

Kiel Institute for World Economics
Duesternbrooker Weg 120
24105 Kiel (Germany)

Kiel Working Paper No. 1268

**The Duration of Union Membership: an
Empirical Study**

by

Andrea Vaona

February 2006

The responsibility for the contents of the working papers rests with the authors, not the Institute. Since working papers are of a preliminary nature, it may be useful to contact the authors of a particular working paper about results or caveats before referring to, or quoting, a paper. Any comments on working papers should be sent directly to the authors.

The Duration of Union Membership: an Empirical Study

Abstract

Thanks to direct access to union databanks, this paper can answer two new questions in Industrial Relations: how long union membership lasts and what are the determinants of its duration. This also allows to conceptualize union membership as a much more dynamic phenomenon than in previous studies, where it was considered a static situation whose causes or effects were to be investigated. Survival analysis applied to a sample of 48705 workers highlights that union membership duration is a positive, though declining, function of age. Furthermore, women, “flexible” workers, foreign ones and those working in cities tend to show less attachment to union membership than the other workers.

1 Aim and structure of the paper

Schnabel (2003), reviewing the literature on union membership, argued that research on this topic should “try to integrate better the different approaches of the various disciplines of social science, it should pay more attention to the process of joining or leaving a union and to union recruitment strategies, and it should attempt to provide a more comprehensive model in which individual workers’ optimizing decisions are seen in a wider perspective that pays more attention to the social and institutional background”. Thanks to direct access to union databanks and by exploiting a dataset of 48705 Italian workers, this contribution meets the second challenge above. In particular, it can answer two questions that the literature on industrial relations could not directly tackle so far: how long union membership lasts and what are the determinants of its duration.

As it will appear in the section devoted to the literature review, studies on union membership are generally based on surveys, where union membership is usually conceptualized as a permanent condition whose determinants or effects have to be investigated.

However, union membership is a much more dynamic phenomenon and considerable inflows and outflows from unions usually do take place. Moreover, as showed by Figure 1, the turnover ratio of union membership - namely the ratio of the sum of new and resigning union members over the stock of all the members in a given year - has dramatically increased during the last decade, making the duration of union membership a top issue for union officials (FILT – CGIL, 2005)¹.

The rest of this paper is structured as follows. Section 2 reviews the literature about union membership. Section 3 illustrates the methodology of this contribution. Section 4 describes the data and the results here achieved and section 5 concludes.

2 Literature Review

The review that follows is meant to point out the variables that the literature on industrial relations has used in order to explain union membership. Indeed, though it was not possible to find studies directly tackling the issue of the duration of union membership, this may well be influenced by those individual characteristics that affect the choice to join a union (for wider surveys see Riley, 1997 and Schnabel, 2003).

¹Furthermore, though the data refer only to the Veneto Region, this is a nationwide phenomenon in Italy (FILT - CGIL, 2005).

Bland (1999), Brook (2001) and Hicks (2000), though being descriptive contributions, propose a rather encompassing classification of the individual characteristics that may induce workers to join a union. One may group these characteristics into three categories:

- individual characteristics:
 - age;
 - gender;
 - ethnic origin;
 - education;
 - marital status;

- job characteristics:
 - tenure;
 - the kind of contract (full or part-time, permanent or temporary);
 - managerial status (if the job entails managerial or supervising duties);

- workplace characteristics:
 - the economic sector of the firm;
 - the region of the plant;
 - the size of the plant.

Analysing the data of the UK Labour Force Survey, Bland (1999), Brook (2001) and Hicks (2000) conclude that in the UK union membership is more likely among older, more educated and married workers. The effects of age and gender overlap each other: older women are less unionized than older men, but there are no major differences between younger women and men. Regarding ethnic origin, there are more differences within non-white workers than between white and non-white ones: black people tend to be more unionized than Indians or Pakistani. Job tenure is positively correlated with union membership, which is more common among full-time and permanent employees.

As far as managerial status is concerned, the most unionized workers are those with supervisory duties, followed by those without any managerial responsibility. Managers are the less unionized group.

Unionization varies both across regions and sectors: it is higher in the public administration and lower in tourism firms; also it is lower in England than in other parts of the UK. Finally, large plants have higher union densities than smaller ones.

Many of the characteristics above can be safely regarded as exogenous with respect to union membership. However, understanding the direction of causality is less easy when considering job tenure. According to Moreton (1998, 1999), union members experience less job instability because unions defend them. On the other hand, those with a longer job tenure are more likely to be exposed to the reputation mechanisms at the heart of the “social custom” approach to union membership (Corneo 1995, 1997). Furthermore, unionization is easier in the workplaces with less turnover (Schnabel and Wagner, 2003).

Machin (2004) analyses the decline of union density in the UK thanks to two representative samples belonging to 1975 and 2001 and on the ground of an interpretative framework similar to the one above, omitting only marital status, job tenure and managerial status. He concludes that the decline in union density experienced by the UK went hand in hand with an increase in the unionization differentials between young and old workers and between workers of different economic sectors, but also together with a convergence of the union densities of men and women, of workers with different job contracts (part-time or full-time), of different ethnicities and of workplaces of different sizes. Regional differences have remained stable.

Charlwood (2002), thanks to the analysis of the data from the 1998 British Social Attitudes Survey, aims at finding the factors affecting individuals’ willingness to join unions. First and foremost, about 40% of non unionized workers would be willing to join a union. This percentage is higher for manual workers than for non-manual ones and for former union members than for those that have never joined unions before. Furthermore, a leftist political orientation is a strong incentive to join unions, together with scarce job satisfaction and a strong trust in the ability of unions to improve workplace conditions.

Machin (2000), considering WIRS80², WIRS 84, WIRS 90 and WERS98³, concludes that it is not workers’ age to affect union membership, rather the age of the workplace. In the workplaces opened after 1980, union density is lower for workers of all the age classes.

In Germany, Windolf and Haas (1989), Lorenz and Wagner (1991), Wagner (1991), Goerke and Pannenberg (1998) and Fitzenberger et al. (1999) analysing data from different representative samples find a posi-

²Workplace Industrial Relations Survey

³Workplace Employee Relations Survey

tive relationship between plant size and union density, but they obtain conflicting results regarding other variables.

However, Schnabel and Wagner (2003) find that union membership is more likely for men, old and full-time workers than for women, young and part-time workers. More educated workers are usually more unionized than less educated ones. Their multivariate regression analysis stresses the importance for union membership of a leftist political orientation, as in Charlwood (2002), and of being a blue collar and male.

The results of Schnabel and Wagner (2003) do not support the view that union density is higher within cities due to lower recruiting costs and to a longer union tradition. However, this hypothesis is supported by the findings of Antos et al. (1980) for the US and of van den Berg and Groot (1992) for the Netherlands.

A similar hypothesis was tested by Deery and De Cieri (1991) on Australian data collected in 1987. Their results do not point to the importance of the place of residence or of individual characteristics, rather to the importance of the kind of job and of the economic sector: the probability of being a union member is substantially lower for white collars, for part-time workers, the self-employed and employees in the private sector.

Furthermore, according to Deery and De Cieri (1991), one further factor to consider explaining union density are unions' organizational features, but this hypothesis is not confirmed by the empirical evidence they produce. Hancké (1993) argues that those unions that managed to include within their organization local structures, such as the worker councils, experienced a smaller decline. However, the sample considered is so limited that it does not allow a regression analysis.

Going back to Antos et al. (1980), they analyse data from the US Population Survey of 1976 and they find that men are more likely to join unions than women, that tend to work in less unionized workplaces and jobs, in part-time positions and to suffer discrimination. The likelihood to be a union member is higher for non-white, older and less educated people.

Gomez, Gunderson and Meltz (2002) analyse data from a sample of 1204 Canadian workers. According to their results, young people have a stronger preference towards unionization than adults. Preference for unionization also depends on the workers' social and familiar background and on the presence of alternative devices of human resources management within firms. These results, however, might depend on the presence of only 147 young people within the sample considered.

The importance of the family background, confirmed also by Visser (2002) on Dutch data, leads Gomez, Gunderson and Meltz (2002) to

argue that the decline in union membership is cumulative: once it begins, less union members will be present in the family of each worker providing him with less incentive to join a union.

This is just a “family” version of the theory of cumulative decline of the “social custom” approach to union membership: the compliance to a “social custom” becomes weaker the weaker it is at present. Visser (2002) finds that this “reputation” mechanism works also among colleagues. However, more than cumulative decline, one should use the word “inertia” as, once inverted the decline, growth in union membership should be self-reinforcing.

One further point of Gomez, Gunderson and Meltz (2002) is the presence within the workplace of “voice” devices alternative to unions. More in general, managerial opposition increases the costs and reduces the benefits to union membership, rendering it more unlikely. “Voice” mechanisms alternative to unions might exactly be one of the tools managerial opposition might resort to in order to contrast unions.

Visser (2002) tries to explain not only the probability to join unions, but also that to quit a union. Under this respect it is the closest study to the present one. Its results point to the fact that the people with a greater probability to quit a union are young, female, with a part-time job, with a low income, working in small enterprises and hardly in touch with other unionized workers. Extraordinary events, such as unemployment, a child birth, retirement or a job change, cause a marked increase in the probability to quit a union.

In the end, to provide a micro-economic explanation of union membership, one should control not only for the features highlighted above but also for:

- the political orientation of a worker;
- her/his family background;
- the age of the workplace where she/he works;
- if she/he has unionized colleagues;
- if her/his firm implements anti-union practices.

The analysis that follows can hardly control for all the variables here highlighted. The reason for this shortcoming is that its source is not a survey, but union databanks. Union databanks exist to allow union officials to check the number of union members and to carry out fidelization initiatives, like mailing union newspapers or the union card to members. This very source, though not allowing to have a complete profile of the

members, allows to track with a greater precision the duration of union membership itself, especially when compared to personal recollections that are at the basis of Visser (2002), though, as pointed out by Visser himself, they cannot be completely trusted. However, as it will appear later, the results achieved are very close to those of Visser (2002).

3 Duration Analysis

This section is devoted to introduce the reader to the econometric techniques adopted in this study.

Consider the time spent by a certain subject in a given state (for instance that spent by a worker as union member). Let us assume that the duration of this period is stochastic and individual durations, labelled as t , are just random draws from a continuous random variable, denoted as T . Let the cumulative distribution of T to be F :

$$F(t) = \Pr(T \leq t) \quad (1)$$

and call

$$S(t) = 1 - \Pr(T \leq t) \quad (2)$$

the *survivor function* of T .

It is possible to define the *hazard rate* as:

$$\theta(t) = \lim_{dt \rightarrow 0} \frac{\Pr(T \in [t, t + dt) | T \geq t)}{dt} \quad (3)$$

In words, the *hazard rate* is the probability to exit from a given state given that one has been in that state until t , expressed as a function of t .

It is worth recalling that from (3) the following relations can be derived (Lancaster, 1990):

$$\theta(t) = \frac{f(t)}{S(t)} \quad (4)$$

$$S(t) = \exp\left(-\int_0^t \theta(u) du\right) \quad t \geq 0 \quad (5)$$

A non parametric estimator of the survivor function is the Kaplan-Meier one:

$$KM = \prod_{l=1}^m \frac{N_l}{N_l + E_l}$$

where $N_l + E_l$ is the number of people that could have left in the m th interval: E_l actually did so and N_l did not (Lancaster, 1990).

Two workhorses of the parametric empirical literature of duration analysis are the Weibull model and the Log-logistic model. The specification of the function defined above for the Weibull model is:

$$\theta(t) = \alpha \lambda t^{\alpha-1} \quad (6)$$

$$S(t) = \exp(-\lambda t^\alpha) \quad (7)$$

$$f(t) = \alpha \lambda t^{\alpha-1} \exp(-\lambda t^\alpha) \quad (8)$$

with $\lambda = \exp(\beta'X)$, where X are the regressors and β are their coefficients.

For the Log-logistic model,

$$\theta(t) = \frac{\psi^{(\frac{1}{\gamma})} t^{[(\frac{1}{\gamma})-1]}}{\gamma \left[1 + (\psi t)^{(\frac{1}{\gamma})} \right]} \quad (9)$$

$$S(t) = \frac{1}{1 + (\psi t)^{(\frac{1}{\gamma})}} \quad (10)$$

$$f(t) = \frac{\psi^{(\frac{1}{\gamma})} t^{[(\frac{1}{\gamma})-1]}}{\gamma \left[1 + (\psi t)^{(\frac{1}{\gamma})} \right]^2} \quad (11)$$

where $\psi = \exp(-\beta'X)$ and $\gamma > 0$.

The models of duration analysis can be written in two different forms: the *proportional hazard* and the *accelerated failure time* representations. The *proportional hazard* representation is as follows:

$$\log \theta(t) = \log \theta_0(t) + \beta'X \quad (12)$$

where $\theta_0(t)$ is the baseline hazard. Whereas the *accelerated failure time* representation is:

$$\log t = \beta'X + z$$

where z is a generalised error term. While the Weibull model has both the representations, the Log-logistic model has only the *accelerated failure time* representation.

Given that, as stated above, this study cannot observe for all the individual characteristics that, according to the literature of industrial

relations, affect the probability to join a union and possibly the duration of union membership, specific attention must be paid to the methods developed within duration analysis in order to tackle the issue of unobserved heterogeneity or of *frailty*, as called in this context.

Let us assume that the hazard rate is as follows

$$\theta_v(t, X) = \theta(t, X | v) = \theta(t, X)v \quad (13)$$

where $\theta(t, X)$ is the hazard function considered earlier. Unobserved heterogeneity enters, thus, through a multiplicative scaling factor, v .

Estimation of the models with unobserved heterogeneity is performed by specifying a distribution for v in terms of parameters that can be estimated and working then with the resulting unconditional survivor or density functions. When dealing with *continuous* time models, the Gamma and the Inverse Gamma are the two most common distributions specified for v . In the first case, the survivor function is:

$$S(t, X | \beta, V) = \{1 - V \ln [S(t)]\}^{-\left(\frac{1}{V}\right)} \quad (14)$$

where V is the set of parameters characterizing the distribution of v . When resorting to the Inverse Gamma distribution one has:

$$S(t, X | \beta, V) = \exp \left[\frac{1}{V} \left(1 - \{1 - 2V \ln [S(t)]\}^{\frac{1}{2}} \right) \right] \quad (15)$$

According to the theoretical literature, that usually focused on the proportional hazard representation, ignoring unobserved heterogeneity will lead to:

- overestimate the degree of negative duration dependence ($\frac{\partial \theta(t)}{\partial t} < 0$) and underestimate the degree of positive duration dependence ($\frac{\partial \theta(t)}{\partial t} > 0$);
- biased estimate of the coefficients (as usual for omitted variables).

The first consequence is the result of a selection effect. The people with high v tend to leave quickly the state (to quit unions earlier) and only the people with lower v remain in the sample and therefore with lower hazard. The contrary applies to the case of positive dependence. Therefore, both frailty and non-frailty models will be estimated comparing both their implied duration dependence and coefficient estimates (Jenkins, 2004).

4 Data and Results

In Italy there exist three main union confederation: CGIL (General Italian Labour Confederation), CISL (Italian Confederation of Workers' Unions) and UIL (Labour Italian Union). They are mainly divided along their past political connections and cultures: CGIL was close to the former Italian Communist and Socialist parties, CISL has a catholic inspiration and UIL was closer to the former Socialist, Socialdemocratic and Republican parties. All the main Italian unions have experienced a marked increase in the share of retired workers among their members, which is now above 50%. A broader picture of the recent evolution of the Italian industrial relation system may be found in Baccaro et al. (2003) and Chiarini (1999).

Italian unions have both horizontal (territorial) and vertical (sectoral) structures, named categories. Territorial structures exist both at the regional (NUTS 2, to use the Eurostat classification of regions) level and at the county level (NUTS 3). Within each territorial unit all the categories have their own representatives. The categories considered in this study are: FILCAMS (Italian Federation of Retailing Workers), FILCEA (Italian Federation of Chemical Workers), FILLEA (Italian Federation of Construction Workers), FILT (Italian Federation of Transport Workers), FILTEA (Italian Federation of Textile and Clothing Workers), FIOM (Federation of Metal Workers), FISAC (Italian Federation of Insurance and Credit Workers), FLAI (Federation of Food Workers), FLFP (Federation of Public Sector Workers), FNLE (National Federation of Energy Workers), NIDIL (New Labour Identities), SLC (Communication Worker Union), SNS (National Teachers' Union), the Controversy Office (UFF.VER.). One union member might also adhere directly to the overall confederation (Confederal CGIL). Two peculiar traits of the categories above are that NIDIL was created with the aim to unionize temporary and flexible workers, while FILLEA is known to have a high share of foreign members. Finally, the aim of the Controversy Office is to provide workers assistance when enforcing their individual rights.

The present study builds on data on 48705 non-retired union members of CGIL in two counties belonging to the Veneto region: those of Treviso and Vicenza. On the one hand, given the results regarding political orientation achieved by the literature above, the location of the sample may induce some upward bias in the hazard rate given that the two counties do not have a pro-union environment. On the other, the Veneto region has been often considered at the forefront of post-fordist organizational innovation in production processes. Therefore, it may well be considered, and it was often actually considered, as a labora-

tory where to observe potential future developments for other regions or economies (Scott, 1988).

In the end, the variables that this study uses to explain union membership duration are: the members' category, gender, age and nationality (Italian or foreigner) and the location of the working place (if the union member works in the main city of the county or not). I also control for the province of residence (Vicenza or Treviso).

Figure 2 shows the Kaplan - Meier estimator of the survivor function. It is clearly a declining function of time: the longer a person has been a union member and the more likely he/she will be to quit. This fact would exclude the existence of cumulative fidelization effects, advanced for instance by Visser (2002), whereby the longer a person has been union member and the more likely she/he is to remain in that status.

Figure 3 shows that gender differences do exist, but at a first sight they would not appear to be sizeable: to have a better understanding of the effect of gender on union membership duration, regression analysis is strongly called for. The same applies to the location of the working place (Figure 4). On the contrary, Figure 5 shows that foreign people have a greater probability to quit unions than Italians do.

Table 1 shows the differences between the various categories and some typical statistics of duration analysis. The first column is devoted to the time at risk, namely the number of years each union member has remained in the union times the number of members in the sample (showed in column 3). The incidence rate is the ratio between the number of members that did not renew their membership and the total time at risk. Consequently, the product between the first column and the second one gives the number of members that quit the union.

The last column shows the median time of membership. The estimated median time is overall around six years, very close to the five years found by Visser (2002) on Dutch data. This result would tend to counterbalance the effect of the importance of high union membership turnover: it is true that one third of CGIL members enter and exit their union every year, but there is also a relevant part of them that are strongly attached to the union. Furthermore the similarity of the results achieved here with respect to Visser (2002) would tend to exclude sizeable biases deriving from the location of the sampled workers in the Veneto region.

Going back to Table 1, one can notice that the median membership duration is smaller for NIDIL, FILLEA and the Controversy Office. It is clear that the members with temporary jobs, those joining the union for the services it provides and the workers of the building sector are more likely to quit the union after a short time. Though for the first

two cases, the reason for this behavior appears to be the instability of the labour contract and utilitaristic reasons to join CGIL, for the third it is necessary to keep in mind that FILLEA has a high share of foreign members, that are not linked to the place of residence as local people do and therefore tend to quit their job (and the union) more easily in search for better places and jobs.

Table 2 shows the result for the Log-Rank and Wilcoxon tests to check if the differences highlighted above are statistically significant. For all the cases, statistical significance could not be rejected.

Before moving to regression analysis, it is interesting to understand if the Weibull model or the Log-logistic model fits the data better. A fundamental hypothesis of the former is that there exists a linear relationship between the opposite of the log of the survivor function and the log of the survival time. Figure 5 shows that the data here considered would respect this linear relationship.

While the Weibull model fits the data very well, it is not possible to say the same regarding the log-logistic model. One of its core hypotheses is that there exists a negative linear relationship between $\log \frac{S(t)}{1-S(t)}$ and t . Figure 6 shows that the data do not respect this hypothesis in this application. I will report anyway also the results for the log-logistic estimator to offer one further stability check of the estimates.

Table 3 shows the results for the regression analysis. In the first column there are the results for the Weibull model, in the second those for the Log-logistic one, whereas in the third and in the fourth there are the results for the Weibull model once inserting respectively a Gamma and an Inverse Gaussian frailty. The fifth and the sixth columns insert a non linear relationship between the duration of union membership and age within the two Weibull models of Columns 3 and 4. A positive coefficient is to be interpreted as the result of a positive relationship between the regressor and union membership duration.

The Likelihood Ratio test (test LR) strongly rejects the hypothesis that all the coefficient are equal to zero. Looking at the coefficients, then, it is possible to conclude that men remain union members longer than women, the Italian workers longer than foreign ones and older workers than younger ones. In fact, all the latter groups are characterized by a weaker attachment to the job, given that women exit the labour market when having a child, young workers are inclined to “job shopping” and foreign workers may easily change place of residence in search for better jobs. Age has a positive, non linear and declining (given the negative sign of the quadratic term) effect on union membership duration.

Moving to consider the effect of the category, once taken as control group the members of Confederal CGIL, it is easy to note that all the

categories have a shorter membership duration. The members of the Controversy Office, NIDIL and FILLEA once again display the shortest durations.

The same holds for union members working in the main cities of the counties. This might be due to the fact that within metropolitan areas there is a greater concentration of flexible jobs (Altieri and Oteri, 2002). In the end, unions might have lower organizational costs within cities (Schnabel and Wagner, 2003), but they also have a more discontinuous membership.

At the end of Table 3, there are the estimated values of two parameters, α and θ . Given (6) and (7), $\alpha > 1$ implies that there is positive hazard duration dependence: it is so confirmed that the longer is the membership duration the more likely one member is to quit the union. $\theta > 0$ signals the presence of unobserved heterogeneity. As one would expect from the literature review above, both its point estimate and the Likelihood Ratio test reflect the presence of unobserved heterogeneity, which, however, does not have a dramatic effect on the coefficient estimates. The effect of unobserved heterogeneity on membership duration are mixed: though the Gamma model would not point to a substantial overestimation of positive hazard duration dependence, the Inverted Gaussian model would do it. The difference in the maximum likelihood values of non-frailty and frailty models would point to a larger improvement by using the Inverted Gaussian model instead of the Gamma one. However, the choice between the two is not easy given that they are not nested (Jenkins, 2004).

5 Conclusions

This study meant to answer two new questions in Industrial Relations: how long union membership lasts and what are its determinants.

The median duration of union membership was estimated to be around six years, a very similar result to that obtained by Visser (2002) for Dutch workers - 5 years.

Furthermore, union membership duration is a positive, though declining, function of age. Finally, women, “flexible” workers, foreign ones and those working in cities tend to show less attachment to union membership than the other workers. By and large, this entails that labour market segmentation does not stop on unions’ doors. Rather it permeates it: the workers that have a smaller probability to join unions tend to coincide with those that have a higher probability to leave them once being member. This stresses again the need for unions not only to find new ways to get in contact with workers with a low probability to join them, but also to provide them with incentives to build more long-term

relationships.

References

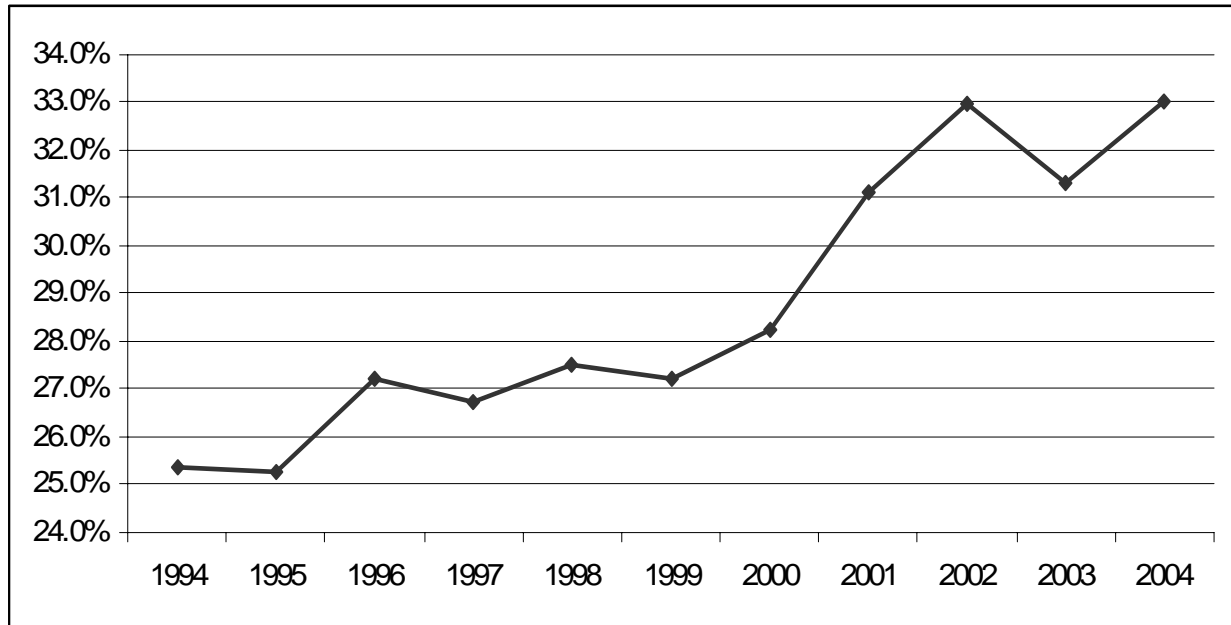
- [1] Altieri, Giovanna and Cristina Oteri. 2002. "Il lavoro atipico in Italia: le tendenze del 2001 [Flexible labour in Italy: the 2001 trends]." Working Paper 22 (January), IRES: Rome.
- [2] Antos, Joseph R., Mark Chandler and Wesley Mellow. 1980. "Sex Differences in Union Membership." *Industrial and Labor Relations Review*, 33: 162-169.
- [3] Baccaro, Lucio, Mimmo Carrieri and Cesare Damiano. 2003. "The Resurgence of Italian Unions: will it last?." *European Journal of Industrial Relations*, 9, 1: 43-59.
- [4] Bland, Paul. 1999. "Trade union membership and recognition 1997-98: an analysis of data from the Certification Officer and the Labour Force Survey." *Labour Market Trends*. London: Government Statistical Service.
- [5] Brook, Keith. 2001. "Trade union membership: an analysis of data from the autumn 2001 LFS." *Labour Market Trends*, London: Government Statistical Service.
- [6] Chiarini, Bruno. 1999. "The Composition of Union Membership: the Role of Pensioners in Italy." *British Journal of Industrial Relations* 37, 4: 577 - 600.
- [7] Charlwood, Andy. 2002. "Why Do Non-union Employees Want to Unionize? Evidence from Britain." *British Journal of Industrial Relations* 40, 3: 463-491.
- [8] Corneo, Giacomo G. 1995. "Social custom, management opposition and trade union membership." *European Economic Review* 39: 275-292.
- [9] Corneo, Giacomo G. 1997. "The theory of the open shop trade union reconsidered." *Labour Economics* 4: 71 - 84.
- [10] Deery, Stephen and Helen De Cieri. 1991. "Determinants of Trade Union Membership in Australia." *British Journal of Industrial Relations* 29, 1: 59 - 63.
- [11] FILT - CGIL. 2005. "Tesseramento e politica delle risorse." [Union membership and resource policy], mimeo.
- [12] Fitzenberger, B., Haggene, I. and M. Ernst. 1999. "Wer ist noch Mitglied in Gewerkschaften? Eine Panelanalyse für Westdeutschland." *Zeitschrift für Wirtschafts- und Sozialwissenschaften* 119: 223-263.
- [13] Goerke, L. and M. Pannenberg. 1998. "Social Custom, Free-Riders, and Trade Union Membership in Germany and Great Britain." Discussion Paper 177 (December), Berlin: DIW.

- [14] Gomez, Rafael, Morely Gunderson and Noah Meltz. 2002. "Comparing Youth and Adult Desire for Unionization in Canada." *British Journal of Industrial Relations* 40, 3: 521-542.
- [15] Hancké, Bob. 1993. "Trade Union Membership in Europe, 1960-1990: Rediscovering Local Unions." *British Journal of Industrial Relations* 31, 4: 593 – 613.
- [16] Hicks, Stephen. 2000. "Trade union membership 1998-99: an analysis of data from the Certification Officer and Labour Force Survey." *Labour Market Trends*, London: Government Statistical Service.
- [17] Jenkins, Stephen P. 2004. *Survival Analysis: lecture notes*. <<<http://www.iser.essex.ac.uk/teaching/stephenj/ec968/index.php>>>.
- [18] Lancaster, Tony. 1990. *The Econometric Analysis of Transition Data*. Econometric Society Monographs, Cambridge: Cambridge University Press.
- [19] Lorenz, Wilhelm and Joachim Wagner. 1991. "Bestimmungsgründe von Gewerkschaftsmitgliedschaft und Organisationsgrad." *Zeitschrift für Wirtschafts- und Sozialwissenschaften* 111: 65-82.
- [20] Machin, Stephen. 2000. "Union Decline in Britain." *British Journal of Industrial Relations* 38, 4: 631-645.
- [21] Machin, Stephen. 2004. "Factors of Convergence and Divergence in Union Membership." *British Journal of Industrial Relations* 42, 3: 423-438
- [22] Moreton, David R. 1998. "An open shop trade union model of wages, effort and membership." *European Journal of Political Economy* 14: 511-527.
- [23] Moreton, David R. 1999. "A model of labour productivity and union density in British private sector unionised establishments." *Oxford Economic Papers* 51: 322-344.
- [24] Riley, Nicola M. 1997. "Determinants of Union Membership: A Review." *Labour*, 11: 265-301.
- [25] Schnabel, Claus. 2003. "Determinants of trade union membership.", in Addison, J. T. and Schnabel, C. (eds.). *International Handbook of Trade Unions*. Cheltenham: Edward Elgar.
- [26] Schnabel, Claus and Wagner, Joachim. 2003. "Determinants of Trade Union Membership in Western Germany: Evidence from Micro Data, 1980-2000." *Discussion Paper Series 708*. Munich: IZA.
- [27] Scott, A. J. 1988. *New Industrial Spaces. Flexible Production Organization and Regional Development in North America and Western Europe*. London: Pion.
- [28] van den Berg, Annette and Wim Groot. 1992. "Union Membership in the Netherlands: A Cross-Sectional Analysis." *Empirical Economics* 17: 537-564.

- [29] Visser, Jelle. 2002. "Why Fewer Workers Join Unions in Europe: A Social Custom Explanation of Membership Trends." *British Journal of Industrial Relations* 40, 3: 403 - 430
- [30] Wagner, Joachim. 1991. "Gewerkschaftsmitgliedschaft und Arbeitseinkommen in der Bundesrepublik Deutschland: Eine ökonometrische Analyse mit Individualdaten." *Ifo-Studien* 37: 109-140.
- [31] Windolf, Paul and Joachim Haas. 1989. "Who joins the union? Determinants of trade union membership in West Germany 1976-1984." *European Sociological Review* 5: 147-165.

Figures

Figure 1 – Union Membership Turnover Ratio in the Veneto Region (Italy), 1994 - 2006



Source: author's elaboration on CGIL data.

Figure 2 – Kaplan – Meier Estimator of the Survivor Function

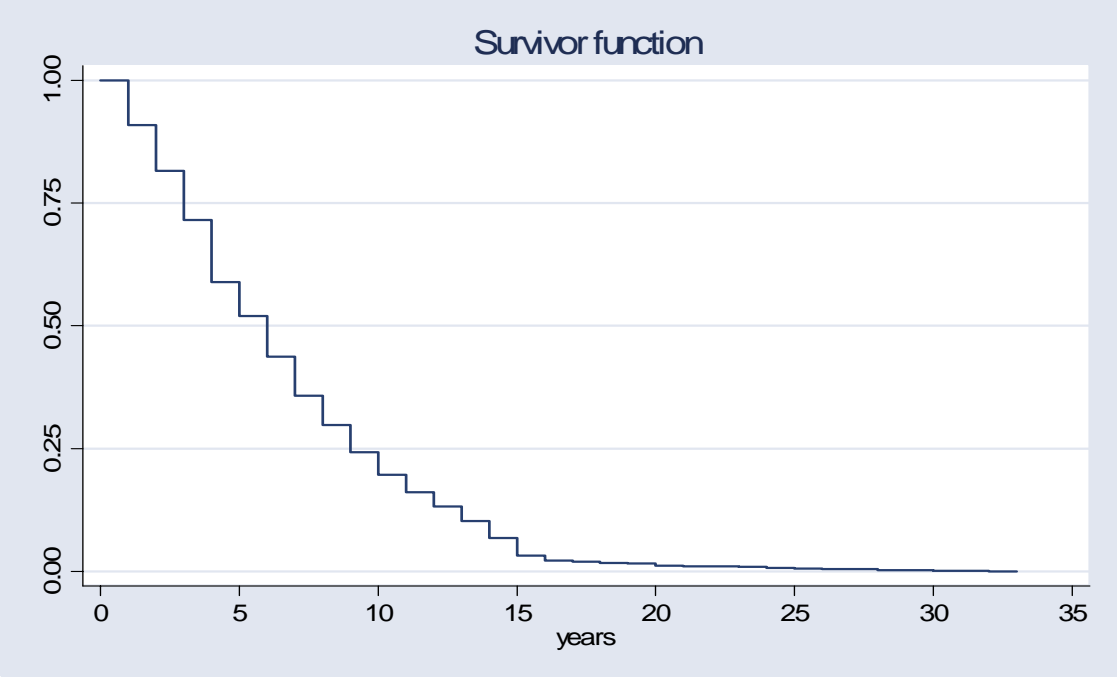


Figure 3 – Kaplan-Meier Estimator of the Survivor Function by Gender

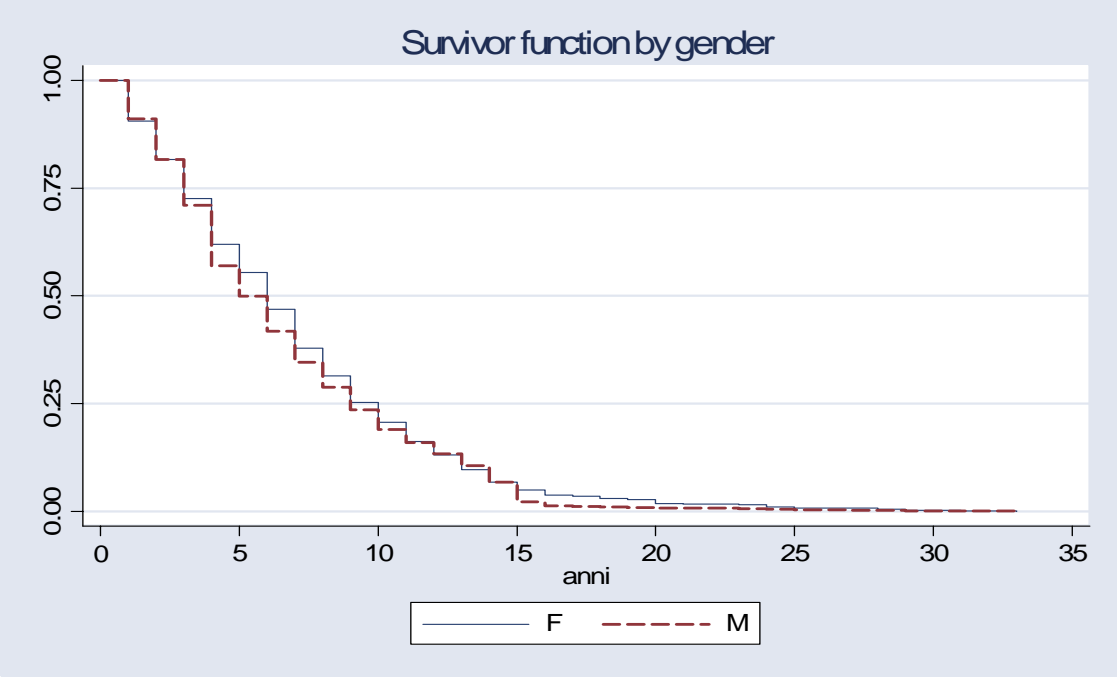


Figure 4 – Kaplan – Meier Estimator of the Survivor Function by Workplace Location

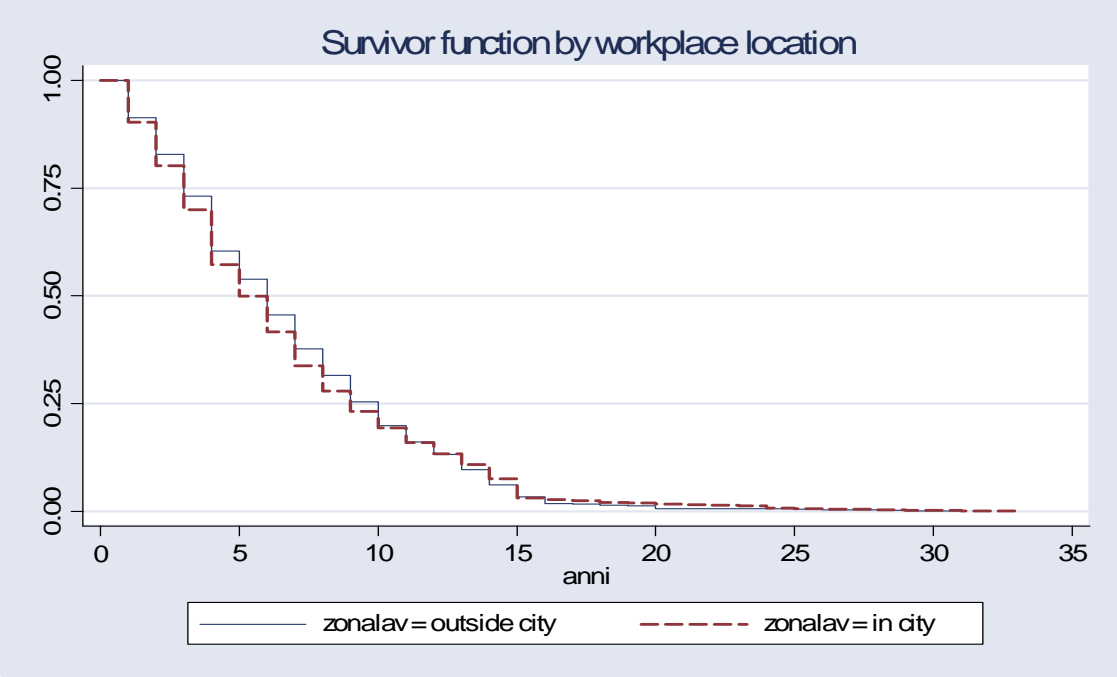


Figure 5 – Kaplan – Meier Estimator of the Survivor Function by Nationality

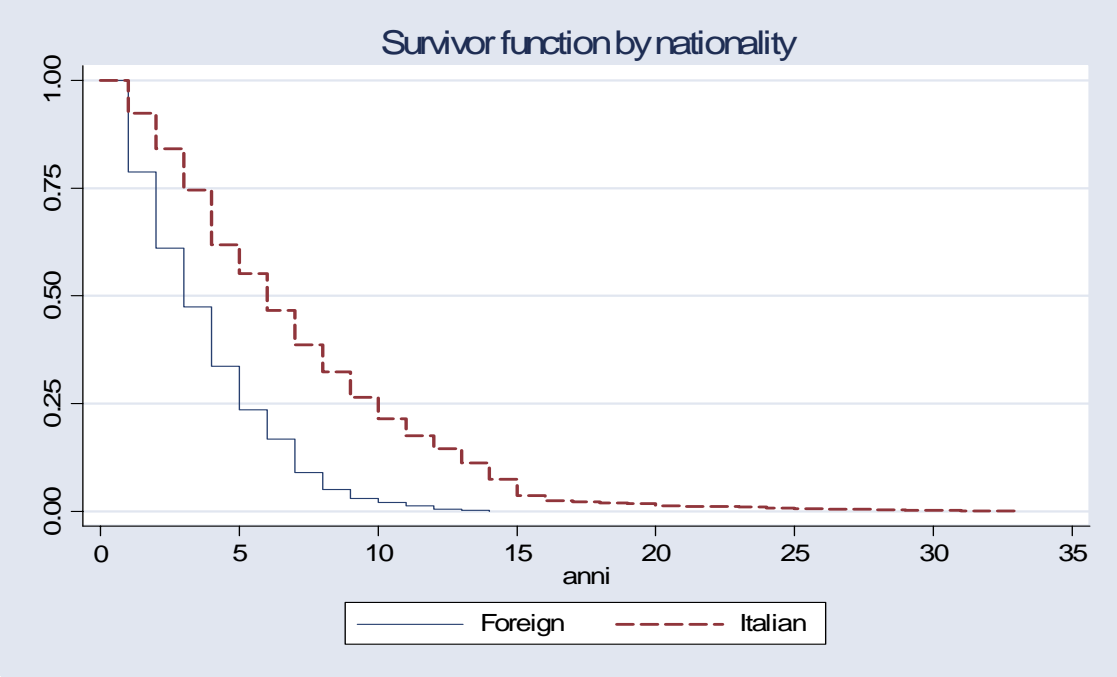


Figure 6 – Check for the Weibull Model

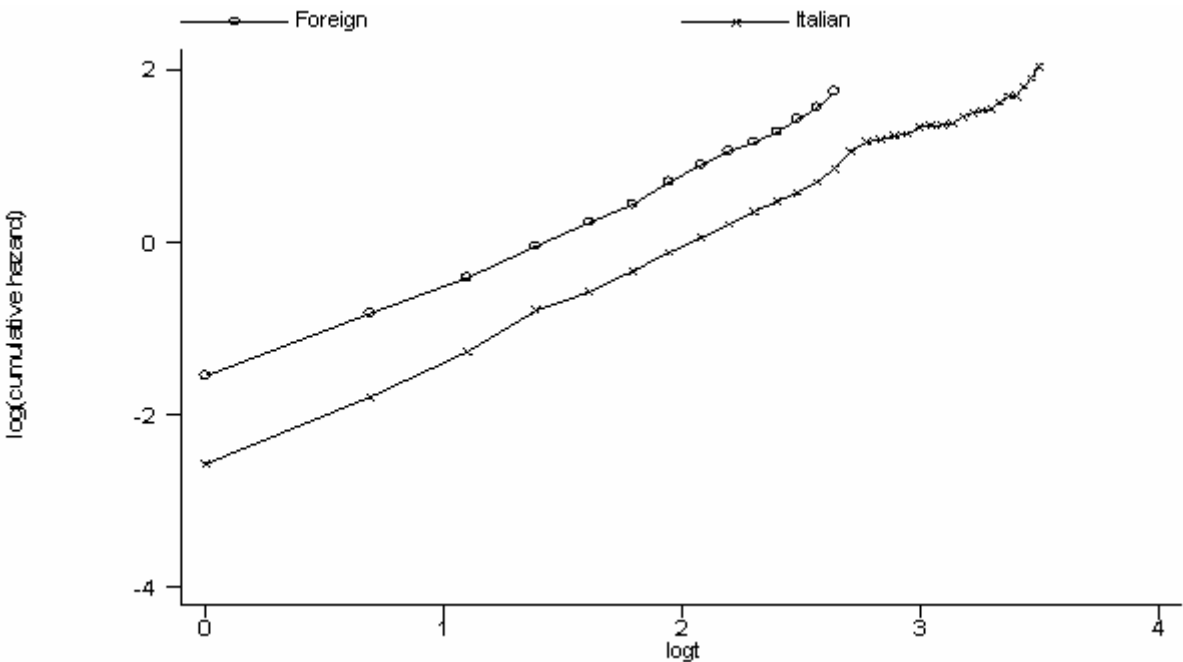
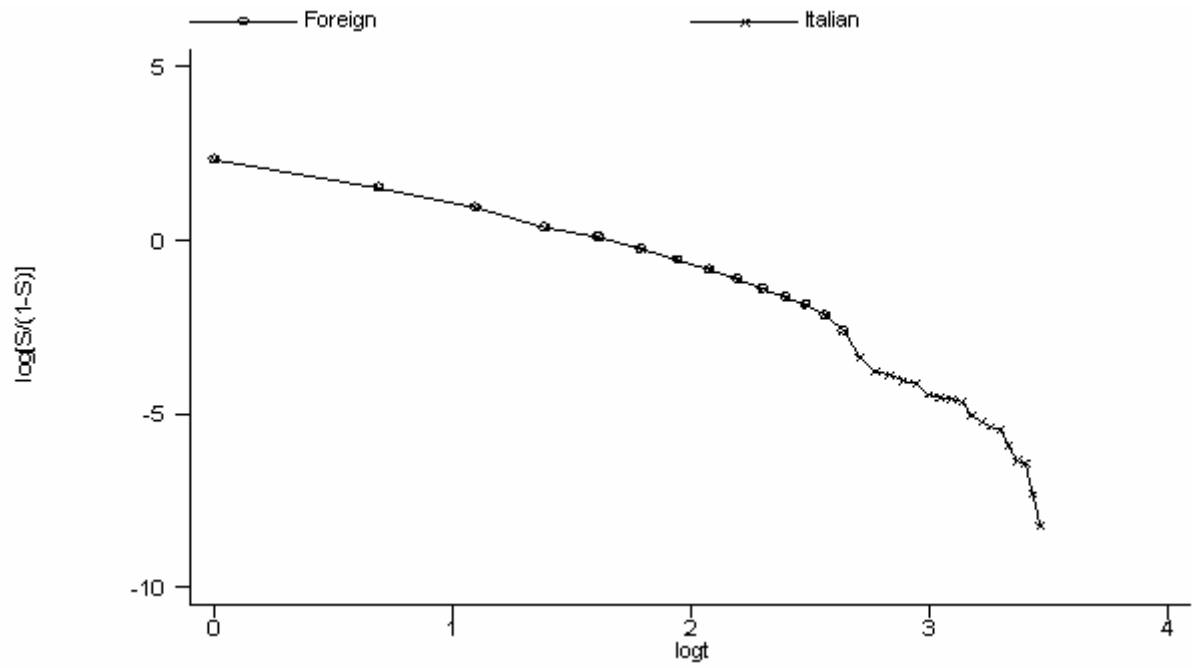


Figure 7 – Check for the Log-logistic model



Tables

Table 1 - Survival analysis statistics by category

	Time at risk	Incidence rate	Number of subjects	Median time of membership
Confederal CGIL	947	0.07	130	9
FILCAMS	26705	0.13	6376	6
FILCEA	16112	0.12	3877	6
FILLEA	23850	0.19	6067	4
FILT	5576	0.14	875	5
FILTEA	14529	0.12	3597	6
FIOM	61994	0.12	13834	6
FISAC	3674	0.16	720	5
FLAI	12130	0.11	2524	7
FLFP	28999	0.14	6175	6
FNLE	1831	0.13	344	6
NIDIL	383	0.27	134	3
SLC	6130	0.14	1383	5
SNS	12583	0.10	1601	8
UFF.VERT.	1086	0.23	773	4
Total	217792	0.13	48705	6

Note on the labels of categories: FILCAMS (Italian Federation of Retailing Workers), FILCEA (Italian Federation of Chemical Workers), FILLEA (Italian Federation of Construction Workers), FILT (Italian Federation of Transport Workers), FILTEA (Italian Federation of Textile and Clothing Workers), FIOM (Federation of Metal Workers), FISAC (Italian Federation of Insurance and Credit Workers), FLAI (Federation of Food Workers), FLFP (Federation of Public Sector Workers), FNLE (National Federation of Energy Workers), NIDIL (New Labour Identities), SLC (Communication Worker Union), SNS (National Teachers' Union), the Controversy Office (UFF.VER.), Confederal CGIL (Italian General Confederation of Labor).

Table 2 - Equality test of the survivor function

	Log-Rank	Wilcoxon
Gender	41,65	25,48
p-value	(0,00)	(0,00)
Nationality	2.603,31	2406,30
p-value	(0,00)	(0,00)
Categories	1763,86	1345,91
p-value	(0,00)	(0,00)
Workplace location	29,67	68,10
p-value	(0,00)	(0,00)

Table 3 - Union membership duration as a function of members' individual characteristics

Model	Weibull ATF	Log-logistic ATF	Weibull ATF Gamma Frailty	Weibull ATF Inverse Gaussian Frailty	Weibull ATF Gamma Frailty	Weibull ATF Inverse Gaussian Frailty
Maximum Likelihood Value	-41071.56	-41814.49	-41015.28	-40560.38	-40957.65	-40527.78
Test LR (p-value)	0.00	0.00	0.00	0.00	0.00	0.00
Male	0.02	0.02	0.02	0.02	0.02	0.02
p-value	(0.01)	(0.06)	(0.03)	(0.01)	(0.02)	(0.01)
Italian Nationality	0.55	0.58	0.55	0.54	0.55	0.54
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Workplace location in the county main city	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FILCAMS	-0.36	-0.47	-0.38	-0.37	-0.38	-0.38
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FILCEA	-0.25	-0.32	-0.26	-0.25	-0.27	-0.27
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FILLEA	-0.54	-0.64	-0.56	-0.55	-0.57	-0.56
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FILT	-0.38	-0.48	-0.39	-0.39	-0.39	-0.40
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FILTEA	-0.30	-0.44	-0.33	-0.33	-0.34	-0.34
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FIOM	-0.27	-0.36	-0.28	-0.28	-0.29	-0.30
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FISAC	-0.49	-0.60	-0.50	-0.50	-0.52	-0.52
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FLAI	-0.17	-0.20	-0.18	-0.17	-0.18	-0.18
p-value	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)
FLFP	-0.42	-0.56	-0.45	-0.44	-0.46	-0.45
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FNLE	-0.38	-0.47	-0.40	-0.39	-0.40	-0.40
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
NIDIL	-0.85	-0.93	-0.87	-0.85	-0.88	-0.86
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SLC	-0.40	-0.58	-0.43	-0.43	-0.44	-0.44
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SNS	-0.09	-0.31	-0.13	-0.13	-0.13	-0.13
p-value	(0.23)	(0.00)	(0.09)	(0.09)	(0.08)	(0.09)
UFF.VER.	-0.88	-1.19	-1.01	-0.90	-1.01	-0.90
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Treviso county	-0.12	-0.13	-0.13	-0.12	-0.13	-0.12
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
age	0.02	0.02	0.02	0.02	0.05	0.04
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
age squared	-	-	-	-	-0.01	-0.01
p-value	-	-	-	-	(0.00)	(0.00)
constant	1.02	0.80	0.97	0.18	0.37	-0.24
p-value	(0.00)	(0.00)	(0.00)	(0.02)	(0.00)	(0.01)
α	1.69	-	1.78	3.09	1.79	3.10
θ	-	-	0.12	26.01	0.13	26.30
LR test (θ=0)	-	-	0.00	0.00	0.00	0.00

Note: for category labels see Table 1.