Temporary Work in Tuscany:
A Multinomial Nested Logit Analysis

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Temporary Work in Tuscany: a Multinomial Nested Logit Analysis

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Abstract

In this paper, distinguishing between the choice of the worker and the choice of the firm, we provide a probabilistic evaluation of the transition from temporary to permanent employment in a regional context. Estimating a *Multinomial Nested Logit Model*, we found that the transition to a permanent job is far from certain, especially for women and older workers.

1 Introduction

In the last twenty years, reforms aimed to reach a higher level of flexibility lead to considerable changes in the national labour market. The relatively high unemployment rates characterizing the end of the 80's, called for a modernization of labour market institutions. Looking for a higher degree of competitiveness, new contractual categories have been introduced to allow firms a more flexible use of the labour force.

An evaluation of such process may conduct to two different conclusions. On one side, we can think at flexible work as a device to reduce training costs and to overwhelm the averse selection problems that firms face in selecting new employees. According to this view, temporary employment is a sort of necessary bridge toward permanent employment.

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On the other side, flexible work may just be a device to reduce labour cost and generate precarious employment.

In this context, an empirical evaluation of the transition from a temporary job to a permanent one may be very relevant. Our analysis attempts to provide a contribution to the debate on flexible work taking the moves from an IRPET (Istituto Regionale per la Programmazione Economica della Toscana) survey carried out at the beginning of 2004. This survey collects a sample of 1874 Tuscan workers that in 2000 held a flexible contract[1].

The IRPET survey contains many information: for each interviewed worker, it is possible to know, among other, the gender, the age, the education, the past work experience, the business sector, and the geographical area where he is employed[2]. The interview set up allows also to know the motivations that led the worker to accept a particular contractual category and to determine his degree of job satisfaction.

Using this database we aim to provide a probabilistic evaluation of the transition from a temporary job to a (possible) permanent employment. However, given the specific characteristic of the survey, the analysis that we are going to develop is not suitable for a general evaluation of the effect of flexible contract. In fact, the probabilities that we are going to estimate are conditioned to a particular initial employment status (the flexible contract) of a worker.

Labour economics literature encloses several contributions dealing on the transition from temporary to permanent employment. In particular, the Spanish case received a lot of attention in recent years[3]. The econometric framework used in those analyses is based on the *Multinomial Logit Model* (MLM). This statistical model is used whenever there is a problem of multiple choice among discrete variables. In our analysis, we use a refinement of the MLM that is the *Multinomial Nested Logit Model* (MNLM), which - as the former - involves that the worker current employment status might be explained through a set of covariants describing the same worker. Therefore, including in this set the contractual category held at the beginning of the survey period, it becomes possible to establish the effect of a particular previous employment experience on the current employment status.

In our analysis, we consider the following employment outcomes: (*i*) permanent em-

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[1] By "flexible contract" we mean a subordinate employment contract chosen among one the following categories: fixed-term job, apprenticeship & training, and part-time.

[2] The survey takes into considerations five different geographical area: Florence, Borgo San Lorenzo, Santa Croce, Rosignano, and Follonica.

[3] For the Spanish case see Alba-Ramirez (1998), Amuedo-Dorantes (2000), and Guell e Petrongolo (2003). Booth, Francesconi and Frank (2002) deal with the British case while Zijl, Heyma and Van den Berg (2002) deal with the Dutch one.

ployment, (*ii*) flexible contract, (*iii*) apprenticeship & training, (*iv*) self-employment, (*v*) unemployment, (*vi*) out of the labour force. On the other hand, we use the social-economic information on the worker as independent variables.

The above classification may lead to some inconsistencies in a *sic et simpliciter* MNLM application. Dealing with labour market issues, a particular attention has to be devoted to the free willingness of the choices. The MNLM, in fact, is based on the *Random Utility Model* (RUM) which involves that the worker current employment status is chosen through a maximizing process. Therefore, it is likely that some employment outcomes result as the upshot of a worker free choice, while others - once the option for subordinate employment have been chosen - result as an upshot of the firm.

The rest of the paper is organized as follows: in section 2 we describe briefly the current legislation on flexible jobs, in section 3 we describe the data, in section 4 we present the theoretical framework to which we refer, in section 5 we give some notions on the econometric technique we use, in section 6 we present our results, and in section 7 we draw some conclusions.

2   The Institutional Framework

Our analysis takes into consideration four categories of flexible jobs[4]: fixed term contracts, part-time (fixed-term and permanent), apprenticeship, and training contract (contratto di formazione lavoro). The fixed-term contract, originally introduced in 1962, received the last modifications in 2001[5]. A firm is allowed to sign a fixed-term contract for technical, productive, organizational, or substitutive reasons. It can be extended only if the initial term is shorter then 3 years. The extension is allowed only one time and it has to deal with the same job activities. A fixed-term contract turns automatically in a permanent contract whenever the worker is re-hired within 10 days from the expiration if the original term was shorter than 6 months, or within 20 days if the original term was larger than 6 months.

The part-time contracts, originally introduced 1984, received the last modifications in 2004[6]. They can be permanent or fixed-term. A part-time job is usually characterized by a reduced working time, however, a part-time worker has the same rights and the

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[4]The information collected in this section derives mainly from the Welfare Ministry official web site: www.welfare.gov.it

[5]For reference, see L.230/1962 and D.lgs. 368/2001. Note that the former allowed fixed-term employment as an extraordinary case.

[6]Fore reference, see L.79/1983 and circ.gov. 9/2004.

same duties of a full-time subordinate worker[7]. There are 3 types of part-time contracts: horizontal part-time, vertical part-time, and combined part-time. A horizontal part-time job has a working time shorter than a full-time job. In a vertical part-time job the working time is the same as in a full-time job, however, the worker performance is limited to predetermined periods. A combined part-time job joins together the characteristics of horizontal and vertical part-time. Recently (D.lgs 276/2003), legislation on part-time contracts became more flexible allowing for lower constraints in using additional and overtime work.

Apprenticeship is an ancient institution. The latest legislation (L.30/2003) distinguishes three types of apprenticeship[8], each one reserved to workers with different characteristics. In general, apprenticeship is devoted to young workers (the maximum age is 29 years old), it lasts from 2 to 6 year, and it is addressed - from the point of view of the involved worker - to the achievement a particular training or qualification target[9].

The training contracts (contratti di formazione lavoro), originally introduced in 1983, received the latest modifications in 1997[10]. As apprenticeship contracts, training contracts are devoted to young workers (the maximum age is 32 years old), and it allows firms to save on payroll taxes. However, it last only 24 months and it impossible to extend it after the expiration date. There are two types of training contracts, each of them characterized by a different amount of hours committed to training[11]. Hiring a worker with a training contract is possible once the competent authority approved the training program presented by the firm.

3 The Data

We use data from an IRPET survey on flexible workers in Tuscany carried out in 2004. The survey contains detailed information on 1874 individuals that in 2000 held a contract of one of the following forms: fixed term, part-time fixed term, part-time permanent,

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[7]In addition, a part-time worker has to be preferred to new employees if the employer decide to turn the job in a full-time position.

[8]In details: (*i*) "apprendistato per l'espletamento del diritto-dovere di istruzione e formazione" , (*ii*) "apprendistato professionalizzante" , and (*iii*) "apprendistato per l'acquisizione di un diploma o per percorsi di alta formazione" .

[9]Apprenticeship entails also the attendance of a businnes tutor for the worker.

[10]For reference, see L.79/1983 and L.196/1997.

[11]In details, training contracts for intermediete positions (80 hours), and training contracts for superior positions (130 hours).

apprenticeship & training[12]. While individuals where chosen on the base of their employment status in 2000, most of the information refer to 2004.

The information we have used can be classified in the following groups:

(*i*) *Job characteristics in 2004*: labor force participation status (out of the labor force, self employed, subordinate employment), employment status for subordinate employers (permanent job, temporary job, apprenticeship & training, not employed).

(*ii*) *Job characteristics in 2000*: form of the contract held, job sector (agriculture, manufacturing, services, retail, accommodation & food services).

(*iii*) *Personal characteristics*: gender, age, age squared, marital status, years of education and geographical area. We take in consideration five area: Florence (urban district), Borgo San Lorenzo (touristic/industrial district), Santa Croce (industrial district), Follonica (rural touristic), Rosignano (touristic).

(*iv*) *Labor force participation*: reason for being in or out of the labor force, free willingness of fixed term employment.
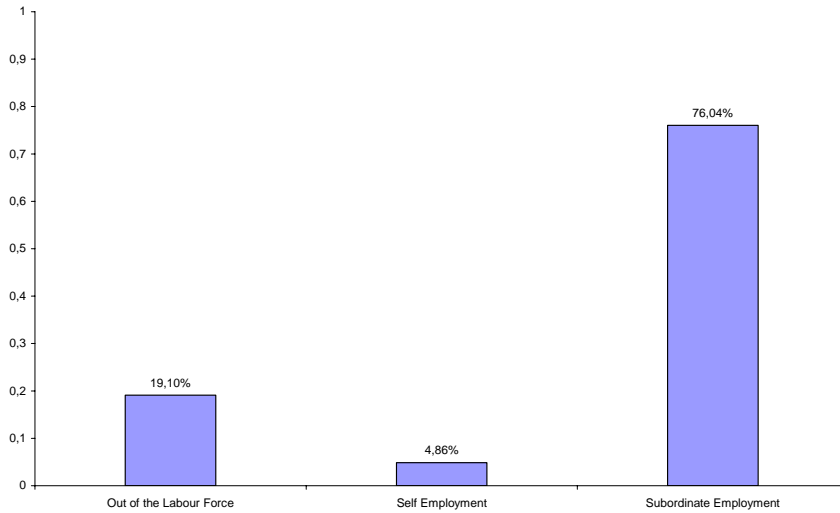

Figure 1: Relative frequencies of participation decisions

In our analysis the data in group (*i*) constitutes the independent variables that we try to explain while group (*ii*) and (*iii*) variables are the covariants. Finally, we use information contained in group (*iv*) to identify the decision process for each worker.

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[12]This category gathers two different kind of contracts that we described before: "apprendistato" (strictly apprenticeship) and "formazione lavoro" (training contracts).

The determination of the occupational status is the aim of our work: some descriptive statistics on this are contained in the following graphics. Figure 1 shows the relative frequency of the three possible labor force participation status in 2004; Figure 2 does the same distinguishing between male and female workers.
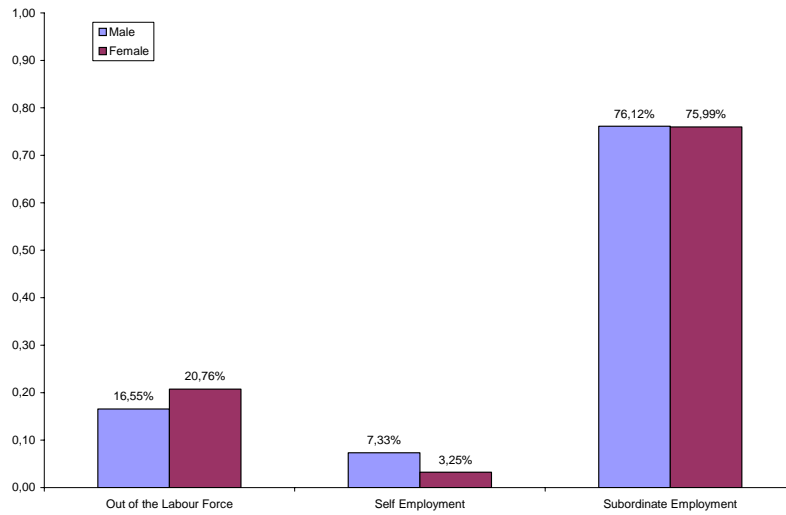

Figure 2: Relative frequencies of participation decisions by gender

Figures 3 and 4 show the relative frequency of the employment status in 2004 for the workers that had chosen to search a subordinate employment.
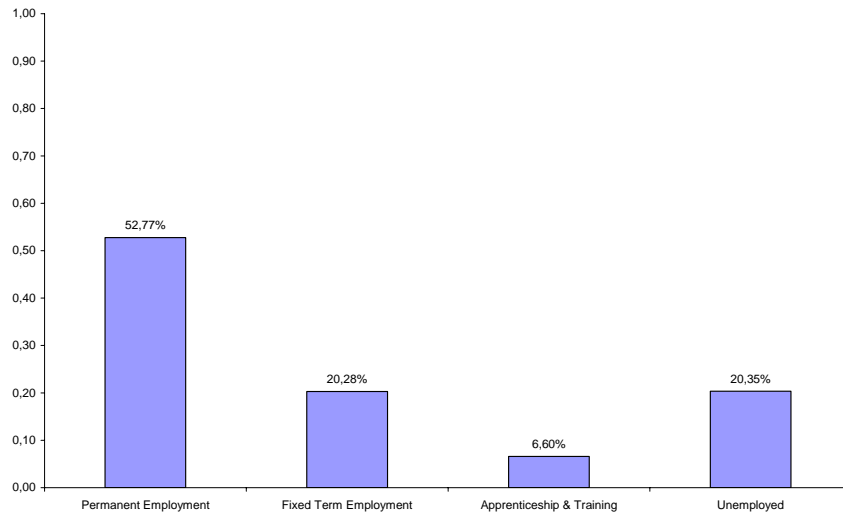
Figure 3: Relative frequencies of employment outcomes

The figures shows that around 76% of the people chosen to remain in subordinate employment and slightly more then half of them were able to stabilize their position. Discriminating between gender, we see that relatively less women where able to stabilize their position and relatively more of them became unemployed.
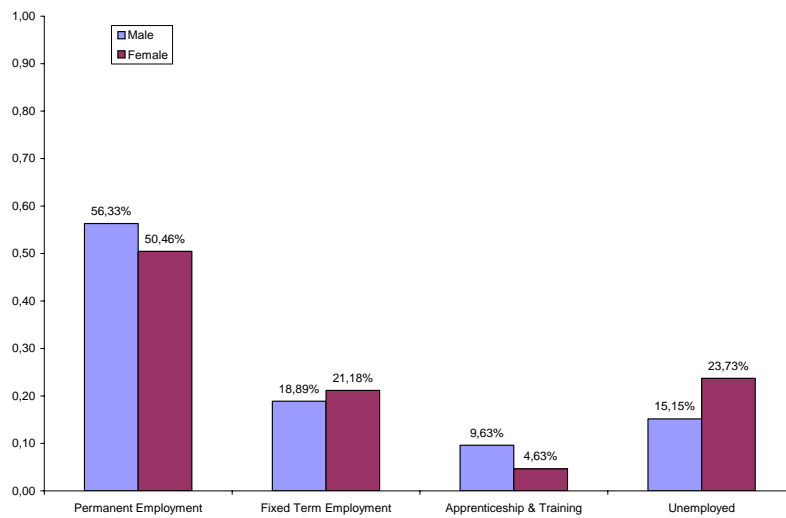

Figure 4: Relative frequencies of employment outcomes by gender

4 Choice Problem and the Decisional Structure

In explaining the employment status of a worker we must be extremely careful in assessing the exact sequence of the decisions and the role that free willingness played in determining them. In principle, for every worker, we can imagine six different final employment status: out of the labor force, self employed, permanent job, temporary job, apprenticeship & training, not employed. However, not all these outcomes are real alternatives nor they come from the decision of a worker: it is then necessary to specify a coherent decisional structure and use it to carry on our analysis. We we will start supposing that each individual maximise his utility choosing one of the six alternatives and we will then add further hypothesis to improve the decisional structure.

4.1 The Choice Problem

Once we have decided which agent is making the employment decision, we can discuss how that decision is made. We will formalize the choice problem adopting the *Random Utility Model* for both workers and firms. According to this model, each agent i maximises his utility choosing the alternative j among the J available. The utility function depends on the characteristics that are relevant for the agent choice[13] and on an erratic component. Therefore,

$$U_{i,j} = \beta_j x_i + \varepsilon_{i,j} \tag{1}$$

where $U_{i,j}$ is the utility for the agent i from choosing the alternative j, x_i is the vector of the characteristics that influence the utility, β_j is the parameters vector determining how those characteristics influence the utility, and $\varepsilon_{i,j}$ is the erratic component.

If we call Y_i the variable identifying the outcome of the choice of agent i ($Y_i = j$ if i choose j) then

$$Y_i = j \text{ if } U_{i,j} > U_{i,v} \ \forall \ v \neq j \tag{2}$$

Such formulation of the choice problem allows to express the decision of agent i in probabilistic terms: the probability p_{ij} that agent i chooses j is given by

$$p_{ij} = \Pr(U_{i,j} > U_{i,v}, \forall \ v \neq j) = \Pr(\beta_j x_i + \varepsilon_{i,j} > \beta_v x_i + \varepsilon_{i,v}, \forall \ v \neq j) \tag{3}$$
$$= \Pr(\varepsilon_{i,j} - \varepsilon_{i,v} > \beta_v x_i - \beta_j x_i, \forall \ v \neq j)$$

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[13]It is important to stress that the worker makes the choice on the base of his own characteristics while the firm chooses according to the worker characteristics.

Under the assumption that $\varepsilon_{i,j}$ is identically and independently distributed with a log Weibull distribution[14] and that the J alternatives are mutually exhaustive and exclusive it is possible to show that (see Maddala, 1983)

$$p_{ij} = \frac{e^{\beta_j x_i}}{\sum\limits_{v=0}^{J} e^{\beta_v x_i}} \tag{4}$$

Equation (4) provides the transition probabilities in a standard MLM. It is important to stress that this equation holds only if the hypothesis on the distribution of the error terms $\varepsilon_{i,j}$ are met. Moreover, the probabilities we have computed exhibit the property of Indipendence from Irrilevant Alternatives (IIA), which implies that the odds of any two alternatives do not depend on the other existing alternetives.

Dealing with the wide set of employment outcomes considered in our analysis, the property of IIA seems far from being verified (and the hypothesis on the error terms $\varepsilon_{i,j}$ seems not to be met). In fact, it is likely that some employment status are more substitutable than others: for example we guess that flexible jobs and permanent jobs are closer substitutes than the unemployment status.

In order to solve these problems, we need to specify a coherent decisional structure and to test whether it is supported by the data.

4.2 The Decisional Structure

The first fact worthing to note is that labour market outcomes are determined by decisions taken by workers and firms. Given this, we believe that a coherent decisional structure should follow the one represented in figure 1.

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[14]The log Weibull distribution (also known as Type I extreme value distribution) has the convenient property that the cumulative density of the difference between any two random variables with this distribution is given by the logistic function.
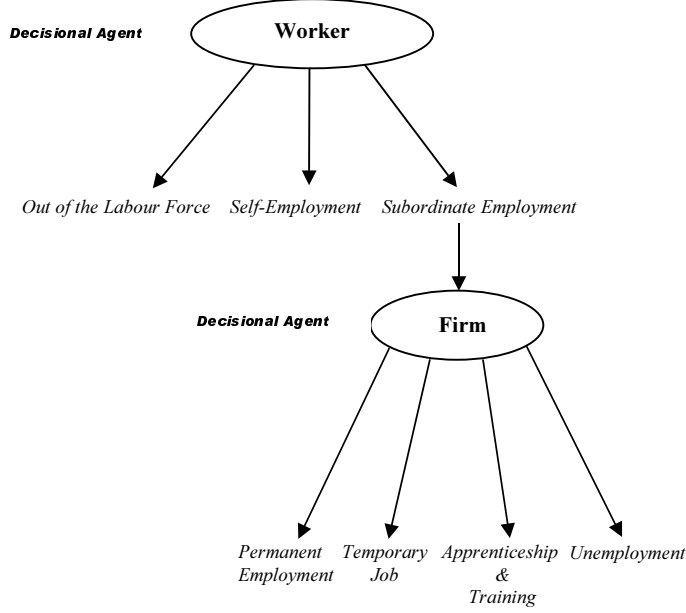
Figure 5: The decisional structure

This structure is made of two steps: first workers decide among (i) leaving the labor force, (ii) being self employed and (iii) looking for a subordinate job. If a worker chooses to look for a subordinate job then the firm will choose whether to offer him (i) a permanent job, (ii) a temporary job, (iii) an apprenticeship & training or (iv) to leave him unemployed. Note that the choices in the two steps are sequential and separated, with the alternatives in the second steps playing no direct role in the first step decision.

Once we have adopted these scheme we have to take into consideration the problem arising from the possible violation of the IIA property. In particular, we believe that, in the first step, the IIA does not hold between the alternatives of being self-employment and looking for a dependent job. In other, word we guess that a worker chooses first whether to stay or not in the labor force and then he decides what kind of employment he desires. In a similar way, we think that, in the second step, the IIA does not hold among the alternatives permanent job, temporary job, and apprenticeship & training. From an economic point of view, this mean that a firm at first chooses whether to hire or not a worker, and then it chooses which kind of contract better suit him[15]. This decisional

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[15]It is possible to test whether the IIA property holds or not. In our case we found that this property usually is not appropiate but there are some cases where the test delivers unreliable results. To avoid this problem, as it will become clear later, we have used directly a nested specification and we have then

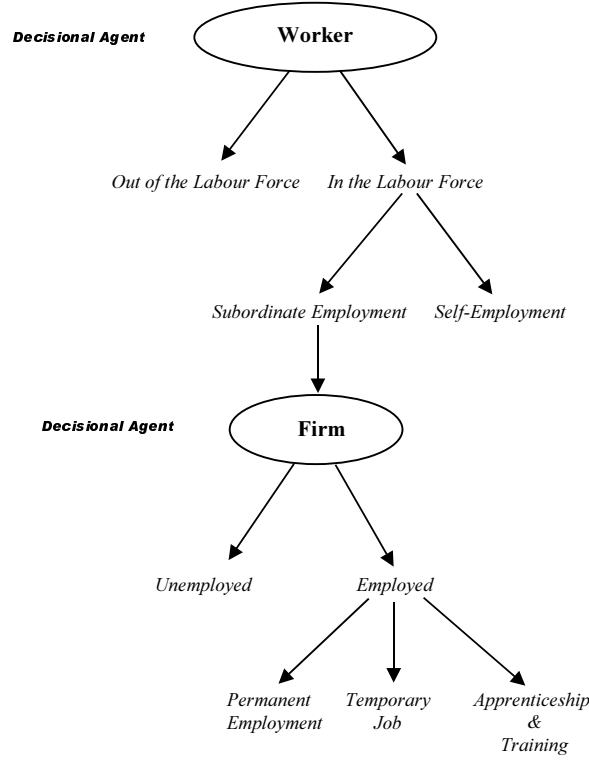structure is represented in figure 6.

Figure 6: The nested decisional structure

This scheme seems to give a reasonable account of reality but neglect the possibility that a worker may voluntarily choose a flexible job; in order to avoid this problem, it is common to assume that a worker always prefer a permanent job over a flexible one. For an example, see Guell and Petrongolo (2003).[16]

5   Econometric Specification

Given the structure in figure 6, we will adopt an econometric technique called *Nested Logit*. Following this technique, we divide the J alternatives (in the first step (*i*) leaving the labour market, (*ii*) being self-employed, and (*iii*) looking for a subordinate job) into

tested if this specification is acceptable.

[16]Our data allow us to distinguish those workers who voluntarily chose a flexible job. The data show that roughly 10,3% of flexible jobs were chosen voluntarily (3,05% of the worker who looked for a dependent employment).

L subgroups: in this case: (a) inside the labour force, and (b) outside the labour force. Starting from equation (4), we can write the individual i probability of choosing the alternative j belonging to the subgroup l as the product of the probability of choosing the group l and the conditional probability of choosing j once l has been selected:

$$p_{i,jl} = p_{i,j|l} * p_{i,l} = \frac{e^{\beta_j x_{i,j|l} + \beta_l x_l}}{\sum_{l=0}^{L} \sum_{v \in J_l} e^{\beta_v x_{i,j|l} + \beta_l x_l}} \tag{5}$$

The conditional probability $p_{i,j|l}$ is

$$p_{i,j|l} = \frac{e^{\beta_j x_{i,j|l}}}{\sum_{v \in J_l} e^{\beta_v x_{i,j|l}}} \tag{6}$$

If we define the *inclusive value* for the branch l as $I_l = \ln \sum_{v \in J_l} e^{\beta_v x_{i,j|l}}$ and using equations (5) and (6) we obtain

$$p_l = \frac{e^{\beta_l x_l + \tau_l I_l}}{\sum_{l=0}^{L} e^{\beta_l x_l + \tau_l I_l}} \tag{7}$$

It is straightforward that the parameter τ_l must equal 1 to reproduce the standard RUM. When τ_l differs from 1, we have the *Nested Logit* and a test on the value of this parameter is helpful in understanding if the proposed specification suit our case.

Using equations (6), (7), and defining $d_{ij} = 1$ if alternative j is chosen by agent i, we can write the following log-likelihood function

$$\ln L = \sum_{i=1}^{n} d_{ij} \left[p_{i,j|l} * p_{i,l} \right] \tag{8}$$

and through its maximisation we obtain the estimates of the β_j coefficients. Such estimates are very important for our analysis: through them it is possible to determine (i) the probabilities that a given agent i chooses an alternative j (or, in other words, the probability that he happens to be in a given employment status), and (ii) which and how individual characteristics enter in the determination of a particular outcome j.

5.1 The Decisional Structure Estimation

Our aim is to provide a probabilistic evaluation of the transition from a flexible contract toward one of the possible employment status. In doing that, we have supposed that the

transition happen in two steps: in the first the worker chooses if and how to stay in the labour force, and in the second the firm chooses if and how to employ him. Moreover, both the two steps have a nested structure. From these considerations, the estimation of the probabilities associated to each possible employment outcome can be obtained through the use of two distinct MNLMs. In the first, workers will maximise their utility choosing among (*i*) leaving the labor force, (*ii*) being self employed, and (*iii*) looking for a subordinate job. In the second, the firms will do the same choosing among offering (*i*) a permanent job, (*ii*) a temporary job, (*iii*) an apprenticeship & training contract or (*iv*) leave him unemployed. In practice, we will perform distinct estimates for each decisional steps, employing in each one the econometric tecnique previously described. It is worth to note that we could have adopted a unique MNLM, in which the choices at the first step and the ones at the second step are part of the same decisional process. However, we think that such alternative does not suit our case, where the two decisions are taken by two different maximising agents. It is our opinion that in this case the use of an unique *Nested Logit* would mean to imply that workers know exactly the firms decision mechanism, an assumption that is hardly verified in practice.

6 An Overview of the Results

After we have organized the data according to the nested decisional structure described above, it is possible to provide an estimation of the β_j vectors. The coefficients of such vectors lack an immediate economic interpretation but their statistical significance is fundamental to find out which independent variables affect the transition probabilities[17].

Given that, we provide straightforward (*a*) the significance of the β_j vector coefficients in each decisional step and (*b*) the estimation of the p_{ij} probabilities, that is, the probability for the agent i to be in the employment status j. Since p_{ij} depends on the worker i characteristics, we show the probabilities for a base-agent that, in our case, is a single male aged 34, with a high school diploma, working in the services of the Florence area and that, in 2000, held a fixed-term contract. Varying those characteristics, it is possible to show how the transition probabilities change with respect to the base case.

Furthermore, we provide the significance of the text on the IV. Whenever $\hat{\tau}$ is significantly different from one, the nested specification cannot be rejected.

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[17]A covariant contributes in explaining an employment outcome whenever it has a coefficient statistically different from zero in at least one β_j vector.

6.1 The Choice of the Worker

Table 1 shows the base-agent probabilities associated to each labour market participation option: (*i*) out of the labour force, (*ii*) self-employment, (*iii*) subordinate employment. The following results are worthwhile to be noted:

- female individuals hold a lower probability to become self-employed;

- apprenticeship & training contracts holders seems less likely to exit the labour force;

- part-time fixed-term contracts does not show any statistical significant difference compared to full-time fixed-term contracts. This result holds in each worker decisional step;

- Borgo San Lorenzo and Rosignano workers are less likely to search for a subordinate job. Florence workers are less likely to exit from the labour force;

- workers employed in accommodation & food services have a higher probability to exit from the labour force;

- education does not affect the participation choices of the worker;

- married workers are more likely to exit the labour force;

Those results may be interpreted in many different ways which cannot be fully discussed here. However, it may be worth to stress the result stated in the second point. In fact, this might indicate that more flexible contractual categories produce a higher willingness to exit from the labour force due to a possible discouragement effect.

	Transition Probabilities					Differences from the Base-Agent		
	Out of the Labour Force	Self Employment	Subordinate Employment			Out of the Labour Force	Self Employment	Subordinate Employment
Gender				Sign. 1° choice	Sign. 2° choice			
Male	5,19%	8,25%	86,56%	-	-	-	-	-
Female	6,90%	2,80%	90,30%	yes	yes	1,71%	-5,45%	3,74%
Contract in 2000								
Fixed-Term	5,19%	8,25%	86,56%	-	-	-	-	
Apprenticeship & Training	2,12%	8,93%	88,95%	yes	no	-3,07%	0,68%	2,39%
Permanent Part-Time	2,25%	8,09%	89,66%	yes	no	-2,94%	-0,16%	3,10%
Fixed-Term Part-Time	5,36%	12,76%	81,88%	no	no	0,17%	4,51%	-4,68%
District								
Florence	5,19%	8,25%	86,56%	-	-	-	-	-
Borgo San Lorenzo	15,68%	15,20%	69,12%	no	yes	10,49%	6,95%	2,62%
Santa Croce	7,42%	3,40%	89,18%	yes	no	2,23%	-4,85%	2,62%
Follonica	7,92%	7,40%	84,68%	yes	no	2,73%	-0,85%	-1,88%
Rosignano	17,89%	19,63%	62,48%	no	yes	12,70%	11,38%	-24,08%
Sector								
Services	5,19%	8,25%	86,56%	-	-	-	-	-
Retail	7,50%	4,92%	87,58%	yes	yes	2,31%	-3,33%	1,02%
Agriculture	8,79%	4,54%	86,67%	yes	no	3,60%	-3,71%	0,11%
Manufacturing	2,74%	5,38%	91,88%	yes	yes	-2,45%	-2,87%	5,32%
Accommodation & Food Services	12,31%	7,89%	79,80%	yes	no	7,12%	-0,36%	-6,76%
Education								
High School (13 years)	5,19%	8,25%	86,56%	-	-	-	-	-
Compulsory School (8 years)	4,91%	6,23%	88,86%	no	no	-0,28%	-2,02%	2,30%
Undergraduate Degree (17 years)	5,61%	10,25%	84,14%	no	no	0,42%	2,00%	-2,42%
Marriage								
no	5,19%	8,25%	86,56%	-	-	-	-	-
yes	8,25%	6,55%	85,20%	yes	no	3,06%	-1,70%	-1,36%
Age								
25	16,00%	7,56%	76,44%	yes	no	10,81%	-0,69%	-10,12%
40	4,00%	8,49%	87,51%	yes	no	-1,19%	0,24%	0,95%
60	30,40%	8,09%	61,51%	yes	no	25,21%	-0,16%	-25,05%
Inclusive value: $\hat{\tau} = -6.6888$ (3.285)			LR test on τ=1: $\chi^2(1)$=7.30		Prob. (χ^2)=0.0069			
Pseudo R^2=0.1537								

Base-Agent: single male aged 34 years old, holding a fixed-term contract in services in 2000, working in the Florence area, and holding a high school diploma.

Table 1: The choice of the worker

It is possible to obtain further interesting results examining how probabilities change varying the workers age. Since the age may be assimilated to a continuous variable, it is possible to track graphically such relationship.
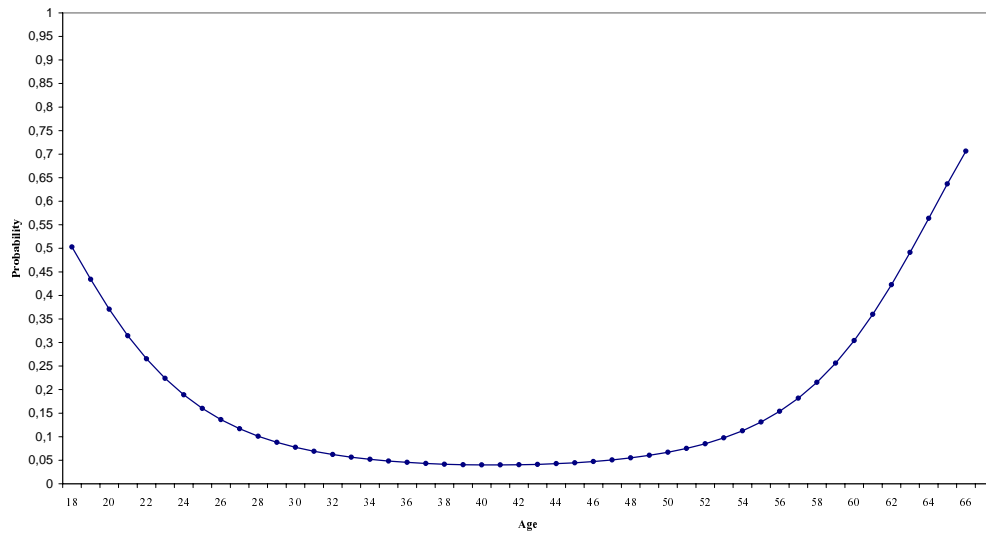
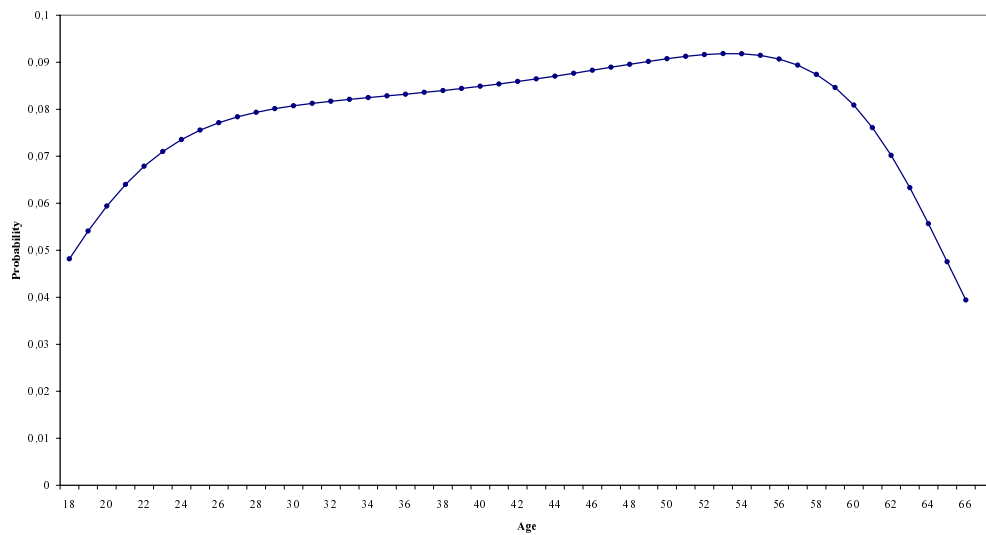Figure 7: The probability to exit the labour force

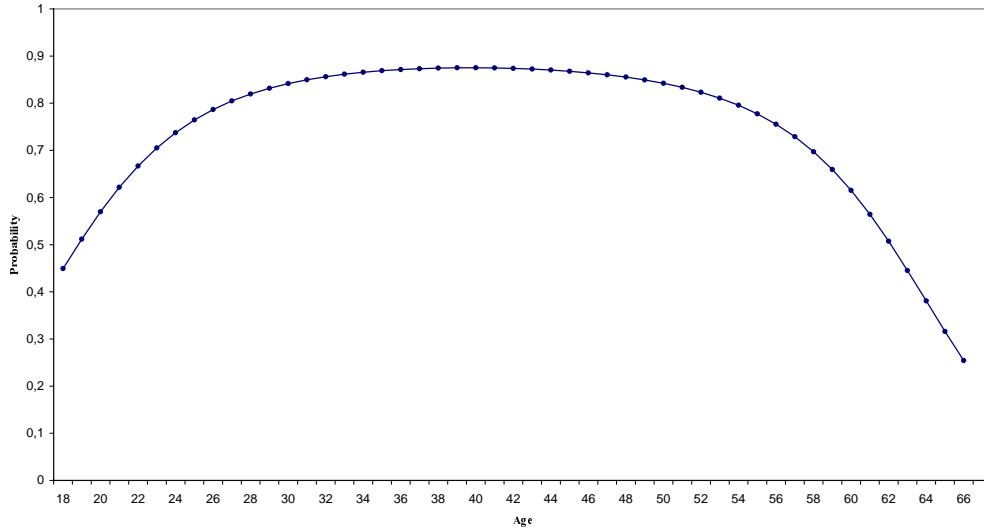
Figure 8: The probability to turn in self-employed worker

Figure 9: The probability to turn in a subordinate worker

From the graphs above it follows that:

- the probability to exit the labour force is ∪-shaped with a minimum around 40 years old. A possible explanation of this pattern may be the fact that younger workers return to school while older workers choose to retire;

- the probability to turn in a self-employed worker is ∩-shaped but it displays a low variability;

- the probability to turn in a subordinate worker decreases in the age interval $18-30$, it is constant in the interval $30-50$, and it decreases in the final part;

6.2   The Choice of the Firm

Table 2 shows the firm probabilities associated to each different employment outcomes considered in our analysis, that is, permanent employment, temporary job, apprenticeship & training, and unemployment. The following results seem remarkable:

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	Transition Probabilities						Differences from the Base-Agent			
	Permanent Employment	Flexible Contract	Apprenticeship & Training	Unemployment	Sign. 1° choice	Sign. 2° choice	Permanent Employment	Flexible Contract	Apprenticeship & Training	Unemployment
Gender										
Male	56,93%	25,28%	0,38%	17,41%	-	-	-	-	-	-
Female	46,25%	28,11%	0,47%	25,17%	no	yes	-10,68%	2,83%	0,09%	7,76%
Contract in 2000										
Fixed-Term	56,93%	25,28%	0,38%	17,41%	-		-	-	-	-
Apprenticeship & Training	71,24%	20,17%	1,04%	7,55%	yes	yes	14,31%	-5,11%	0,66%	-9,86%
Permanent Part-Time	82,78%	8,02%	0,14%	9,06%	no	yes	25,85%	-17,26%	-0,24%	-8,35%
Fixed-Term Part-Time	53,73%	29,83%	0,66%	15,78%	no	no	-3,20%	4,55%	0,28%	-1,63%
District										
Florence	56,93%	25,28%	0,38%	17,41%	-	-	-	-	-	-
Borgo San Lorenzo	60,23%	22,38%	0,36%	17,03%	no	no	3,30%	-2,90%	-0,02%	-0,38%
Santa Croce	59,28%	22,42%	0,20%	18,10%	no	no	2,35%	-2,86%	-0,18%	0,69%
Follonica	52,79%	30,15%	0,67%	16,39%	no	yes	-4,14%	4,87%	0,29%	-1,02%
Rosignano	46,59%	27,86%	0,59%	24,96%	no	no	-10,34%	2,58%	0,21%	7,55%
Sector										
Services	56,93%	25,28%	0,38%	17,41%	-	-	-	-	-	-
Retail	64,59%	14,25%	0,24%	20,92%	yes	no	7,66%	-11,03%	-0,14%	3,51%
Agricolture	43,19%	37,16%	0,00%	19,65%	no	no	-13,74%	11,88%	-0,38%	2,24%
Manufacturing	65,88%	19,16%	0,44%	14,52%	no	yes	8,95%	-6,12%	0,06%	-2,89%
Accommodation & Food Services	35,94%	25,60%	0,24%	38,22%	yes	no	-20,99%	0,32%	-0,14%	20,81%
Education										
High School (13 years)	56,93%	25,28%	0,38%	17,41%	-	-	-	-	-	-
Compulsory School (8 years)	56,48%	21,95%	0,55%	21,02%	yes	no	-0,45%	-3,33%	0,17%	3,61%
Undergraduate Degree (17 years)	56,73%	28,04%	0,28%	14,95%	yes	no	-0,20%	2,76%	-0,10%	-2,46%
Marriage										
no	56,93%	25,28%	0,38%	17,41%	-	-	-	-	-	-
yes	62,94%	21,64%	0,09%	15,33%	no	yes	6,01%	-3,64%	-0,29%	-2,08%
Age										
25	51,70%	24,66%	7,45%	16,19%	no	yes	-5,23%	-0,62%	7,07%	-1,22%
40	55,14%	26,82%	0,02%	18,02%	no	yes	-1,79%	1,54%	-0,36%	1,83%
60	34,25%	50,24%	0,00%	15,51%	no	yes	-22,68%	24,96%	-0,38%	-1,90%

Inclusive value: $\hat{\tau} = -1.5658 \ (0.9105)$ LR test on $\tau=1$: χ^2 (1)=7.79   Prob. (χ^2)=0.0052

Pseudo R^2=0.1334

Base-Agent: single male aged 34 years old, holding a fixed-term contract in services in 2000, working in the Florence area, and holding a high school diploma.

Table 2: The choice of the firm

- the base-agent holds a transition probability to a permanent employment equal to 59.93%;

- female individuals hold a strictly lower probability to obtain a permanent job. However, the gender discrimination is not significant in the hiring decision of the firm;

- apprenticeship or permanent part-time contract holders have an higher probability to obtain a permanent job. Holding a part-time contract does not affect the hiring decision;

- the district does not affect the probability to be hired. Furthermore, belonging to a particular industrial locality does not exert a significant influence on the employment outcome except for the case of Follonica, where there is the higher probability to get a flexible contract;

- agriculture and manufacturing do not exert a significant influence on the possibilities to obtain a job. On the other hand, manufacturing is the only business sector significant in explaining the contractual category assigned by the firm and it also provides the higher stabilization probability;

- quite surprisingly, education does not display a statistical significant effect in expaining the contractual category assigned by the firm. However, education matters in the hiring decision;

- to be married provides a higher stabilization probability, but it does not affect the probability to obtain a job;

Varying the age, we derive the results illustrated in the following graphs.
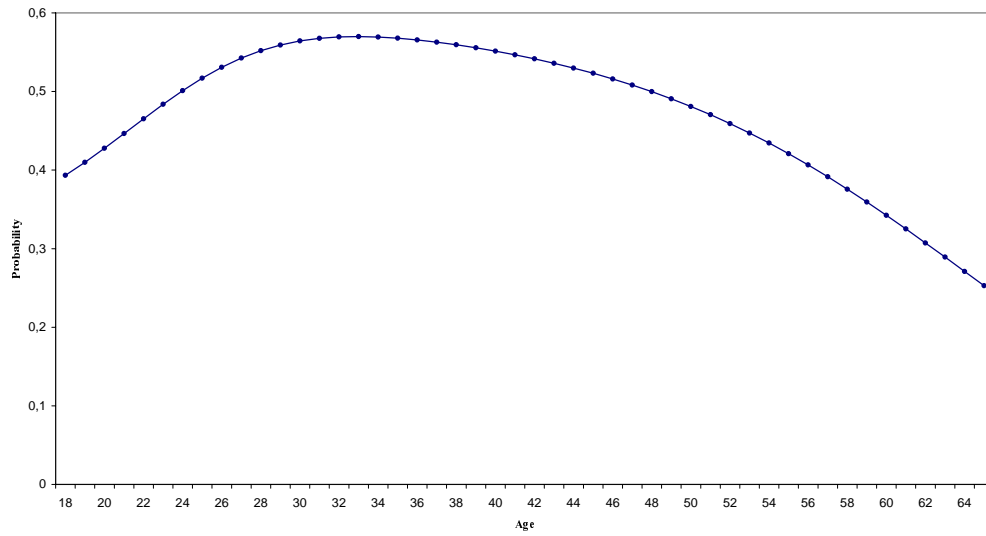
Figure 10: The probability to obtain a permanent job
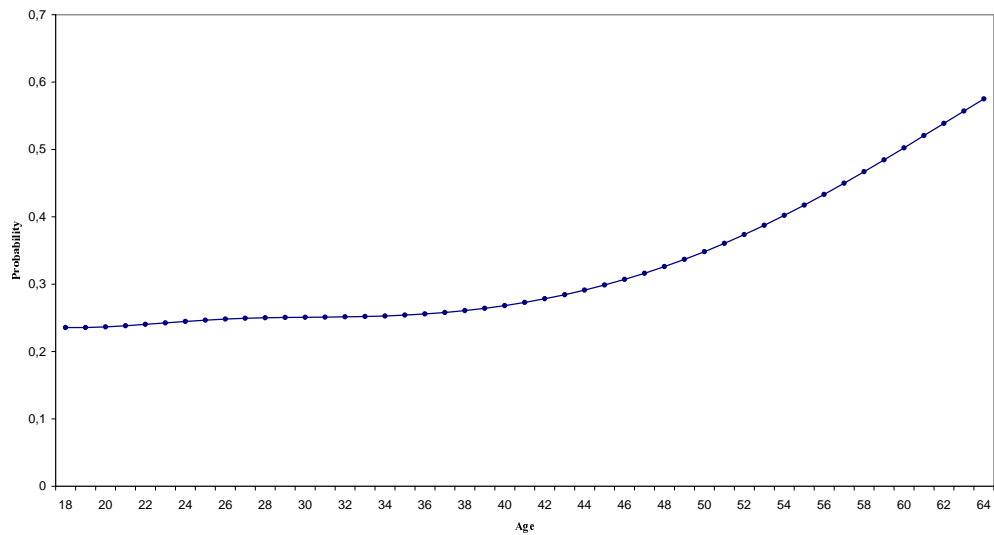
Figure 11: The probability to obtain a temporary job

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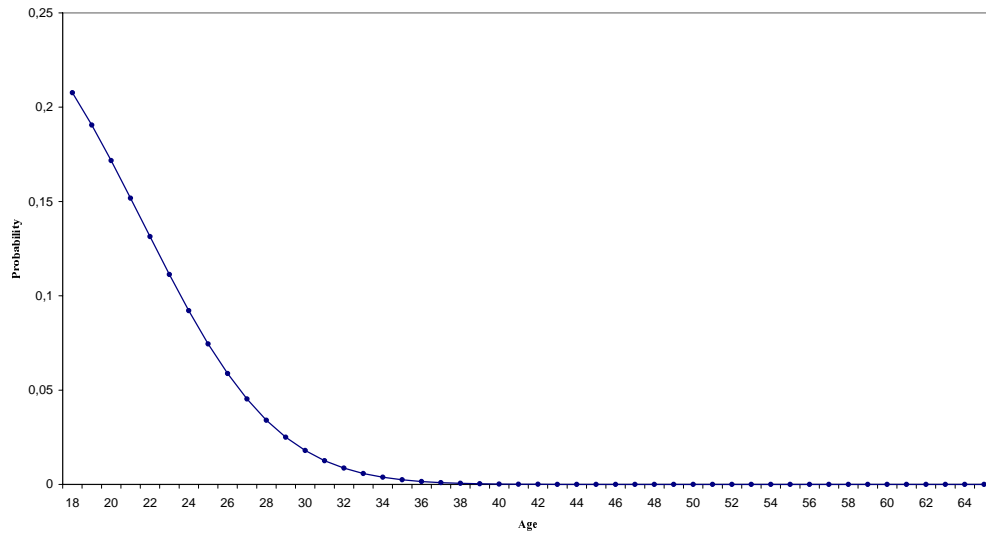
Figure 12: The probability to obtain an apprenticeship-training job
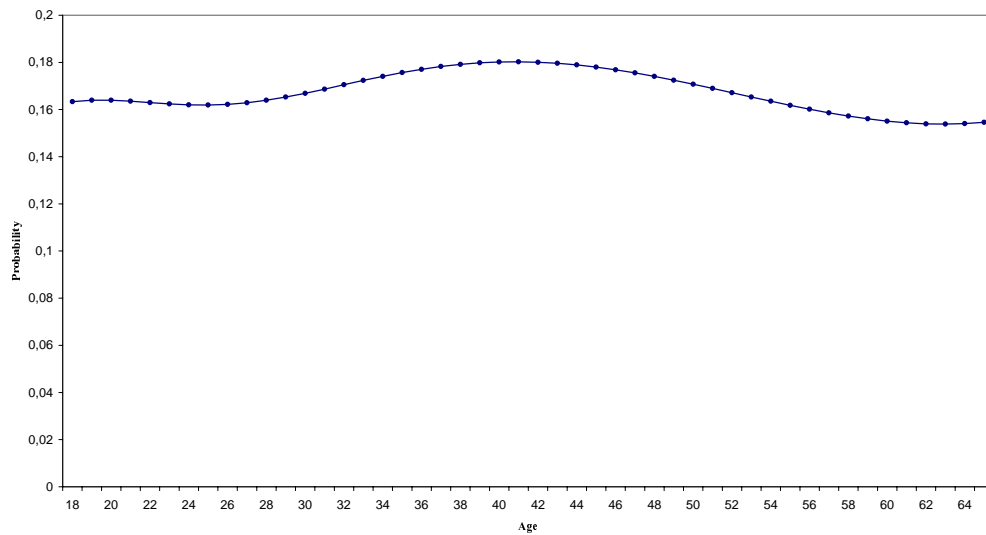
Figure 13: The probability to become unemployed

From the graphs above it follows that:

- once a certain age is reached (about 38 years old), the probability to obtain a permanent job start to decrease. Therefore, older worker face smoother risks to be trapped in a flexible job.

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- unsurprisingly, apprenticeship & training contracts are devoted to younger workers[18];

- the probability to be unemployed is almost constant;

7 Conclusions

This paper aimed to provide a probabilistic evaluation of the transition process from temporary work toward the different employment outcomes. In this context, it should be interesting the estimation of a stabilization probability, that is, the probability that a temporary worker successes in obtaining a permanent job. Our goal has been the estimation of such a probability, and examining how it changes according to the different social and economic characteristics of the individual worker.

After the definition of a decisional scheme that distinguished between employment outcomes chosen by the worker from those chosen by the firm, we find out that the estimation of the stabilization probability for our base-agent is $59, 93\%$. However, this value displays significant variations across workers characteristics, with age and gender being particular relevant. The results suggest that a precariousness trap may be a real possibility, especially for women and older workers. However, this conclusion is not suited for a general policy validation. Our database lacked workers with an initial employment condition different from the flexible one and, consequentially, we are not able to assess whether temporary worker face higher risks of being trapped in a situation of precariousness than other workers.

As for the other characteristics, we observe that the stabilization probabilities vary in a considerable way according to the sector and the initial contractual category. Finally, it is worth to note the fact that the educational background affects worker choices but it has little influence on the firm decision.

To conclude, we believe these results contains valuable information and depict lights and shadows of flexible jobs. However, a more comprehensive evaluation of such a phenomenon would ask for a panel data with information even on workers whose initial condition was not necessary a flexible job[19].

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[18]This result is a clear reflection of the institutional framework described in section 2.

[19]Note that to include in the sample a comparison group (control) that is really suitable to evaluate the effect of the flexible jobs legislation on the possibilities to obtain a certain employment outcome, we shoud refer even to an institutional framework in which legislation on flexible job is stricter.

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