t. In our case this means assessing the probability to get a stable job in t, conditional to the fact that stabilization has not occurred during the period running from the time of entrance into the labour market to time t. The results of the Cox regressions are shown in Table 4[13]. Parameter estimates measure the rate of change in the log of the hazard corresponding to a one-unit change in the predictor variable, adjusted for the effects of the other predictors. The hazard ratio for sex compares the hazard function for males to the hazard function for females. Since the estimate is less then 1 the hazard function for males is lower than the hazard function for females, meaning that males take a longer time to get a stable job. This result is rather puzzling and unexpected and deserves further investigation.

With respect to time periods, if we compare each period with the following one, the hazard to get a stable job decreases by about 7.9%, providing further support against the hypothesis that patterns of stabilization have not changed over time and that the time required to get a stable job has increased over time.

Finally for each unit change (one year) in the variable "age", the hazard increases by 2.8%. It is very likely that this result reflects differences in the level of education, which are correlated to age.

[12] An in-depth examination of this model can be found in Collect (2003).

[13] Notice that there is no intercept term in the model. The intercept is part of the baseline hazard function, which is not estimated in the Cox proportional hazards model. The Wald chi-square and its associated p-value test whether the parameter estimate is significantly different from 0. At the .05 significance level, period of time, sex and age are significant.

Figure 5: Survivor function (three periods poolled)

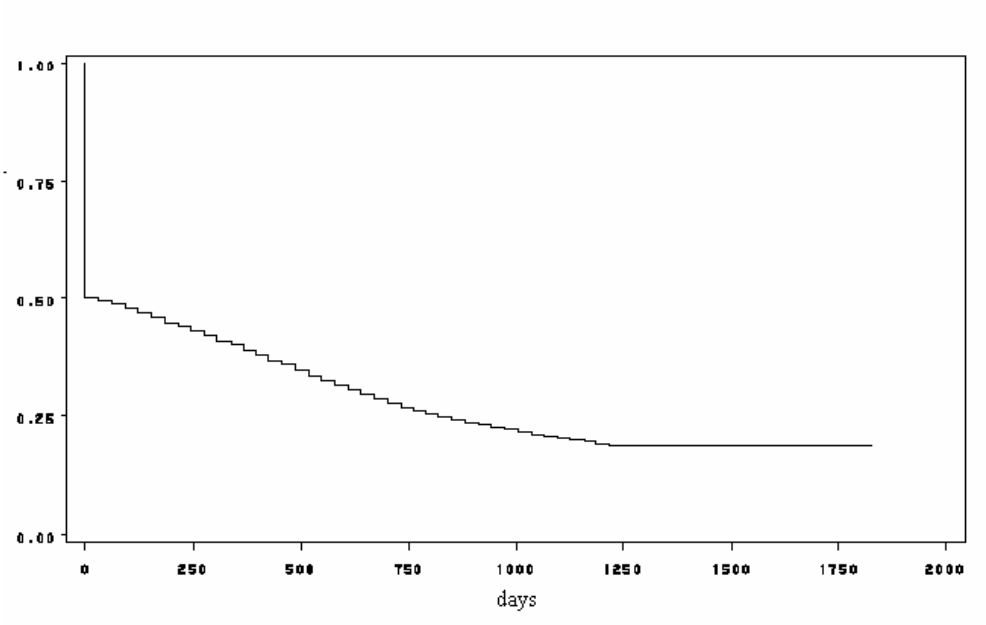
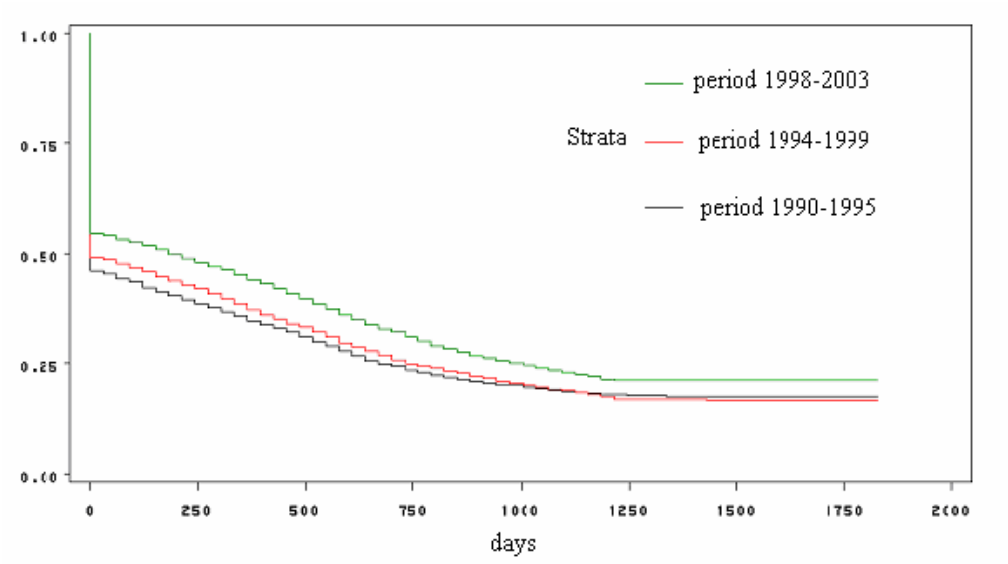


Figure 6: Survivor function with stratification by 3 different periods:



3.3 The effects of instability on wages

The level stability of WH is likely to have an effect also on wages and this both in the short and long run. Unstable workers may pay a price (or get a dynamic wage premium), compared to stable workers, both during the early stage of their carrier and in the long run.[14] In our empirical analysis the short term effects of labour stability on wages is estimated looking at average values (computed on a daily basis) of wages earned by 15 different cohorts of people during the two years period following their first entrance in the labour market. Long term effects are estimated taking into account the dynamics of wages in a five year period (using longitudinal data for three cohorts of people entered respectively in 1990, 1994 and 1998). Data on wages have been deflated using 2007 as the base year.

Figure 7 shows that unstable workers are paid around 20% less than stable workers and that this gap has not significantly changed over the last 15 years. It is interesting to note that workers characterized by an unstable-with-saturation WH category do not get penalized when compared to stable workers. In other words, by frequently changing jobs this flexible component of the labour force is able to reach (also in the short run, i.e. taking into account a two years period) income levels comparable to those of stable workers.

The long term effects of instability may not be so obvious. An unstable worker may pay a short term price in order to get greater economic returns in the long run. As already pointed out this is the basic hypothesis behind the job-searching literature.

In order to shed some light on this issue the growth rates of wages of stable and unstable WH in three periods (1990-1995, 1994-1999, 1998-2003) have been compared. Figure 8 shows that wages within unstable WH grow much slower than the wages characterizing the career of workers employed through one single-full-time job. This gap holds across the three periods. A rather interesting result is the higher dynamic wage performances shown by workers in the "unstable-with-saturation" category. As already pointed out, people in this category are likely to be workers with a high professional profile. In other words this seems a component of the labour force able to exploit the up-grading opportunities linked to a high job to job mobility. However, our previous analysis has shown that only a minority of "new entrants" is able to combine a high mobility with a full saturation of working time, and this is likely to be even more so in a five years time span. A possible implication stemming from these finding is that the basic job-searching hypothesis (i.e. the idea that a high level of mobility in the labour market facilitates the accumulation of human capital and assures a better job-matching) is relevant only for the most qualified component of the labour force (that, especially in Italy, represents a minor fraction of total working population).

The descriptive evidence presented in Figure 8 is confirmed by the analysis of variance (ANOVA). The results of ANOVA presented in Table 5a, referring to data pulled for the three periods, shows the presence of statistically significant differences in the wage dynamics across types of WH (Table 4a), and, more importantly, the low wage performances of unstable WH (when compared to both stable and unstable-with-saturation WH).

[14] On this point there are contrasting theoretical hypotheses and evidences. On the one hand, the job-searching literature tends to emphasise the greater opportunities that flexible (compared to rigid) labour markets provide to both workers and firms and the higher dynamic efficiency obtained through an appropriate job-matching. On the other hand, there is a large amount of evidence showing that a too high level of mobility in the labour market could seriously hamper the accumulation of human capital.

Moreover, the results of ANOVA, presented in Table 5b, show that the gaps in the wage dynamics across the different WH (and in particular between stable and unstable WH) tends to increase over time. This implies the presence of a process of wage polarization between stable and unstable WH and also that increasing disparities of wages observed in most industrialized countries could be in part explained by the spread of "atypical" and "fragmented" jobs.

Figure 7: Wages by type of work history
(euro per day - deflationated median values)

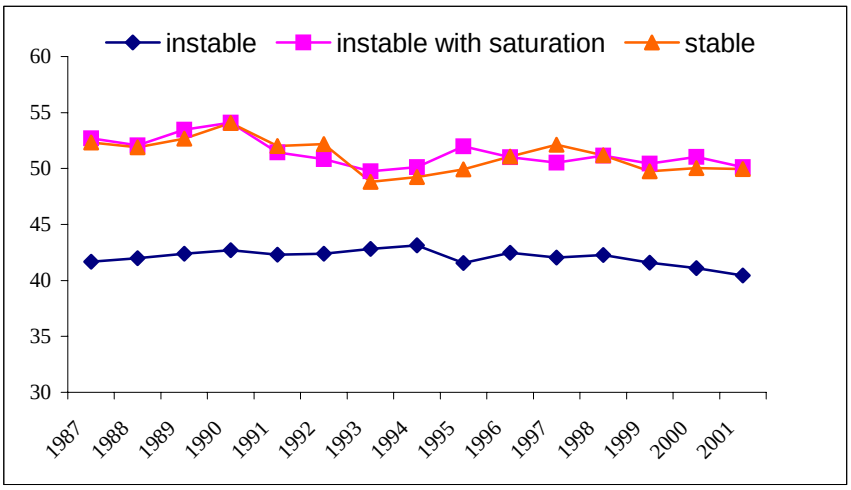
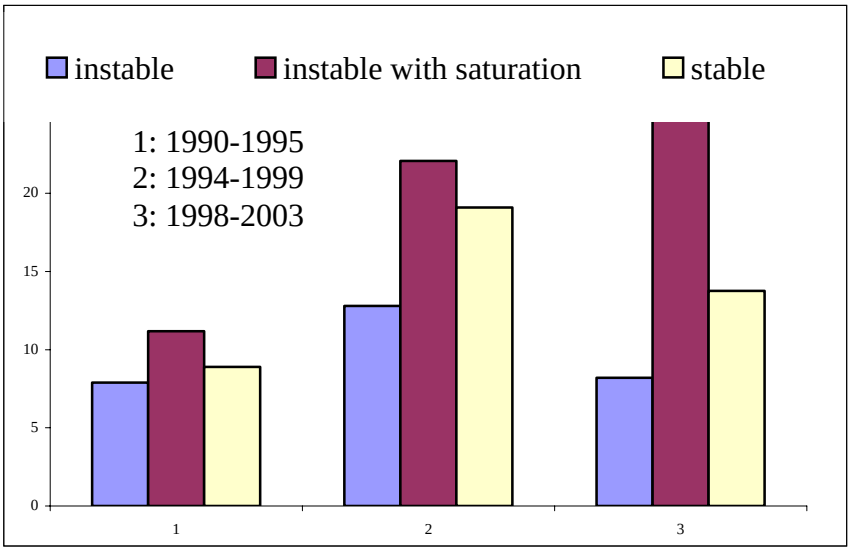


Figure 8: Differences in growth rates of wages by type of work history



4. Conclusions

The results presented in this paper confirm fist of all that a proper analysis and quantitative assessment of the level and nature of stability/instability in the labour market requires the use of longitudinal data-sets on individual work history. At least in the Italian case, administrative data drawn from social security archives (INPS) still maintain a comparative advantage vis à vis data provided by standard labour surveys.

In this work we have moved for the hypothesis that a more effective measurement of the area of stability and instability in the labour market requires to jointly take into account both the *mobility* (number of job to job changes) and the continuity (level of saturation) of work history. The evidence presented confirms our hypothesis. In fact, our analysis has shown that the level of mobility has only slightly changed over time, and that the instability in the labour market (in the access stage) is largely connected to the difficulty of working on a continuous basis.

Our analysis shows that the area of instability for young people entering the labour market has significantly increased over the last 15 years. At the end of the period taken into account in our study (2003) around three quarters of the work history of the new entrants were unstable (lack of saturation). WH characterized by a high stability have sharply decreased accounting at the end of the period for less than one third of total work history.

Our analysis has also shown that there is a marginal fraction of workers who are able to combine high level of mobility with a high level of saturation of working times. This component of new entrants has steadily increased over the last 15 years accounting at the end of the period for almost 17% of the total sample.

The analysis of the stabilization patterns has shown a clear polarization between two types of WH: a first category of workers getting a stable work through the first contract (around 50%); another small fraction stabilizes in two or three years. There is however a non marginal share of workers (20%) which seems to be got trapped into a permanent instability condition. Moreover, this area tends to increase over time. The data also reveal a general worsening of stabilization patterns.

Finally, our data provide strong evidence that being an unstable worker has a negative impact on wages both in the short and in the long terms. The exception is represented by those unstable workers, which are able to combine high level mobility with a full saturation of working time.

Table 1: Description of the sample

	Number of workers (new entrants)		Sex (%)		Age (%)		
	No.	%	f	m	16-20	20-25	25-30
1987	6620	6.8	38.8	61.2	39.3	40.5	20.2
1988	6658	6.8	41.1	58.9	39.5	40.9	19.7
1989	6390	6.5	41.8	58.2	38.1	40.6	21.3
1990	6494	6.6	37.9	62.1	33.6	39.1	27.3
1991	5868	6.0	39.1	60.9	35.3	38.6	26.1
1992	5261	5.4	39.2	60.8	35.0	37.9	27.1
1993	4252	4.3	39.8	60.2	33.5	39.2	27.3
1994	5173	5.3	41.8	58.2	36.1	38.9	25.0
1995	6210	6.3	40.3	59.7	32.4	40.5	27.1
1996	6424	6.6	39.4	60.6	29.9	40.6	29.6
1997	6297	6.4	41.6	58.4	28.5	40.8	30.7
1998	6765	6.9	42.9	57.1	29.3	41.4	29.3
1999	8172	8.3	42.1	57.9	28.5	40.8	30.7
2000	8994	9.2	41.7	58.3	30.1	38.6	31.3
2001	8564	8.7	42.5	57.5	31.8	37.0	31.3
total	98142	100.0	40.7	59.3	33.4	39.7	26.9

Table 2: Factors explaining the probability of being a stable worker. Results of a logistic regression

Analysis of Maximum Likelihood Estimates	DF	Estimate	Standard error	Chi-Square	Pr > ChiSq
Intercept	1	-0.160	0.008	442.0	<.0001
Sex F	1	0.103	0.007	193.8	<.0001
Period 1990-1993	1	0.063	0.013	23.5	<.0001
Period 1994-1997	1	-0.084	0.013	43.7	<.0001
Period 1998-2001	1	-0.179	0.012	230.9	<.0001
Age 16-20	1	-0.223	0.010	454.3	<.0001
Age 26-30	1	0.159	0.011	209.4	<.0001

Odds Ratio Estimates: Effect	Point Estimate	95% Wald Confidence Limits	
Sex F vs M	1.229	1.194	1.265
Period 1990-1993 vs 1987-1989	0.872	0.835	0.911
Period 1994-1997 vs 1987-1989	0.753	0.721	0.785
Period 1998-2001 vs 1987-1989	0.684	0.657	0.713
age 16-20 vs 21-25	0.751	0.726	0.777
age 26-30 vs 21-25	1.099	1.061	1.139

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	52.7	Somers' D	0.124
Percent Discordant	40.3	Gamma	0.133
Percent Tied	7	Tau-a	0.061
Pairs	1469823407	c	0.562

Table 3: Test of Equality over Strata

Test	Chi-Square	DF	Pr >Chi-Square
Log-Rango	61.81	2	<.0001
Wilcoxon	85.01	2	<.0001
Tarone	79.78	2	<.0001
Peto	83.63	2	<.0001
Peto modifica	83.63	2	<.0001
Fleming(1)	85.01	2	<.0001

Table 4: Cox proportional hazard model: analysis of maximum likelihood estimates

Variable	DF	Parameter estimate	standard error	Chi-square	Pr > Chisq	Hazard ratio	95% - hazard ratio confidence limits	
period	1	-0.079	0.011	47.98	<.0001	0.924	0.904	0.945
sex	1	-0.103	0.020	27.14	<.0001	0.902	0.868	0.938
age	1	0.027	0.002	125.99	<.0001	1.028	1.023	1.033

Table 5a: Differences in growth rates of wages across work history.
Anova results. (Data pulled for the periods 1990-1995; 1994-1999; 1998-2003)

Work history type	Wage growth rates: LSMean values (a)	(b)	95% Confidence Limits for LSMean	
unstable	4.68	7.73	4.66	4.69
unstable with saturation	4.77	17.62	4.74	4.79
stable	4.73	13.75	4.72	4.74

Work history type	Wage growth rates: differences between means		95% Confidence Limits for the difference between means	
unstable vs unstable with saturation	-0.088	(<.0001)	-0.123	-0.053
unstable vs stable	-0.054	(<.0001)	-0.075	-0.034
unstable with saturation vs stable	0.033	(-0.0431)	0.001	0.066

p-values in brakets
(a) computed on normalizated values: log(y+min(y)+0.1)
(b) computed before normalization

Table 5b: Differences in growth rates of wages across work history. Anova results. (Periods 1990-1995; 1994-1999; 1998-2003)

Periods	Work history type	Wage growth rates: LSMean values (a)	(b)	95% Confidence Limits for LSMean	
1990-1995	unstable	4.66	5.60	4.64	4.68
	unstable with saturation	4.70	9.57	4.66	4.74
	stable	4.69	9.30	4.68	4.71
1994-1999	unstable	4.70	9.64	4.67	4.73
	unstable with saturation	4.78	19.01	4.73	4.83
	stable	4.77	17.73	4.75	4.79
1998-2003	unstable	4.70	9.78	4.67	4.72
	unstable with saturation	4.81	23.33	4.77	4.86
	stable	4.74	14.83	4.73	4.76

Periods	Work history type	Wage growth rates: differences between means		95% Confidence Limits for the difference between means	
1990-1995	unstable vs unstable with saturation	-0.037	(0.268)	-0.093	0.019
	unstable vs stable	-0.034	(0.020)	-0.065	-0.004
	unstable with saturation vs stable	0.002	(0.993)	-0.049	0.054
1994-1999	unstable vs unstable with saturation	-0.082	(0.020)	-0.153	-0.010
	unstable vs stable	-0.071	(0.000)	-0.113	-0.029
	unstable with saturation vs stable	0.011	(0.924)	-0.056	0.077
1998-2003	unstable vs unstable with saturation	-0.116	(<.0001)	-0.174	-0.059
	unstable vs stable	-0.045	(0.007)	-0.080	-0.010
	unstable with saturation vs stable	0.071	(0.005)	0.018	0.124

p-values in brakets

(a) computed on normalizated values: log(y+min(y)+0.1)

(b) computed before normalization

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