The working life of dependent labor in Emilia Romagna: a dynamic analysis using the SILER database

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Abstract

Institutions play a fundamental role in shaping the working life pattern of dependent labor. In the years of the great recession started in 2008, firms struggled to adopt more flexible contracts, in Italy and elsewhere, to minimize the burden of labor costs and face the ups and downs of global and local market demand. Governments in Italy progressively adopted innovative types of contractual agreements to fight long-term unemployment and facilitate the matching between historically disadvantaged labor seekers (young and women) and firms. So short-term types of contracts became an important instrument to introduce flexibility in the labor market. The SILER database collects the obligatory communications that an employer in Italy must make to a special office when starting a contract with a new employee. The communication contains information on the employee, on the type of job and sector. Another communication must be sent when the contract ends, as well when major changes in the contractual terms arise. By collecting all the information for each single worker through many years, it is possible to reconstruct workers' career, with the length of contracts, types of contract, and so on. The data allow for testing the efficacy of the flexisecurity model in Italy, as it can be evaluated if people can find a job without facing long periods of unemployment, even when the contracts offered are not permanent. Moreover, with some degree of approximation, it becomes possible to tell exactly the length of time existing between a contract and another, a very good proxy for the length of unemployment. Section 1 contains the key elements in the institutional panorama featuring the labor market in Italy in recent years and the evidence suggested by the ESS data concerning individuals' perception of their own working life. Section 2 presents some insights from the relevant literature themes. Section 3 contains a description of the SILER database. Section 4 contains a quantitative analysis of people having a dependent labor contract in Emilia Romagna from at least 2008 onwards. This includes computing the distribution of the most commonly adopted contracts by age, sex, industry and institutional type of contract, as well as the typical sequence of contractual forms for workers considered. Section 5 concludes and illustrates the opportunities offered by further analyses, as to shed more light on the stepping stone hypothesis, the behaviour of firms in the aftermath of the financial crisis, the role of major labor market institutional changes.

Keywords: dependent labor, labor market institutions, careers analysis

JEL classification: J20, J21, J41

1. Introduction

This paper presents the features and some preliminary analyses built on a new database constructed in Emilia Romagna in 2013. The database collects and elaborates the administrative data from the mandatory communications that every employer has to make when taking in and laying off a worker, as well as when transforming or extending the duration of a contract. In other words, the administrative data concern the whole population of dependent labor in Emilia Romagna, and the database built upon allows for labor market analyses hardly ever possible before.

The specific inspiration that led us to present the database and a small part of the potential applications came from the European Social Survey data, as a key contribution that these data can give is an assessment of the working life of individuals, a main factor behind life satisfaction as a whole.

In other words, we can provide further insights into the social and cultural environment (at least in Emilia Romagna) with respect to the elements already emerging from the ESS rounds.

In recent years, most Western economies faced the need to boost market competitiveness, through processes of delocalization, off-sourcing, and with regards to the labor market, increases in the degree of flexibility. More flexibility was meant to allow a larger share of the population to enter the labor market, by means of innovative, short term and so-called "atypical" contractual forms. The parallel scope was endowing firms with flexible instruments to meet swings in final demand, as they could turn to flexible labor contracts when needed.

Institutions, in Italy and in many other European countries, were increasingly urged to introduce more flexible contracts, as the global markets entered a phase of harsh competitiveness, especially in the aftermath of the financial crisis, (not to mention the pivotal role of the new Asian manufacturing giants, led by China). "Flexisecurity" became almost a must for Spain, France, UK, Germany, Italy; but it must be underlined that it started as a progressive liberalization of the labor market at the margin, as short-term jobs, for instance temporary agency contracts, were increasingly deregulated, while the bulk of the permanent contracts legislation was not or only scarcely affected.

The academic and political debate started questioning the effectiveness of the deregulation in creating more opportunities against the odds of instead, more uncertainty in the labor market. Some authors started wondering if firms' productivity was likely to be blessed by such deregulation, or rather suffered from the increasing uncertainty and potential lack of motivation and skills of temporary workers.

The negative effects of the Great Recession probably exacerbated the undesirable aspects of the labor market deregulation. As a matter of fact, the composition and nature of contracts changed dramatically. In about twenty years, Italy experienced the doubling of temporary jobs, from about 7% in 1994 to about 14% in 2014. In other countries, as France, the same figure increased by one third, with temporary jobs growing from 11% to 16%, while Germany experienced an increase from 11% to 13%. Spain ranked third among OECD countries in 2014 with a figure of 24% (OECD: 2016).

The European Social Survey data inspired us to investigate about the nature and size of the changing labor context in the past years, as the perception and the structure of people's working life has changed, if not dramatically for most workers, at least for some of them. As it also emerges from the literature overview, the introduction and deregulation of temporary contract agreements (in the various forms)

has introduced more flexibility in the labor market, but higher uncertainty about life prospects with income for the future as well.

We initially moved from the ESS data for Emilia Romagna in 2002 and 2012, as to capture the changing perception of life as whole, labor market conditions and expectations. By matching some key questions, we were able to detect a clear pattern of increasing uncertainty and decreasing confidence, likely to lead to social structure disintegration scenarios as traditional schemes, classes and categories might not be holding anymore in the future (e.g. the certainty of the middle-class, the role of past and new generations, and so on).

We took as reference some key questions in a decade time spam to pick a broader panorama; apart from this, for Italy, only three rounds of ESS are available (2002, 2004, 2012). We used the ESS online database and computed weighted percentages for Emilia Romagna respondents. There were 113 interviewees in 2002 and 64 interviewees in 2012. As advised, we weighted the table as to take into account the sampling procedure and the population size. Figure 1 sums up some of the indicators. The idea is that, given the answers about having a paid job or not and the duration of contracts, the feeling about household's income and life satisfaction are likely to be consequently affected and worsen.

Figure 1. Working life and life perception, Emilia Romagna, ESS data, 2002 and 2012 rounds.
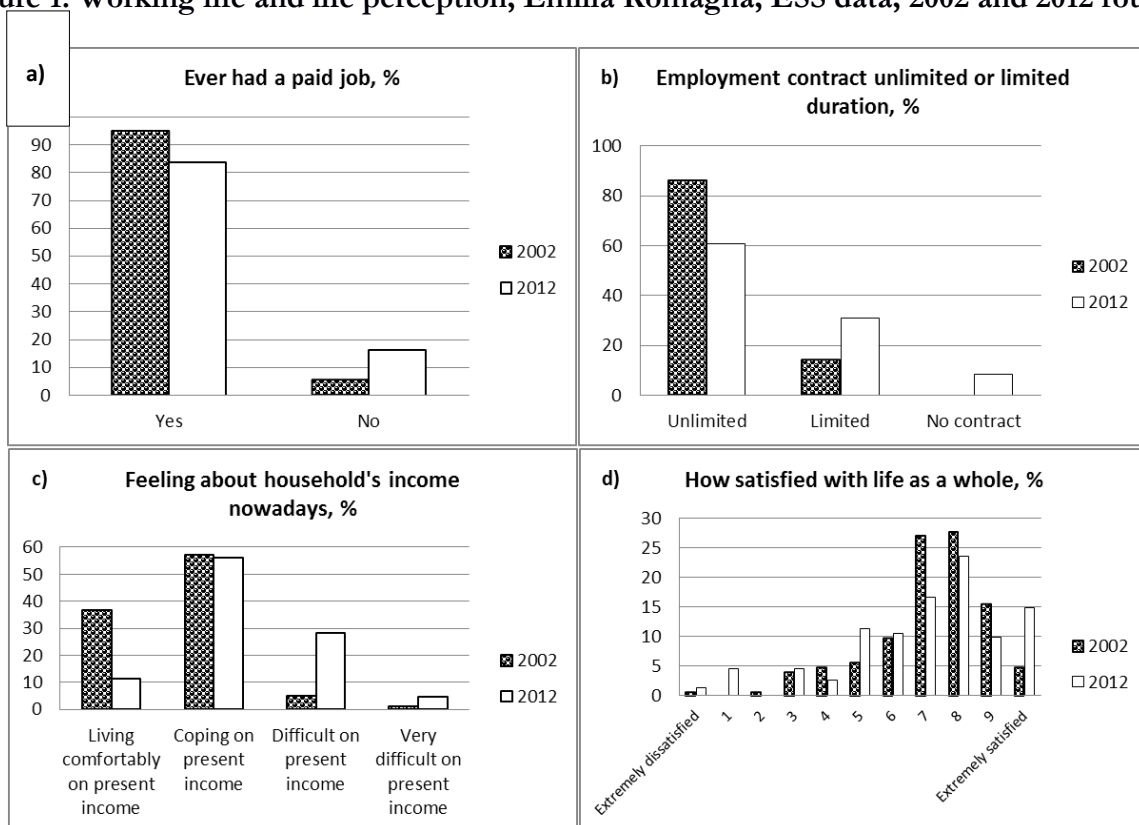
Starting from figure 1 a) and proceeding clockwise, we go through the change that has been taking place among the interviewees from 2002 to 2012. The percentage of those who have never had a paid job has increased from 5.3% to 16.3%, hinting for more difficulty for the youngsters to find their first occupation in 2012 with respect to 2002. Figure 1 b) finds that the number of individuals engaged with

a limited duration contract has increased from 13.9% in 2002 to 31% in 2012. (This exacerbates the national trend, as according to OECD the incidence of the temporary jobs in Italy was 9.86% in 2002 and grew to 13.79% in 2012). In 2012 moreover, we also get the extra answer of 8.3% of individuals with no contract at all at the moment of the interview. Figure 1 c) and d) are about perception. People living comfortably on present income fell from 36.8% in 2002 to 11.2% in 2012, while those who feel difficulties with the present income increased from 4.9% to 28.5%. This represents the major change in the statistics for this question and clearly hints for a worsening in the global life and opportunities perception. The last picture, 1 d), shows a negative kurtosis of -0,21 in 2012 with respect to 0.2 in 2002. This shift took place since less people concentrated on the higher degrees of satisfaction 7 and 8 (they accounted for 27.1% and 27.8% in 2002, down to 16.7% and 23.6% in 2012), with more people reporting lower levels of satisfaction. An odd result is the one of those extremely satisfied individuals, a minority that, tough, grew from 4.8% to 14.9%. All in all, objective and perceived uncertainty has increased.

Do we find evidence for matching changes in the labor market for Emilia Romagna in our data? The answer is positive, at it will become clear below.

2. The institutional framework and benchmark studies.

Italy started experiencing some major labor market reforms at the beginning of the 1990s, with the agreements putting an end of the so-called "scala-mobile", an automatic system of wage indexation in 1993. Institutional reforms concerning new, temporary and atypical job contracts have been gradually introduced since the mid-1990s. The first major intervention has been the "pacchetto Treu", from the name of the Labor Minister at the time. For the first time, this law gave legal recognition to a number of non-standard work arrangements. The second important milestone was the Biagi reform in 2003, which attributed legal content to additional temporary work arrangements (job on call, staff leasing, etc.), defined in more detail the functions of work agencies and increased the number of services they can offer (CNEL, 2006).

To provide a glimpse of how much these reforms have impacted on the regulatory framework, we could report the Employment Protection Index (EPL) constructed by the OECD: in 2008 Italy ranked broadly mid-field in OECD comparison (twenty-fifth out of forty countries) with the EPL indicators being 1.89 against an OECD average of 1.94. Back in 1990, Italy ranked fourth out of twenty-six countries in the same decreasing order of protection (Battisti and Vallanti, 2013). Moreover, when looking at the most recent data on Employment protection, the deregulation at the margin triggered a decrease in the employment protection of temporary workers from 4.75 in 1997 to 2 in 2013, while the related indexes for permanent workers basically remained unaltered.

In 2015 another major reform was introduced, the so called "Jobs Act", which has determined a deep change in the Italian industrial relations. Bringing at completion a reform process begun in the 1990s, the Jobs Act has introduced a new contract type - 'contratto a tutele crescenti' - implying a substantial downsize of he obligation for workers' reinstatement in case of firms invalidly firing them. The new permanent contract is therefore deprived of the substantial previous requirements of an open-ended

contract. Although the effectiveness of the law in boosting employment growth is questioned (Fana, Guarascio, Cirillo, 2015), it has represented an intervention in the direction of introducing flexibility at the core of the permanent contracts agreements.

The academic focus concerning labor market reforms in Italy (and elsewhere) has been especially directed to the "stepping-stone" versus the opposite "dead lock" testing hypothesis. As for other European countries, and as highlighted when introducing the ESS data, changing working conditions can impact on the perceived well-being both on the material and psychological plan (De Graaf-Zijil, 2005), and therefore on the life quality and life style of the society as a whole. If ever increasing temporary jobs fail to create a secure job environment, perhaps resulting in an infinite cycle of temporary jobs, the outcomes could be far from desirable. Jahn, Riphahn Schnabel (2012), when assessing the impact of labor market deregulation of firms productivity, point to a possible trade-off between efficiency and equity.

The research on the working life of people has often turned to sophisticated instruments to see if after being granted temporary contracts, workers are likely or not to end up with permanent jobs. The evidence is mixed, and results change depending on the specific type of contract considered, on age, gender, labor market context, and so on, but it is also likely to depend on the methodology used (Amuedo-Dorantes et al., 2008). In Europe, there is some unclear evidence concerning the effectiveness of temporary jobs in leading to more stable – or fixed term contractual agreements.

On one side, the introduction of "atypical" or "flexible" contractual agreements may actually give an opportunity to enter the labor market where none existed before. Ichino, Mealli and Nannicini (2008) detect two broad theoretical points of view for why temporary employment could offer a springboard to stable jobs: 1) more able workers can use temporary work to signal their skill by making themselves available for screening and 2) temporary jobs may be an opportunity to build extra human capital, social contacts and information. Whenever point 1) prevails, the screening procedure can also induce less shirking and build more stable relationships between employers and employees (Portugal and Varejao, 2009). In the same article, Ichino et al. (2008) provide positive evidence for the springboard effect for workers hired through temporary agencies. Some effectiveness of the stepping-stone is also found in Barbieri and Sestito (2008). On the other, the "trap" or "deadlock" hypothesis in an endless precarious condition cannot be ruled out, so that the empirical investigation only can provide some evidence. According to Blanchard and Landier (2002), the use of temporary workers as buffer stocks increases job instability and uncertainty inside the firm, reduces investment in training, lowers workplace cooperation and workers' motivation, and harm long-run growth prospects. Exactly the opposite evidence as the one found for Italy by Ichino et al. (2008) is instead found in Spain by Amuedo-Dorantes et al., (2008). In the US, Autor and Houseman (2010) take into consideration a welfare-to-work program in Detroit and find that temporary help placements may even harm subsequent employment and earnings outcome.

Across Europe, temporary jobs are associated with poorer labor conditions with respect to standard employment: lower wages, lower training, higher job insecurity, and lower protection from social security. In their introduction to an Economic Journal Symposium on temporary jobs, Booth et al. (2002) summarize the thrust of the contributions as suggesting that the expansion of temporary jobs as a way of increasing labor market flexibility may be undesirable, although in some case they indeed find some stepping stone evidence in the case of British workers. Booth, Francesconi and Frank (2002) are the authors of a pioneering work on the stepping stone hypothesis, where apart from assessing the

existence of such "entry port", they also find that temporary workers in Great Britain report lower level of job satisfaction, receive less training and lower wages.

Studying the same subject for Australia, Cai, Law and Bathgate (2014) interestingly model the evaluation of the different starting statuses, in particular, when trying to assess the correct probability of transitioning into a fixed term contract from a temporary job, the individuals out of the labor force (Not in the Labor Force, NILF) should be considered as a baseline case, as those who are simply unemployed are anyway putting some effort into finding a job. They find evidence for the stepping stone effect. Addison, Cotti and Surfield (2015) tested the stepping stone for the US workers, finding positive results and controlling for the endogeneity that may lead a worker to be in a given position rather to another, with the special caveat that the labor market in the US is highly polarized between temporary, unskilled, low-pay workers and high-pay, specialized, temporary consultants and contractors. Drawing on data from representative national longitudinal studies, Scherer (2004) finds that lower mobility chances in Italy, and the strongly segmented labor market in Germany, inhibit the exit out of a labor market segment once it has been entered, therefore hinting for an entrapment effect in lower status positions.

Findings in Figure 1 are partially supported by the research by van Oorschot and Chung (2015), who use ESS data to analyze feelings of income insecurity among workers, finding that labour market policies matter, but affluence matters, too.

Across the literature, a number of studies focused on the wage differences existing between fixed term and temporary contracts. In principle, there may be a reason for temporary workers to have higher wages than open-ended counterparts, as a premium pay for the relative instability of their position and since they allow employers to save in term of takes and social contributions. In reality, the opposite can happen, as temporary workers are seen as a low-cost resource to deploy on demand, that is costly to invest on, as the worker may be just in search of the right job or might be searching for better positions at the end of the contract.

Pavlopoulos (2013) finds a wage penalty for entering the labor market through temporary contracts for British males (7.1%) and especially British females (21.2%), while in Germany this wage penalty for temporary starters is inferior (4.5% for males and 3% for females). Ghinetti (2013) finds that the port of entry hypothesis is verified in Italy only for few individuals, where the entry is more likely – but with associated lower wage growth – when staying with the same employer.

Another, smaller, stream of literature is investigating the impact of recent labor market reforms on firms' productivity, which is also at least partially related to changes in wages. Battisti and Vallanti (2013) evaluate for the Italian data the impact of the share of atypical jobs (together with other factors) on firms' productivity, finding a negative impact when the temporary jobs do not turn into stable jobs.

Dolado, Ortigueira and Stucchi (2012) investigate Spanish firms TFP by means of the Olley and Pakes decomposition, modeling a dual labor market where TFP is negatively affected by the increase in the gap between firing permanent workers and temporary workers. In other words, market reforms at the margin are not conducive to higher TFP for firms, as the incentive to put effort by temporary workers and the incentive to train by firms decrease.

Bassanini, Nunziata and Venn (2009) find that mandatory dismissal regulations have a depressing impact on TFP growth in industries where layoff restrictions are more likely to be binding. They also

find that the dampening impact of EPL on productivity appears to be entirely due to the effect of dismissal regulations, while restrictions on the use of temporary employment have, if any, a positive impact on TFP growth. In other words, even though in recent years many countries have chosen to ease regulations on temporary and atypical contracts to make their labor market more flexible, the productivity growth pay-off that can be expected from these reforms is very low.

Cappellari, dell'Aringa, Leonardi (2012) find that the reform of apprenticeship contracts in Italy increased job turnover and induced the substitution of external staff with firms' apprentices, with an overall productivity-enhancing effect. But they report as well that the reform of fixed-term contracts instead did not produce the intended results: it induced a substitution of temporary employees in favor of external staff and reduced capital intensity, generating productivity losses.

Hirsch and Mueller (2012) investigate plant level productivity on a panel of German firms, finding that an inversely U-shaped relationship between temporary agency workers use and productivity, so that the effect of adopting temp workers up to the 15% of total workforce is positive, but becomes insignificant above that threshold. A similar result is found for Spain, where Roca-Puig, Beltrán-Martín and Segarra-Ciprés (2015) find a negative linear relationship between temporary contracts and labor productivity and a predominantly positive concave downward curve between temporary contracts and gross operating margin.

The administrative data elaboration we draw upon benefitted to a great extent by the experience and insights developed by Fondazione Obiettivo Lavoro and CRISP in Lombardy (see for instance, Fondazione Obiettivo Lavoro and CRISP, 2013) and by Veneto Lavoro (see for instance Anastasia et al. 2010). Their pioneering analyses helped in interpreting the administrative data and traced the paths for the empirical research in this relatively new and unexploited field.

3. The SILER database.

SILER (Sistema Informativo sul Lavoro in Emilia Romagna) is a proprietary database that collects all the mandatory communications that must be sent to a specific office (Centro per l'impiego) whenever a new labor contract is created, extended, transformed or ceased in the region Emilia Romagna. The transmission is made online, and the responsibility for the communication lies with the employer. The collection of the information takes place at regional level, and it is afterwards pooled by the Ministry of Labor, where a national report is produced. The national data, however, remains property of the Ministry and only samples for research are publicly available in Italy.

The SILER offers a wide range of possibilities to analyze the trend and dynamics of the labor force in Emilia Romagna, before the same data is processed at national level. Since every person[1] in the dependent labor market of the region can be detected into the database, it becomes possible to track the working life of people in a given time span and to follow them until the exit from the dependent

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[1]Every person who underwent a registration, termination, transformation or extension of a contract in Emilia Romagna since 2008.

labor market. So, features as age, education, citizenship and industry, among others, can be related to the length and type of the contractual agreements undersigned.

The treatment of the data for statistical purposes has been impressive. Since about 7 million people appear at least once in the database, it became necessary to estimate the number of those who never appeared, since they had been working before the mandatory communications appeared in 2000; to set starting points for the analyses, since workers start working at different points in time and sometimes keep working with the same or a new contract on the last day of collection and observation of the data; some workers have several contracts in a given period of time (and sometimes there are cases where the number of contracts for the same individual, even at the same time, is surprisingly high).

From the point of view of workers, the database offers a unique view on the pattern of their working life and contributes significantly to the empirical studies of the labor market, not only from the economic point of view, but also from the institutional side. While linking the results to macroeconomics data is tricky but interesting (for reasons that will become clear below), it is possible to evaluate the appreciation of the types of contracts arising through the years: basically permanent jobs vs. all the universe of flexible and atypical contracts.

To a larger extent, since also employers can be detected from the database, and their data crossed with available balance sheets and sectoral reports, the database allows for shedding light on the economy as a whole, in terms of output, labor productivity, seasonality, and so on.

As already mentioned, the information in SILER allows for several perspectives of analysis. For our preliminary analyses, we chose to detect a panel of individual for a preliminary evaluation of the individual and external features that determine the type of contract held at given point in time and to map the typical sequence on contracts as a first attempt to contribute to the findings over the stepping-stone evidence. Moreover, as a descriptive exercise, we are also able to compute the duration of contracts for this group of workers as well as the spell of time without any formal contractual agreement between one contract and the other. This particular feature of the data allows for interesting inference on the length of unemployment.

3.1. Some descriptive statistics.

A general view on the SILER data, with descriptive statistics and analyses on the whole population, can be found in the Rapporto Annuale 2015 - Il mercato del Lavoro in Emilia-Romagna (Ervet, 2015).
Here, we started by extracting a sample of workers observed through five years, 2008 – 2012, in order to track the working life pattern of all the individuals who appeared for the first time in 2008 with a contract. Specifically, the workers were chosen according to the following criterion: we considered all the workers who had at least one contract starting in 2008 and had up to five contracts overall during the period 2008 – 2012. We subsequently chose to focus on individuals with up to five contracts in the 2008-2012 time span, as those with six or more contracts in five years represented a minority of the population (14.3% against the 85.7% of those with at maximum five contracts in the period).

Ideally, the workers can therefore be split into five groups: those who only have one contract in the five years considered, started in 2008; those who have 2, 3, 4, and 5 contracts, but with at least one contract starting in 2008. We don't consider here those workers who have been working since 2007 or earlier

and are still on the job in the five years 2008- 2012; and those who start a job in 2009-2012, but not in 2008, so perhaps they start in 2009 and keep working (they never appear in the present study). Table 1 reports the workers according to the number of contracts.

Table 1. Workers with at least one contract started in 2008 and number of contracts held (up to five contracts, 2008 – 2012).

NUMBER OF CONTRACTS	WORKERS	PERCENTAGE
1	234284	41,35
2	126904	22,4
3	83364	14,71
4	60524	10,68
5	61563	10,86
Total	566639	100

Totally, there are 1288095 contracts started in the 2008-2012 time span, that result in 2.27 contracts per person on average. Some of the contracts we consider are concluded before the end of the quinquennial (before 31.12.2012), but we don't investigate further on what follows; some other contracts are still "alive" on 31.12.2012, but still, we don't investigate on what follows. Notice that for those contracts not ending on December 31, 2012, but still "alive", we required a virtual conclusion on that date, so to be able to account for the whole period the workers have been working until the end of our observation period. Some other contracts overlap for the same person, since it happens for part-time workers, for example, to have more than one job at a time. Given this structure, the data do not represent a natural panel, even if a panel can be built and dealt with the usual techniques.

For each worker we can observe: age at the beginning of the (first) contract, sex, citizenship, type of contract according to the taxonomy reported in the Appendix[2] and under Table 2, education level, economic macro sector, province, professional category, skill level. Two time variables have been computed: the length of the contracts in days, and the length of the time span between one contract and another, for those individuals having at least two non-overlapping contracts in the quinquennial. This second time variable can be considered the "waiting time" between the end of a contract and the start of another, for those workers having a contract starting after the end of the previous one in the quinquennial. We don't observe the effective length of time between two contracts in the case the first ends before December 31, 2012, and the second starts from January 1, 2013, onwards.

The initial set contains 566,639 workers aged between 13 and 75, with this age bracket representing the age at the beginning of the first contract registered in 2008 (the age information is available for 565,500 individuals). In order to fully appreciate the information on contractual types, it is advisable to preliminary go through Table A1, where each type of contractual agreement, as reclassified by Ervet

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[2]The Ervet reclassification of contractual types was created in 2013 in order to summarize into 8 categories a number of various agreements. The variables according to which contracts were pooled into categories are duration, the degree of independence from the employer, flexibility in working hours and other social variables.

(2015) is illustrated[3]. Basically, we have open-ended contracts on one side, (representing the 30% of the first contractual agreements signed in 2008), and atypical contracts on the other, fully differentiated into seven subgroups of temporary contractual agreement[4]. Our set, referring to the first contractual agreement signed in 2008 can be described by the figures in Table 2.

Table 2. Descriptive statistics of workers by working arrangement (mean values)

	CTI OPEN-ENDED CONTRACTS	CTD FIXED TERM CONTRACTS	ELAV INTERNSHIPS	LDOM DOMESTIC WORKERS	LINT JOBS ON CALL	LPAR PARASUBORDINATE WORK CONTRACTS	SOM TEMPORARY AGENCY WORK CONTRACTS	CAI APPRENTICESHIPS AND ACCESS-TO-WORK CONTRACTS
Individual characteristics								
Age	36.26	35.92	22.62	41.30	33.26	38.51	30.77	21.04
Female	0.40	0.50	0.56	0.86	0.56	0.45	0.42	0.42
Foreign	0.26	0.28	0.10	0.91	0.17	0.08	0.24	0.22
Education level								
Primary School Junior High School	0.59	0.61	0.60	0.88	0.64	0.69	0.54	0.67
	0.20	0.22	0.15	0.06	0.22	0.11	0.23	0.18
High School	0.16	0.13	0.18	0.04	0.13	0.13	0.19	0.14
University	0.05	0.04	0.07	0.02	0.02	0.07	0.04	0.02
Job characteristics								
Duration in days[a]	855.7	225.7	156.0	393.1	339.3	346.2	139.2	395.5
Part time	0.22	0.25	0.12	0.81	0.23	0.06	0.16	0.19
Waiting time in days[b]	107.0	178.9	240.4	180.7	220.9	152.8	123.8	243.6
Overlapping[c]	0.009	0.009	0.003	0.052	0.008	0.002	0.005	0.006
Industrial Sector								
Industry	0.27	0.16	0.22	0.01	0.04	0.12	0.55	0.25
Agriculture	0.008	0.181	0.010	0.003	0.001	0.006	0.006	0.005
Trade and Tourism	0.16	0.24	0.23	0.01	0.63	0.14	0.18	0.33
Services	0.39	0.24	0.44	0.97	0.28	0.50	0.20	0.22
Education[d]	0.038	0.064	0.036	0.000	0.014	0.169	0.002	0.002
Construction	0.10	0.07	0.03	0.01	0.01	0.04	0.02	0.16
Skill level								
High	0.26	0.14	0.41	0.01	0.09	0.67	0.11	0.12
Medium	0.44	0.47	0.50	0.22	0.72	0.28	0.42	0.79
Low	0.30	0.39	0.09	0.78	0.20	0.05	0.43	0.09
N	175532	241331	9250	18801	9637	43285	36248	29805

Notes
[a]: For open-ended contracts of contracts lasting more than 5 years, the maximum allowed is 1826 days. Part time contracts were weighted by 0.5 as for lenght.
[b]: Only for those individuals with more than one contract in the 2008-2012 time span, as number of days between the end of the first contract and beginning of the second contract, with non-overlapping contracts

[3]The Ervet reclassification is aimed at creating uniform job categories. Nonetheless, about 8 percent of contracts were the result of merging two different types, whenever the first one was transformed in another contractual type, such as from fixed-term to an open-ended type. For details on the initial treatment of the data, see CRISP (2014).
[4]It must be underlined, though, that the number of people with an open-ended contract is much higher than 30%, over total Emilia Romagna's workforce: here we pick the moment of creation of new contracts, but do not observe pre-existing contracts that did not undergo some kind of mandatory communication.

Younger workers are engaged in apprenticeships and internships, but the way to the open-ended contract is quite long, since on average a workers gets one at 36. Domestic workers, that are females (and foreign) are the older workers, followed by those workers with parasubordinate contractual agreements. The percentage of males in open-ended contracts is 60%, a first sign of gender discrimination that appears also from other indicators (as the fragmentation of working life contracts, much higher for women, even if we can't tell without further investigation if this is at least partly due to individual/family preferences). The educational attainments of workers is pretty low. University degrees (and post-university education) is pretty rare. Fixed term contracts on average last about eight months, while the shortest duration is registered for temporary agency workers. It must also be underlined that these workers are also those who wait less between the first contract and the following one, while it takes really long to find another job after an internship. Open-ended contracts are the most popular in Services and Industry, while jobs on call are especially concentrated in Trade and Tourism (this is explained with the seasonality of the touristic area on the seaside of Romagna). Parasubordinate workers are those with the highest average skill level (in fact, they are also those with a high concentration of university graduates). Domestic, female workers, are those with the lowest skill level.

Finally, Table 3 presents a focus on job pathways over the 2008 – 2012 time span for the workers as a whole, where for every worker, the first and the last contractual arrangement is picked, according to the total number of contracts held (up to five, see above). While we will perform a more accurate sequence analysis of contractual agreements on the next paragraph, we just give here a snapshot of those workers who obtain an open-ended contract as the last contractual agreement registered. We do not report those workers who started with an open-ended contract in 2008 and did not have other contracts subsequently in 2008 – 2012 (44% of workers with only one contract, starting in 2008, have an open-ended contract).

Table 3. Transition rates to the final open-ended contract, 2008-2012

Panel 3a

OPEN-ENDED CONTRACT AS ENDING ARRANGEMENT BY NUMBER OF CONTRACTS

INITIAL ARRANGEMENT	2 contracts	3 contracts	4 contracts	5 contracts
CAI - Apprenticeships and access-to-work contracts	2595	1586	939	536
CTD - Fixed term contracts	15414	11848	9715	6481
CTI - Open-ended contracts	27129	10698	4842	2346
ELAV - Internships	882	668	412	225
LDOM Domestic workers	626	390	252	158
LINT - Jobs on call	487	320	224	140
LPAR - Parasubordinate work contracts	2471	1877	1099	714
SOM - Temporary agency work contracts	3597	3091	2079	1554
n.a.	259	158	82	40
N	53460	30636	19644	12194

Panel 3b

PERCENTAGE OF WORKERS ENDING WITH AN OPEN-ENDED CONTRACT OVER TOTAL ENDING CONTRACTS

INITIAL ARRANGEMENT	*2 contracts*	*3 contracts*	*4 contracts*	*5 contracts*
CAI - Apprenticeships and access-to-work contracts	0.34	0.30	0.24	0.19
CTD - Fixed term contracts	0.30	0.31	0.31	0.16
CTI - Open-ended contracts	0.72	0.60	0.51	0.42
ELAV - Internships	0.35	0.36	0.32	0.27
LDOM Domestic workers	0.13	0.13	0.13	0.14
LINT - Jobs on call	0.22	0.20	0.20	0.16
LPAR - Parasubordinate work contracts	0.24	0.26	0.22	0.17
SOM - Temporary agency work contracts	0.37	0.40	0.37	0.35
n.a.	0.51	0.52	0.44	0.33

The main feature of Table 3 is that an hysteresis of the open-ended contracts is well evident, as found for example by Addison et al. (2015). 72% of workers who had an initial open-ended contract also have an open-ended contract a second job, 60% as a third job, and so on. Therefore, the observational likelihood to enter a final open-ended contract seems to depend crucially from the fact of having the same type of agreement before. If we were to pick some signs of stepping stones from here, it does not seem that having different contractual agreements leads to higher probabilities of an open-ended contract as final arrangement. If any, it seems that temporary agency workers have a higher probability of entering an open-ended contract with respect to the institutionally longer agreement, the fixed term contract: for those with two contracts, 37% of workers were temporary agency workers, versus only 30% of fixed term contracts. Therefore, we find here traces for an effect which could go on the opposite direction of what was found by Amuedo-Dorantes et al., (2007), as for the Spanish case agency workers endured a lower likelihood of being hired on a permanent basis following their temporary assignment than their direct-hire counterparts.

To fully check for this effect, we would need to analyze transitions, given the same employer. From here, data could instead suggest that a learning effect is taking place for temporary agency workers, as they have a higher chance to be subsequently hired with regular contract than their fixed term counterparts. Or perhaps firms are using temporary agency workers as a screening device, while they are adopting fixed term contracts as a real alternative to regular contracts, and not in the perspective of hiring workers on a more stable basis. This is supported by the strong hysteresis featuring also fixed term contracts, as it is very likely that having a previous fixed-term contract will also imply a final fixed term agreement.

We also computed Kaplan-Meier estimates of both completed and uncompleted durations (in days, this should reach a maximum of 1826 days, that is five years, as the contracts ending after December 31st, 2012 were artificially closed on that date) for the first contracts registered in 2008 for the 569633 individuals of our sample (we did not consider here the whole duration of all the contracts started after the first one considered).

The estimates in Figure 2 reveal that the median duration of all contracts, but open-ended ones, is less than one year. In particular, internships have a median duration of 92 days, temporary agency contracts

have a median duration of 73 days, and fixed-term contracts have a median duration of 119 days. Overall, among temporary jobs, only domestic labor and parasubordinate workers have a median duration over six months.

Figure 2. Kaplan-Meier estimates of job durations.
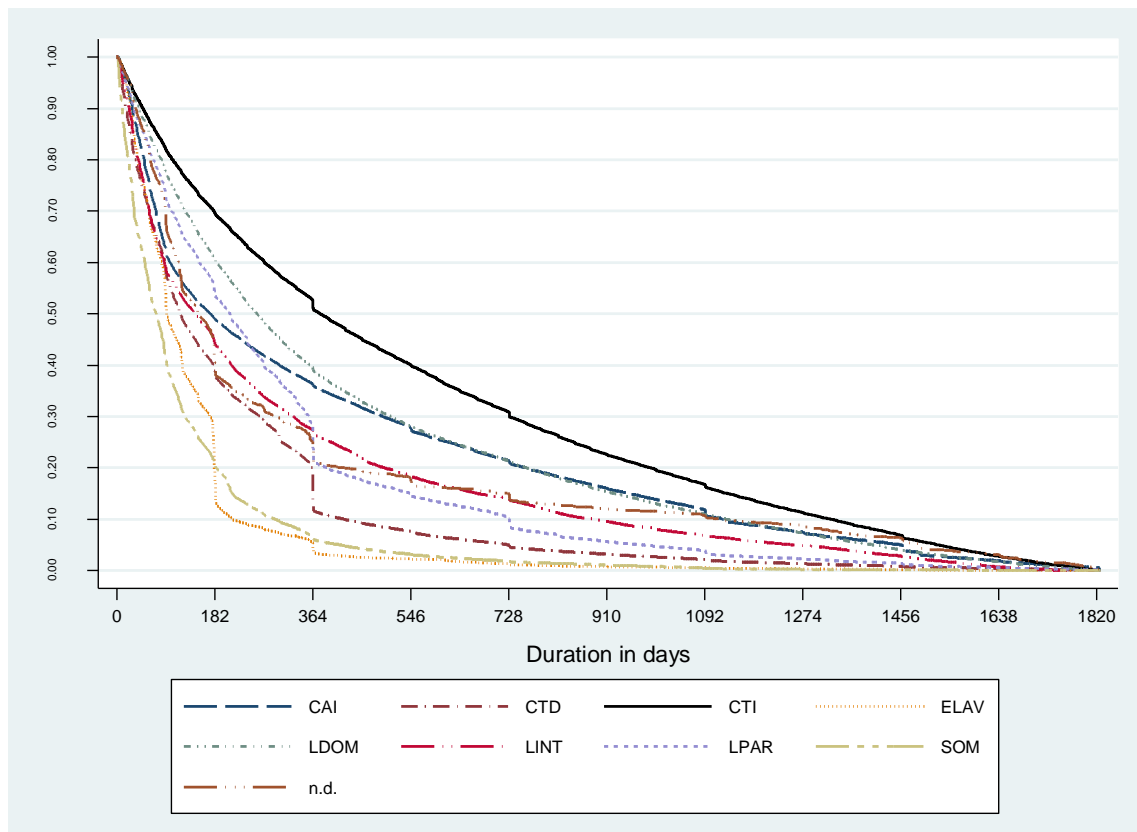
We also adopted the Kaplan Meier approach to compute the "waiting time" between the first contract undersigned in 2008 and the following one, for those individuals who have more than one contract in the 2008-2012 period, (but not-overlapping contracts). This seems a crucial information to get an insight of which initial type of contract performs better in terms of reduced (probably?) unwanted spells of non-employment. (Similarly, one could ask with another analysis which type of second contract performs better in terms of decreasing the waiting time after the end of the first contract).

Figure 3 illustrates the waiting time in days between the end of the first contract and the second contract. The median value of the waiting time for open-ended contracts is 1 day. The waiting time increases for temporary jobs; temporary agency workers are those who wait less before entering a second contract (median of 16 days), followed by parasubordinate workers (25 days). The situation is instead more dramatic for those whose first contract is an apprenticeship (median of 88 days). From the figure, we notice that 50% of the workers find a second job, after the first one registered, in less than six months. The average waiting time across all types of contracts is 163 days.

Focusing on the open-ended contract as a second contract, it is interesting to assess how efficient (or rather, not-efficient) is the eventual transition to a permanent contractual position, starting from any of

the possible contractual types observed. Table 4 collects the average and median waiting time in days for workers who end up with a permanent position as a second contract.

Figure 3. Kaplan-Meier estimates of the waiting time between the first the second contract.
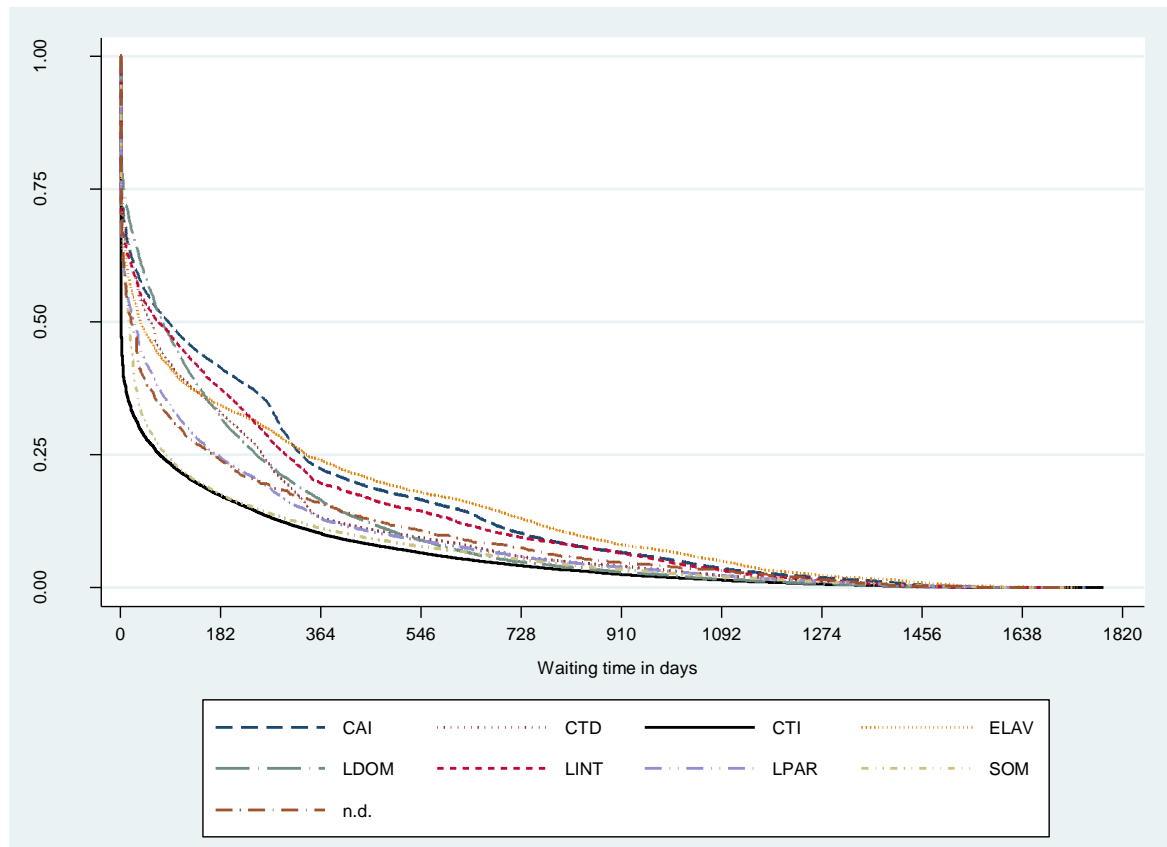
While we already discussed the waiting time in general, assessing for instance how the open-ended contract workers wait less than anyone else when entering another open-ended contract (as confirmed here), the interpretation of the median of the distribution has some equity and efficiency implications. Basically speaking, the higher the number of people who have to wait a lot before getting a new job, the more unfair is the functioning of the matching between demand and supply of workers in the market, *coeteris paribus*. On the basis of the number of people in each category of contractual agreement observed during their transition in the open-ended contract, it is possible to elaborate an indicator for the relative inefficiency of the transition. (I.I.).

Table 4. Waiting time in days before an open-ended contract as a second contract.

Initial contract	Average	Median	Number of workers
Waiting time in days between first and second contract, when the second contract is open-ended and the two contracts do not overlap			
CAI - Apprenticeships and access-to-work contracts	137	5	3449
CTD - Fixed term contracts	132	20	23194
CTI - Open-ended contracts	64	1	41337
ELAV - Internships	143	5	1065
LDOM Domestic workers	138	26	1013
LINT - Jobs on call	158	2	785
LPAR - Parasubordinate work contracts	126	4	3633
SOM - Temporary agency work contracts	90	3	5175
n.a.	117	4	336

The indicator therefore weights the waiting time by the number of workers concerned by the transition into a permanent job over the total number of workers in transition. Table 5 represent the Inefficiency Indicator I. I., pointing clear at the fixed term contract as the worst initial contract before entering a permanent position.

Table 5. Inefficiency indicator of transition towards the open-ended job.

Initial contract	Weighted median waiting time
CAI - Apprenticeships and access-to-work contracts	5.91
CTD - Fixed term contracts	38.28
CTI - Open-ended contracts	33.07
ELAV - Internships	1.90
LDOM Domestic workers	1.75
LINT - Jobs on call	1.55
LPAR - Parasubordinate work contracts	5.72
SOM - Temporary agency work contracts	5.82
n.a.	0.49

4. Methodology and quantitative analysis

In the following paragraphs, we exploit the richness of the observational data and perform two types of analysis: 1) a multinomial cross-section of the first contract registered for each worker in the sample (started in 2008) and 2) the analysis of the sequence of contracts according to the type of contract and economic branch of activity. We created two different databases according to the scope of the analysis.

In the first, each person is linked to the string of all the contracts entered in the period 2008 – 2012. In the second, the first database is transformed and a chronological order for the contracts is built (by setting an order for the contracts on the basis of the starting and ending date, if present, or forced on December 31, 2012).

4.1. Multinomial analysis

We ran a multinomial logit regression on a given type of contractual agreement to find out which individual or context variables do have an effect on the probability of observing the chosen benchmark category; in particular, we focus on the first type of contract started in 2008 and analyze the features of the workers and job type to assess how much internal and external factors affect the likelihood to be involved in a given contractual agreement.

Secondly, we ran a multinomial analysis for the second type of contract observed for every individual with at least two contracts, given the initial category of contract. We could therefore track the likelihood of ending up with a given type contract, given the previous status. In this second step, we ruled out those type of contracts that are not deemed to be proper "dependent labor" contracts, that is domestic labor, jobs on call and traineeships.

The multinomial analysis allows for computing the "success probability" of an event with respect to a base event category, using as explaining factors the people's features, the location of the contract, the economic branch, and so on. This methodological approach is used in the literature seen above, when trying to assess the stepping stone hypothesis, toward a fixed term contract type. It fits those situations where the variable one wants to explain in terms of success/not success is of categorical type, and the related fitted coefficients for the explanatory variables (relative risks ratios) describe the probability that an event belongs to a given category with respect to the base event/category, that can be arbitrarily chosen, when a change in the explanatory variable is observed. We created dummies for the economic sectors and for the Bologna province. The following equation:

$$Contracttype_i = \beta_0 + \beta_1 Age + \beta_2 Sex + \beta_3 Citizenship + \beta_4 Bologna + \beta_5 Education +$$
$$\beta_6 TradeTourism + \beta_7 Industry + \beta_8 Agricolture + \beta_9 Construction + \beta_{10} Services$$

$where\ i = 0,1,\dots,7$ are the eight different types of contractual agreements.

is estimated through the maximum likelihood method (Greene, 2011; Verbeek, 2012). As already mentioned, we removed overlapping contractual agreements, since we only take into consideration the first contract observed. We have the contract type information for 563,889 individuals, that is for the 99.5% of the workers. Age is the age at the beginning of the contract; Sex is a dummy equal to 1 if the worker is female; Citizenship is a dummy equal to 1 if the worker is not an Italian citizen. The other variables represent the province dummies for Bologna and the macroeconomic sectors where the job is taken.

Table 4. Multinomial logit. Determinants of contractual types, first contract (2008)

		Number of			561494
		LR chi2(84)			322545.82
		Prob > chi2			0.0000
Log-likelihood	-684585.68	Pseudo R2			0.1907
Base outcome: fixed-					
		Relative-risk ratio	Std. Error	z	P>|z|
Open-ended					
	Age	1.02	0.0003	40.36	0.0000
	Female	0.7	0.0051	-48.95	0.0000
	Foreign	0.98	0.0078	-1.58	0.1140
	University degree	1.37	0.0229	19.28	0.0000
	High School degree	1.27	0.0123	24.89	0.0000
	Bologna	1.37	0.0110	39.73	0.0000
	Education	0.85	0.0199	-6.92	0.0000
	Trade & Tourism	1.01	0.0194	0.57	0.5710
	Industry	2.31	0.0440	44.11	0.0000
	Services	2.36	0.0441	46.32	0.0000
	Agriculture	0.06	0.0021	-85.61	0.0000
	Constructions	1.84	0.0384	29.33	0.0000
	constant	0.34	0.0074	-49.44	0.0000
Apprenticeships					
	Age	0.75	0.001	-166.23	0.0000
	Female	1.00	0.015	0.07	0.9460
	Foreign	0.72	0.012	-19.33	0.0000
	University degree	1.55	0.077	8.96	0.0000
	High School degree	1.25	0.026	10.91	0.0000
	Bologna	1.15	0.020	8.48	0.0000
	Education	0.09	0.013	-17.45	0.0000
	Trade & Tourism	1.28	0.050	6.5	0.0000
	Industry	2.01	0.080	17.78	0.0000
	Services	1.26	0.050	5.91	0.0000
	Agriculture	0.03	0.003	-37.91	0.0000
	Constructions	3.16	0.133	27.33	0.0000
	constant	1.44	1.440	95.71	0.0000
Parasubordinates					
	Age	1.020	0.000	50.97	0.0000
	Female	0.630	0.007	-38.7	0.0000
	Foreign	0.270	0.005	-68.31	0.0000
	University degree	1.130	0.026	5.56	0.0000
	High School degree	0.760	0.013	-15.98	0.0000
	Bologna	1.690	0.021	43.24	0.0000
	Education	3.320	0.117	34.23	0.0000
	Trade & Tourism	0.870	0.030	-4.03	0.0000
	Industry	1.020	0.036	0.68	0.4940
	Services	3.310	0.102	34.92	0.0000
	Agriculture	0.040	0.003	-44.88	0.0000
	Constructions	0.770	0.031	-6.46	0.0000
	constant	0.060	0.003	-70.62	0.0000
Traineeships					
	Age	0.790	0.002	-94.08	0.0000
	Female	1.190	0.028	7.81	0.0000
	Foreign	0.350	0.012	-29.46	0.0000
	University degree	3.400	0.154	27.02	0.0000
	High School degree	1.340	0.040	10.07	0.0000
	Bologna	1.220	0.032	7.68	0.0000
	Education	1.020	0.084	0.26	0.7980
	Trade & Tourism	0.820	0.052	-3.13	0.0020
	Industry	1.730	0.110	8.67	0.0000
	Services	2.180	0.134	12.72	0.0000
	Agriculture	0.070	0.009	-21.1	0.0000

	Constructions	0.620	0.055	-5.33	0.0000
	constant	1.310	1.046	32.53	0.0000
Domestic Labor					
	Age	1.05	0.001	63.55	0.0000
	Female	4.82	0.114	66.37	0.0000
	Foreign	2.78	0.789	117.66	0.0000
	University degree	0.72	0.046	-5.11	0.0000
	High School degree	0.72	0.033	-7.04	0.0000
	Bologna	1.17	0.026	7.57	0.0000
	Education	0.15	0.056	-5.09	0.0000
	Trade & Tourism	0.34	0.043	-8.58	0.0000
	Industry	0.80	0.101	-1.76	0.0790
	Services	2.95	3.027	33.08	0.0000
	Agriculture	0.11	0.018	-13.48	0.0000
	Constructions	1.12	0.163	0.8	0.4240
	constant	0.00	0.000	-87.89	0.0000
Jobs on call					
	Age	0.99	0.001	-9.1	0.0000
	Female	0.96	0.021	-2.12	0.0340
	Foreign	0.53	0.015	-22.24	0.0000
	University degree	0.47	0.036	-9.88	0.0000
	High School degree	0.69	0.022	-11.5	0.0000
	Bologna	0.62	0.019	-15.51	0.0000
	Education	0.27	0.028	-12.69	0.0000
	Trade & Tourism	2.94	0.170	18.68	0.0000
	Industry	0.28	0.021	-16.88	0.0000
	Services	1.37	0.082	5.38	0.0000
	Agriculture	0.01	0.002	-15.39	0.0000
	Constructions	0.14	0.017	-15.76	0.0000
	constant	0.06	0.004	-41.59	0.0000
Temporary agency					
	Age	0.96	0.0006	-63.16	0.0000
	Female	0.86	0.0108	-11.83	0.0000
	Foreign	0.87	0.0123	-9.86	0.0000
	University degree	1.00	0.0410	10.26	0.0000
	High School degree	1.60	0.0219	19.65	0.0000
	Bologna	1.36	0.0229	38.81	0.0000
	Education	0.03	0.0043	-27.03	0.0000
	Trade & Tourism	0.80	0.0267	-6.65	0.0000
	Industry	3.84	0.1223	42.41	0.0000
	Services	0.90	0.0297	-3.20	0.0010
	Agriculture	0.05	0.0038	-40.74	0.0000
	Constructions	0.38	0.0176	-20.91	0.0000
	constant	0.44	0.0164	-21.92	0.0000

When examining the relative risks ratios, the interpretation is the following: each reported value measures the effect of the given variable of the probability of getting a specific contractual type with respect to the base outcome category, in our case the fixed term contracts. As expected, age at the beginning of the contract has a positive impact on all types of contract but traineeships, apprenticeships, jobs on call and somehow temporary agency workers. Being female does not improve the "risk" of being hired into an open-ended contract with respect to a fixed term contract, but females are especially unlikely to get a parasubordinate job, with respect to all the other job categories; instead, being female represents a plus when domestic labor is taken into account, and with a much stronger risk ratio (4.82) than any other variable and category. The gender effect is particularly reinforced by being a foreign worker, as being foreign for domestic labor is the only situation where the relative risk ratio is pretty larger than 1 and significantly different from zero. In all other cases, being foreign sounds

more as a disadvantage. This evidence is explained by the widespread phenomenon of foreign, mid-aged women coming from abroad to work as caretakers. Women have a marginal advantage respect to men only in two entry-level categories of contracts, traineeships and apprenticeships.

Having an university-level degree has a positive impact over all categories with respect to fixed term contracts, but on domestic labor, jobs on call and temporary agency workers. The category that benefits more from a university degree (with an effect almost triple than the other types) is traineeships, indicating as this is likely to be the preferred port of entry into the labor markets for the youngsters after completing a cycle of superior studies, as also confirmed by the negative impact of age. The fact of working in Bologna, capital town of the region, affects positively the risk in all categories but in jobs on call, for which instead a specific sector specific pattern emerges in Trade & Tourism. Jobs on call are typically exploited during the summer season on the coastal areas (Rimini, Riccione, etc..) while those working in the same sector in Bologna are not subjected to such a strong seasonality effect and are likely taken in with other contractual agreements. Open-ended contracts have a positive risk of being adopted over fixed term contracts in the services and industry sectors: the risk over a fixed term is more than double.

The typical agency worker has more chances in the industrial sectors than in any other sector (3.84); traineeships are more frequent in services (for high skilled, managerial and professional positions). Teachers and instructors, isolated from the other services to proxy for the role of the public administration (as teachers are basically all public employees) have a positive risk of being hired as parasubordinate workers with respect to fixed term, but the risk is otherwise negative for the other contractual forms, and while other contractual forms are simply irrelevant for teachers (who do not enter the domestic labor market, for instance, nor do apprenticeships) the negative effect is relevant with when assessing the open-ended contracts too. This can be interpreted in the light of the progressive de-stabilization of the teacher contractual type, once considered a sort of safe haven against unemployment – as all teachers were basically taken in with fixed term contracts. This is a meaningful episode that confirms the increase perception of uncertainty detected by the ESS data, as baseline, stable type of jobs, simply do not exist anymore in that sector, or decrease in importance through time. When considering the first contract, 51% of workers in the education sector were hired through a fixed term contract, 24% as parasubordinate workers and 21% with open-ended contracts. Teachers represent over 60% of workers hired in the education sector, and half of them are hired through fixed term contracts.

A second specification of the model concerns the second contract observed in the data, provided it does not overlap with the previous one. We evaluate the likelihood of observing a given type of contract in the agreement following the first one, given the initial contractual type. This provides us with a range of probabilities of transition from a contractual form (all types) to a different job, or to the same as the previous one, as a partial answer to the question if any given contractual agreement is likely to lead to a permanent job position, or act efficiently as a stepping-stone or rather a dead-end. The analysis should also be completed with an analysis of those individuals who do not get a contract at all after the first one, given similar characteristics of those who instead get one. This further possible investigation will be discussed at the end of this study.

Unfortunately, at the time being we do not have the information on the employment/not in employment status for those individuals who conclude a contract and disappear, since workers are only observed when entering and exiting a contract. Therefore we can only assume they have been looking

for a job until they find one, apart from the subjects that appear once in our time span, and then disappear (as for the cases of people retiring).

As mentioned before, under this second empirical investigation, we only focus on open-ended contracts, fixed term contracts, parasubordinate contracts (as those are basically formally independent workers, but often engaged in long term collaborations)[5], apprenticeships (as the typical port of entry into the dependent labor world), and temporary agency workers (as one of the most investigated case in the literature over the stepping stone hypothesis). The results of this second specification, limited to the relative risks for open-ended contracts are reported in Table 5.

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[5]We partially followed the choice adopted in the Rapporto Ervet on the Labor Market (2015), where the aggregation of the "proper" dependent labor concerned open-ended contracts, fixed term contracts, apprenticeships, and temporary agency workers. We opted for retaining in this study the parasubordinate workers since the weight of parasubordinate workers among the first contractual agreement observed is over 7%, and remains stable in the second contractual agreements observed, larger than the slightly more than 6% of temporary agency workers; even from the taxation point of view, they are assimilated to dependent workers in Italy since 2001, with the same personal income tax and employees' social security contributions.

Table 5. Multinomial logit. Determinants of contractual types given the first contractual type, open-ended contracts as second contract.

A. Full database		Number of observations			289974	B. Conditioning on apprenticeships		Number of observations			17006
		LR chi(48))			124532			LR chi(48))			4338.04
		Prob > chi2			0.000			Prob > chi2			0.0000
Log likelihood = -302954.54		Pseudo R2			0.1705	Log likelihood = -20913.403		Pseudo R2			0.094
Base outcome: fixed-term contracts						Base outcome: fixed-term contracts					
		Relative-risk ratio	Std. Error	z	P>|z|			Relative-risk ratio	Std. Error	z	P>|z|
Open ended contracts						Open ended contracts					
	Age	1.14	0.03	48.49	0.0000		Age	1.27	0.025	12.15	0.000
	Age^2	0.99	0.00	-47.83	0.0000		Age^2	0.996	0	-10.19	0.000
	Female	0.69	0.01	-36.3	0.0000		Female	0.83	0.041	-3.6	0.000
	Foreign	0.91	0.01	-7.61	0.0000		Foreign	0.89	0.051	-2	0.046
	University degree	1.18	0.02	8.26	0.0000		University degree	1.01	0.153	0.07	0.947
	Bologna	1.30	0.14	24.16	0.0000		Bologna	1.16	0.065	2.7	0.007
	Agriculture	0.08	0.04	-48.49	0.0000		Agriculture	0.08	0.023	-8.58	0.000
	Trade & Tourism	1.50	0.01	11.63	0.0000		Trade & Tourism	1.01	0.185	0.09	0.924
	Constructions	2.37	0.09	23.23	0.0000		Constructions	2.04	0.39	3.73	0.000
	Industry	2.92	0.10	30.73	0.0000		Industry	2.149	0.39	4.17	0.000
	Education	1.09	0.04	2.46	0.0140		Education	0.379	0.14	-2.56	0.011
	Services	3.28	0.11	34.58	0.0000		Services	1.77	0.32	3.15	0.002
	constant	0.02	0.00	-58.22	0.0000		constant	0.112	0.003	-13.26	0.000
Predicted CTI	Mean	**27.9%**				Predicted CTI	Mean	**20.4%**			

C. Conditioning on open ended contracts		Number of observations			62874	D. Conditioning on parasubordinates		Number of observations			25117
		LR chi(48))			9146.52			LR chi(48))			5916.59
		Prob > chi2			0.000			Prob > chi2			0
Log likelihood = -53096.874		Pseudo R2			0.0793	Log likelihood = -22743.285		Pseudo R2			0.1151
Base outcome: fixed-term contracts						Base outcome: fixed-term contracts					
		Relative-risk ratio	Std. Error	z	P>|z|			Relative-risk ratio	Std. Error	z	P>|z|
Open ended contracts						Open ended contracts					
	Age	1.05	0.00	8.11	0.000		Age	1.11	0.016	7.47	0.000
	Age^2	0.99	0.00	-7.47	0.000		Age^2	0.99	0.000	-6.94	0.000
	Female	1	0.02	0.15	0.878		Female	0.74	0.035	-6.13	0.000

		Relative-risk ratio	Std. Error	z	P>|z|			Relative-risk ratio	Std. Error	z	P>|z|
	Foreign	0.75	0.02	-12.74	0.000		Foreign	0.88	0.065	-1.63	0.103
	University degree	1.44	0.07	7.11	0.000		University degree	0.93	0.070	-0.85	0.394
	Bologna	1.1	0.02	4.58	0.000		Bologna	1.11	0.055	2.24	0.025
	Agriculture	0.172	0.02	-18.09	0.000		Agriculture	0.15	0.044	-6.61	0.000
	Trade & Tourism	1.03	0.08	0.45	0.656		Trade & Tourism	0.85	0.150	-0.87	0.386
	Constructions	0.99	0.08	-0.06	0.953		Constructions	0.96	0.190	-0.2	0.844
	Industry	1.86	0.14	8.16	0.000		Industry	1.38	0.250	1.81	0.070
	Education	3.92	0.39	13.56	0.000		Education	0.86	0.160	-0.74	0.457
	Services	1.95	0.14	8.87	0.000		Services	1.29	0.220	1.5	0.133
	constant	0.62	0.09	-3.13	0.002		constant	0.115	0.036	-6.83	0.000
Predicted CTI	Mean	**66.9%**				Predicted CTI	Mean	**14.5%**			

E. Conditioning on fixed term contracts					147367	**F. Conditioning on temporary workers**		Number of observations		26,234	
					36776.27			LR chi(48))			5279.66
					0.0000			Prob > chi2			0
Log likelihood = -103270.97					0.1511	Log likelihood = -30467.509		Pseudo R2			0.0797
Base outcome: fixed-term contracts						Base outcome: fixed-term contracts					
		Relative-risk ratio	Std. Error	z	P>|z|			Relative-risk ratio	Std. Error	z	P>|z|
Open ended contracts						Open ended contracts					
	Age	1.13	0.005	26.28	0.000		Age	1.04	0.014	2.98	0.0030
	Age^2	0.99	0	-28.05	0.000		Age^2	0.99	0	-3.1	0.0020
	Female	0.81	0.013	-12.78	0.000		Female	0.83	0.323	-4.56	0.0000
	Foreign	0.91	0.016	-4.83	0.000		Foreign	0.92	0.042	-1.66	0.0980
	University degree	1.05	0.036	1.59	0.111		University degree	0.95	0.076	-0.53	0.5930
	Bologna	1.31	0.023	15.22	0.000		Bologna	0.95	0.039	-1.1	0.2700
	Agriculture	0.1	0.008	-29.19	0.000		Agriculture	0.061	0.017	-9.71	0.0000
	Trade & Tourism	1.58	0.087	8.23	0.000		Trade & Tourism	0.9	0.125	-0.73	0.4640
	Constructions	2.78	0.164	17.27	0.000		Constructions	1.37	0.216	1.99	0.0460
	Industry	2.38	0.133	15.55	0.000		Industry	1.5	0.203	2.99	0.0030
	Education	1.01	0.616	0.19	0.848		Education	0.173	0.068	-4.45	0.0000
	Services	3.24	0.177	21.49	0.000		Services	1.34	0.184	2.19	0.0280
	constant	0.01	0.001	-39.84	0.000		constant	0.32	0.087	-4.19	0.0000
Predicted CTI	Mean	**15.9%**				Predicted CTI	Mean	**19.8%**			

Table 5 reports six panels. Panel A contains estimates for all the population of individuals with a second a contract (even if only the effect for those with an open-ended as a second contract is shown here). The other panels condition on a selected type for the first contract. Therefore, the first panel can be considered as a baseline for the other estimations.

As before, estimated coefficients are relative-risk ratios, and the threshold for interpretation, although quite complicate (Greene, 2011), is represented by the value "1", as all coefficients larger than 1 mean that the risk of being observed lies with the current outcome with respect to the base outcome, and vice-versa. Age always represent a plus when evaluating the probability of observing an open-ended contract after a first contract of any kind, but the effect is stronger when the first contract observed was an apprenticeship contract. Age squared increased the performance of the specification, but the value always ranges around the value of 1, meaning probably that experience in itself is not a key determinant in the type of the second contract. Being female is never an asset, as the risk of an open-ended contract always decreases if the worker is a woman (with respect to the base outcome, fixed term). Only in the case the first contract was an open-ended contract, being female has a neutral impact. In all other cases but this last, even being a foreign worker gives more chance to get an open-ended contract than being a woman. Having a university degree always leads to higher probability of getting a open-ended contract, but for the case in which the previous contract was a temporary agency contract. The probability is especially high (1.44) in the case also the previous contract was an open-ended contract. This same pattern is reflected in jobs undertaken in the capital, Bologna. Construction, Trade and Tourism, and Industry are those sectors where the risk of ending up with an open-ended contract is higher, no matter the first contract. For the Education sector, the risk is much stronger in case the previous contract was another open-ended contract.

We are particularly interested in the predicted value for open-ended contracts stemming from the estimation. In panel A, the predicted value is 27.9%. This corresponds to the real percentage of individuals with an open-ended as second contract in the population, or in other words, the model exhibits enough terms to fully explain the effective percentage of individuals with an open-ended as second contract; the model is said to be fully saturated.

When we move to the other panels, we find different predictions. In particular, we have 66.9% probability of observing an open-ended contract if the previous was open-ended as well. No prediction is higher, therefore we can conclude that no situation is better than this to expect a second open-ended contract. What about the other previous contractual forms? If we were looking for some stepping stone effect, we could compare the same values when observing other contractual forms. And if we were asked about fixed term contracts as a stepping stone to open-ended contract, the answer would be a clear "no". Actually, only parasubordinates workers perform (marginally) worse than fixed term contracts in increasing the probability of getting an open-ended contract (14.5% versus 15.9%). The best predictor is the apprenticeship contract (20.4%) followed by the temporary agency contract (19.8%). All in all, no stepping stone is observable from this preliminary analysis, as none of the categories observed performs better than the baseline outcome in panel A, but the very open-ended contract itself, hinting for the presence of a strong hysteresis (trapping effect), rather than a stepping stone effect.

4.2. Sequential analysis

Sequences are entities built by a limited number of elements that are ordered in a specific way. A typical example is human DNA, where the elements adenine, cytosine, guanine, and thymine (the organic bases) are ordered into a sequence. Other sequences are songs that are built by tones that appear in a specific order, or careers of employers that are built by specific job positions and ordered along time. This sequential technique[6] allows for tabulating those sequences that appear more frequently in the data. In this analysis, we also retained the overlapping contracts, but contracts were ordered chronologically – logically anyway. The first contract is always the first one observed in 2008 and the time span is always 2008 -2012. We present here the 24 most frequent types of sequences of contractual agreements. We find that the workers with only one open-ended contract are the most frequent (18.53%), followed by those workers with only one fixed – term contract (13.91%); the third most frequent sequence is the one with fixed-term contracts (4.88%), followed by those workers with two open-ended contracts (4.79%). The fifth most frequent sequence is the one with five fixed term contracts. The results for the first 24 sequences are reported in Table 6.

Table 6. Most common sequences of contractual agreements

Frequence	Sequences of contractual agreements (top 24, 71.35% of workers)				
18.53	CTI				
13.91	CTD				
4.88	CTD	CTD			
4.79	CTI	CTI			
4.48	CTD	CTD	CTD	CTD	CTD
2.93	LPAR				
2.79	CTD	CTD	CTD		
2.72	CTD	CTI			
2.12	CTD	CTD	CTD	CTD	
1.79	CAI				
1.55	SOM				
1.36	LDOM				
1.31	CTI	CTI	CTI		
1.23	CTD	CTD	CTI		
1.01	CTI	CTD			
1.01	LPAR	LPAR			
0.91	CTD	CTD	CTD	CTI	
0.68	LINT				
0.65	LDOM	LDOM			
0.64	SOM	CTI			
0.54	LPAR	LPAR			
0.52	CTD	CTI	CTI		

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[6] The routine command is an extension package for Stata developed by Ulrich Kohler, Christian Brzinsky-Fay and Magdalena Luniak, http://www.stata.com/statalist/archive/2006-08/msg00186.html

0.5	SOM	SOM			
0.5	CTD	LINT			

A second sequencing allowed for mapping the most common sequences by sector of economic activity. Table 7 reports as those individuals with only one contract are concentrated in the Services (15.25%) followed by Industry (9.75%) and Trade and Tourism (8.65%).

Table 7. Most common sequences of economic sectors

Frequence	Top 17 (about 70% of workers)				
15.25	Services				
9.75	Industry				
8.65	Trade & Tourism				
6.72	Services	Services			
4.13	Construction				
3.58	Trade & Tourism	Trade & Tourism			
3.58	Industry	Industry			
3.52	Services	Services	Services		
2.54	Agricolture				
2.01	Services	Services	Services	Services	
2	Trade & Tourism	Trade & Tourism	Trade & Tourism		
1.88	Agricolture	Agricolture	Agricolture	Agricolture	
1.69	Education				
1.65	Industry	Industry	Industry		
1.36	Services	Services	Services	Services	Services
1.3	Trade & Tourism	Trade & Tourism	Trade & Tourism	Trade & Tourism	
1.28	Construction	Construction			

The most fragmented sectors in terms of number of contracts per person seems to be the Services sector, the first to appear in the top 17 with three, four and five contracts. Also, a noticeable feature of this table is that changing sector of economic activity simply is not popular. People tend to remain in the economic branch, while perhaps changing the type of contractual agreement.

5. Conclusions and future research

In this study we took inspiration from the ESS data for Emilia Romagna and investigated into the nature of the working life of its inhabitants in the 2008-2012 time span. In particular, we considered those ESS data, in 2002 and 2012, which showed a growing uncertainty in people's life with respect to job conditions, perceived as weakening and worsening through time. We therefore ran some analyses of the dependent labor data coming from the SILER database, the proprietary database collecting the

movements of dependent labor elaborated from the administrative data called C.O. (Comunicazioni Obbligatorie). The statistics present a universe where uncertainty is growing and the weight of temporary, fixed term and atypical jobs is increasing, although the majority of workers do still have permanent job positions. We investigated about contract durations and length of non-employment between one contract and the other. These data can be used to find some of the debated "stepping-stone" effect of temporary jobs towards more stable working agreements. We started by measuring the relative efficiency of transition from various contractual agreements into open-ended jobs, to find out that the widely adopted "fixed term" agreement is the less conducive to permanent job positions. So, a hint for some kind of "entrapping" already emerged from the statistical analysis.

We subsequently performed a multinomial logit analysis of the first and second contract observed for the workers of our sample, to assess the relative effect that each individual and external characteristics have on the likelihood of observing a given contractual type, both in absolute terms (observing just the first contract) and controlling for the first contractual agreement observed. We foundn that women are always in disadvantage with respect to men, as well as foreigners, but in the domestic labor agreements. We found also that rather than being a stepping stone, most contractual forms, and especially the fixed term contract, act as traps. This effect is found in the related literature,(as well as its contrary) and to investigate its robustness to model specifications, a further research should turn to different methodologies (as the propensity score analysis and/or the dynamic panel data analysis).

Furthermore, the data allowed us to reconstruct the more common sequences of contractual agreements and the most frequent sector of economy activity alternations. We found that, while transitions into different contractual agreements is common, (apart from the trapping effect embedded into the fixed term contracts) workers do not change sectors of economic activity.

More research on the stepping stone hypothesis will be based also on the observation of the employer, since stabilization of workers often passes through different contracts granted to the same workers, in the case temporary jobs were used a screening devices.

Major institutional changes can also be evaluated in terms of impact on the labor market, as the Jobs Act in Italy in 2015 (although some recent evidence has already been discussed).

Another stream of research will depart from the above most popular theme to concentrate of the impact of temporary jobs on firms productivity. This field is relatively unexplored yet and a number of research questions can be addressed, that could for instance provide a further support from the broad interpretation of the change in the European social context offered by the ESS data.

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Appendix

Reclassification of labor contractual agreements.

Codes	Description
CTI – Open-ended contracts	Open-ended contracts Open-ended dependent labor in the public administration Open-ended job sharing Open-ended domestic labor Open-ended labor in the Arts&Show sector Maritime open-ended contracts
CAI – Apprenticeships contracts	Apprenticeship leading to a profession Apprenticeship to fulfill the duty-responsibility of education/training Apprenticeship to obtain a diploma or higher education programs Apprenticeship as per art.16. Law 196/97. Access to work contracts Contracts for line-up type a1 Porting
CTD – Fixed term contracts	Fixed term contracts Fixed term dependent labor in the public administration Fixed term job sharing Fixed term labor in the Arts&Show sector Maritime fixed term contracts Fixed term contracts for substitution Fixed term contracts in Agricolture
SOM – Temporary agency work	Open-ended temporary agency work Fixed term temporary agency work
LINT – Jobs on call	Open-ended jobs on call Fixed term jobs on call
LDOM – Domestic labor	Open-ended domestic labor Fixed term domestic labor
LPAR – Parasubordinate work	Project contracts/ continued and coordinated collaboration Casual work Open-ended association in participation Fixed term association in participation Autonomous work in the Arts&Show sector Open-ended agency contracts Fixed term agency contracts
ELAV – Traineeships	Traineeships, internships Community service