Job (in)stability

José A. F. Machado (NOVA SBE)
Pedro Portugal (Banco de Portugal, NOVA SBE and IZA Bonn)
Pedro Raposo (Catolica Lisbon SBE, Universidade Catolica Portuguesa)

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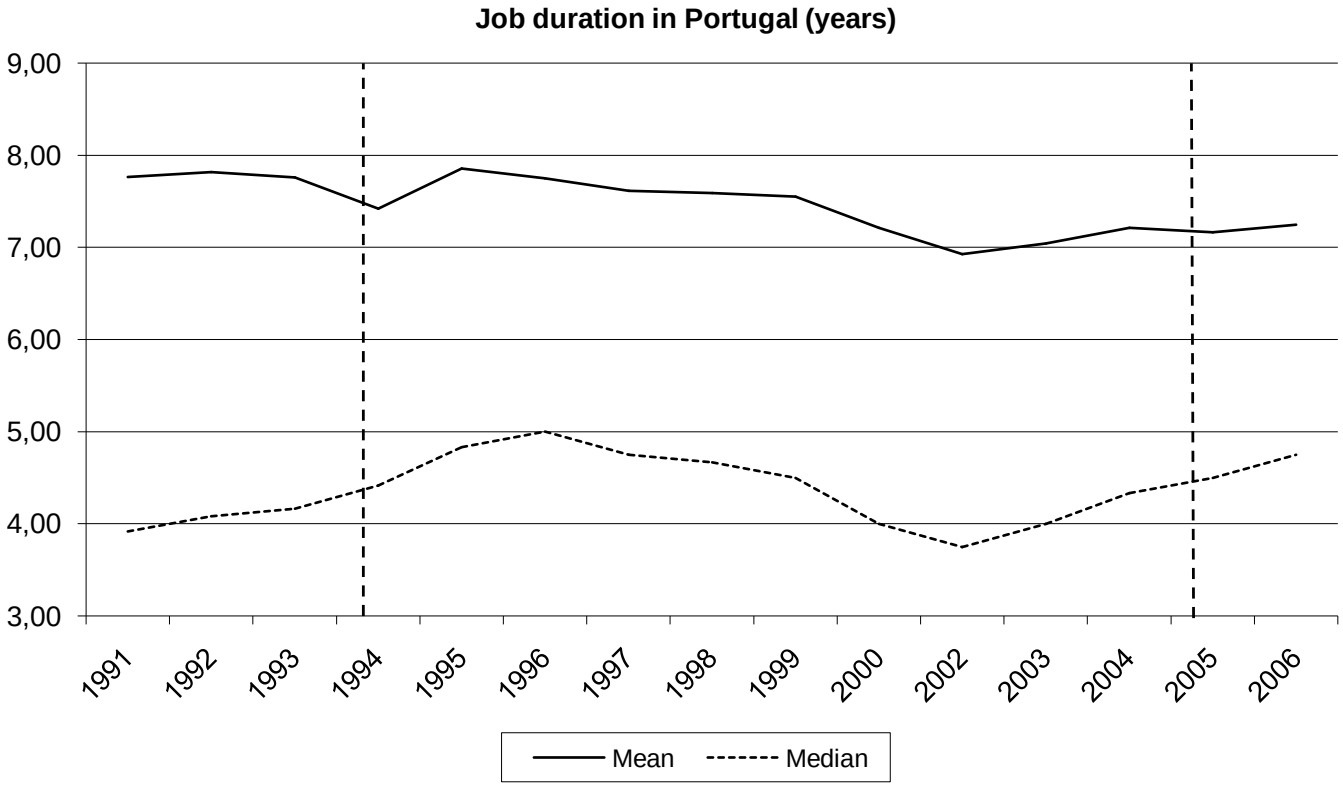
Job duration from 1991 until 2006



Motivation

- Job duration NEGATIVE trend
  - Firm downsizing
  - External Services
  - International competition
- Job duration POSITIVE trend
  - Large aging population

Our study

- Use quantile regression methods to analyze the changes in the job duration distribution in Portugal with matched employer-employee data
- Account for stock sampling. We shall present an alternative semi-parametric procedure which explores the dependency between the distribution of backward recurrence time (that is, elapsed duration) and forward recurrence time (remaining duration), via the use of a device to deal with an observation plan characterized by length bias sampling and right censoring.
- Apply a decomposition method proposed by Machado and Mata (2005) to disentangle the contribution of the composition changes and the structural changes

Previous Literature

- Workers in the 1990s became more pessimistic (Schmidt, 1999) Older, white-collar and college qualifications workers
- No evidence of any systematic change of the overall distribution of job duration in 1980, and 1990s (Farber, 1998 and Diebold et al, 1996)
- Farber (2007) observes a significant reduction for both short and long job durations
- Horny et al (2009) find that firm characteristics explain 30% of the variation in job durations

Data used: Quadros de Pessoal

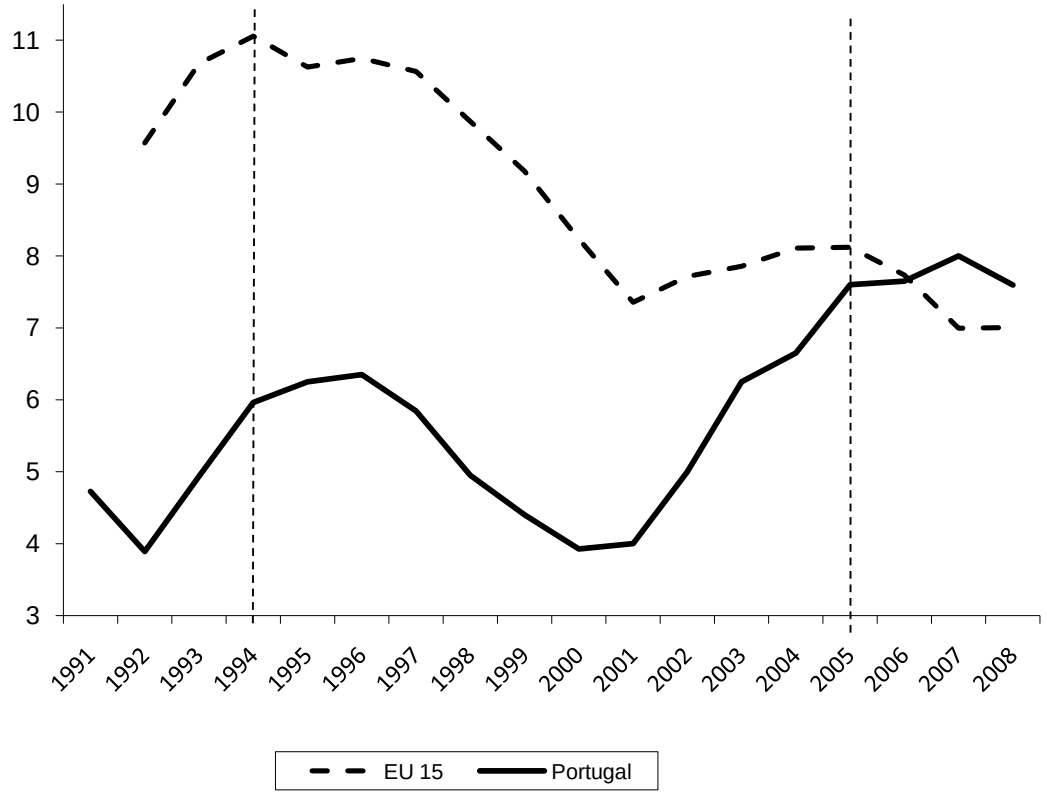
- Panel data - employer-employee match data
- All the population - covers all personnel working for an establishment
- Very rich in worker and firm specific information (Gender, age, schooling, region, industry, firm size)
- 2 years: 1994 and 2005

Data used: Observations

- Full-time employees in the private sector
- Aged 17 to 62
- Exclude agriculture and privatized firms
- 2 years: 1994 (1.310.942 observations) and 2005 (2.097.879 observations)

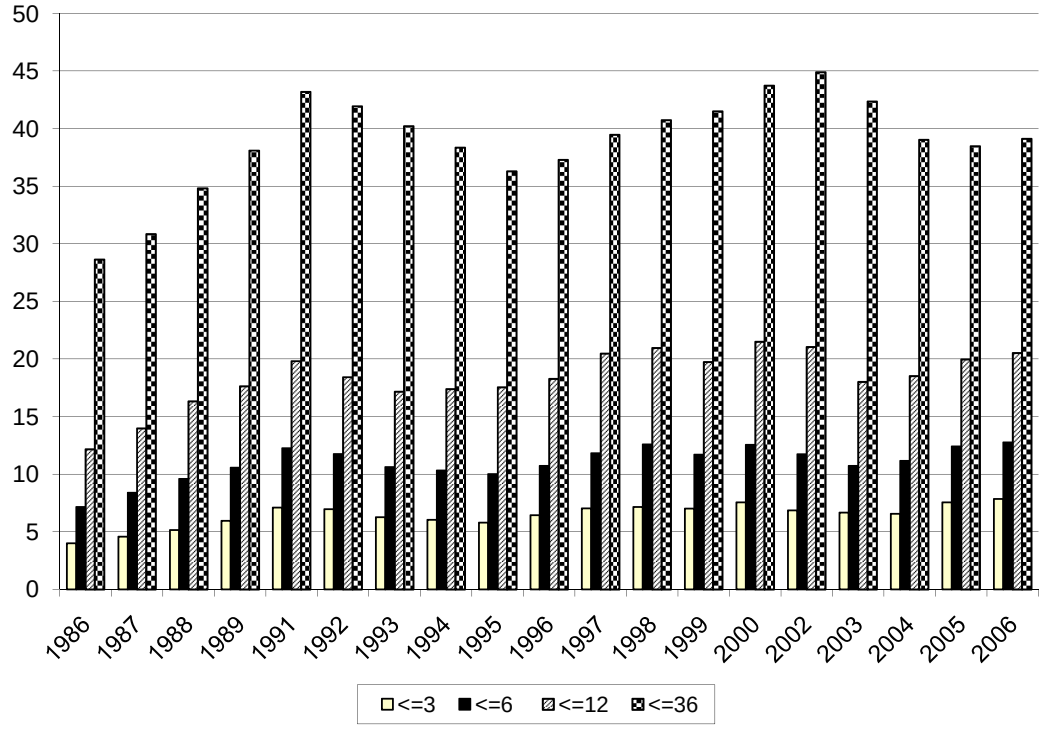
Data used: Years I

Unemployment rates in Portugal and Euro area (1983-2008)



Data used: Years II

Stock of individuals that worked for less than 36 months (% individuals)



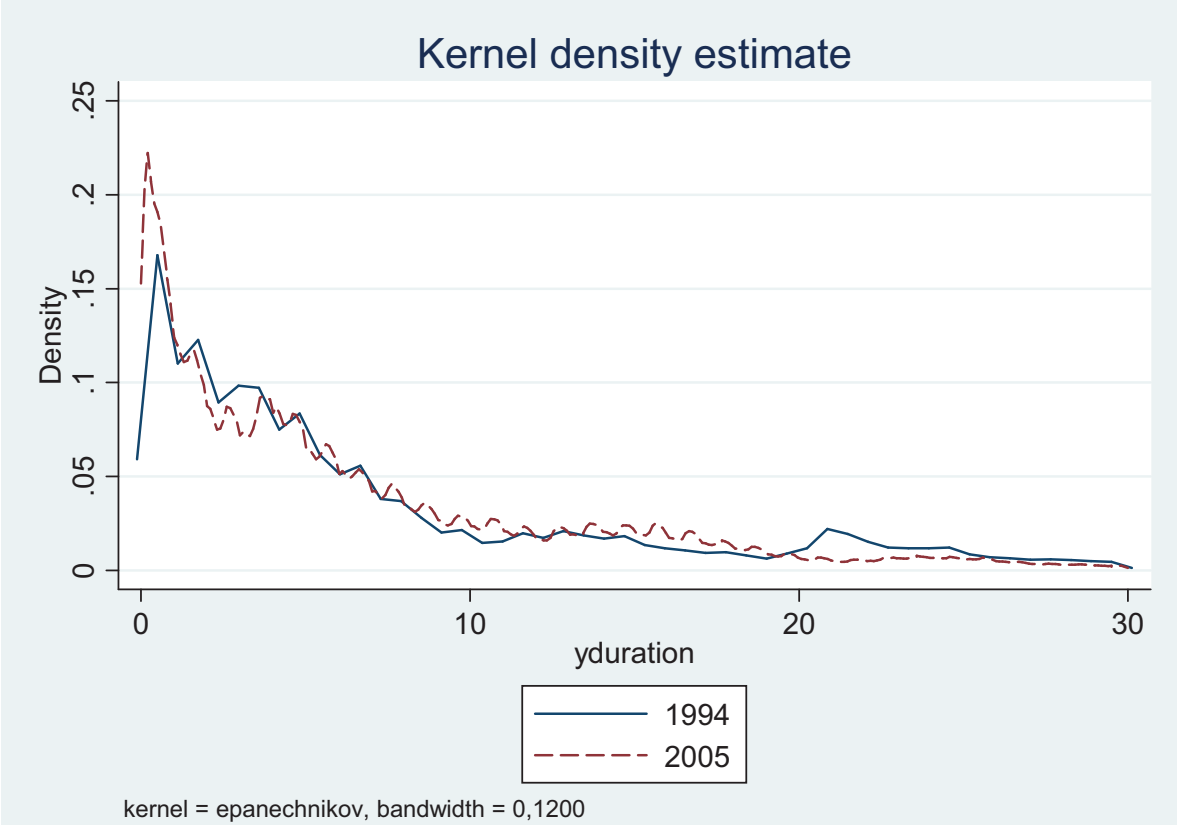
Data used: Variables

- Job duration - tenure in the current job, measured by the difference between october, current year and the month, year of admission
- 7 Industries (Manufacturing, Construction, Commerce, Transports, Financial, External services and education/health)
- External services include namely, Outsourcing, Renting and Temporary work agencies
- Foreign capital - dummy assumes value 1 if rate of foreign capital is at least 10%
- Size of firm (in logs); Education (4 levels); Gender; Age (5 categories)

Descriptives

Variable	1994 Mean	2005 Mean
Median duration (years)	4,42	4,50
Firm size (no. workers)	55	45
Manufacturing	0,44	0,29
Construction	0,10	0,13
Services commerce	0,27	0,29
Services transports	0,03	0,04
Services finantial (except external services)	0,03	0,05
External services	0,04	0,09
Services educ health	0,09	0,11
Foreign capital	0,11	0,11
Schooling 4 - 9 years	0,79	0,68
No schooling	0,03	0,01
Schooling 12 years	0,12	0,19
Schooling bachelor	0,06	0,12
Age	34,69	37,29
17-25	0,24	0,13
25-35	0,33	0,35
35-45	0,23	0,28
45-55	0,14	0,18
55+	0,05	0,06
Male	0,60	0,57

Kernel densities for the job duration



Method - "Weighted censored quantile estimator"

(i) We model the conditional quantiles following equation:

$$Q_p(\omega|t,z) = G(z'(t)\beta^t(p))$$

(ii) Data on $(S, \mathbf{Z})$ is obtained using the stock sampling with follow-up.

It is natural to look at the *weighted* **censored** *quantile regression* estimator defined by minimizing

$$\sum_{i=1}^{n} w(\omega_i, z_i)\rho_p(\omega_i - \min[c_i, \max(z_i'b, 0)])$$

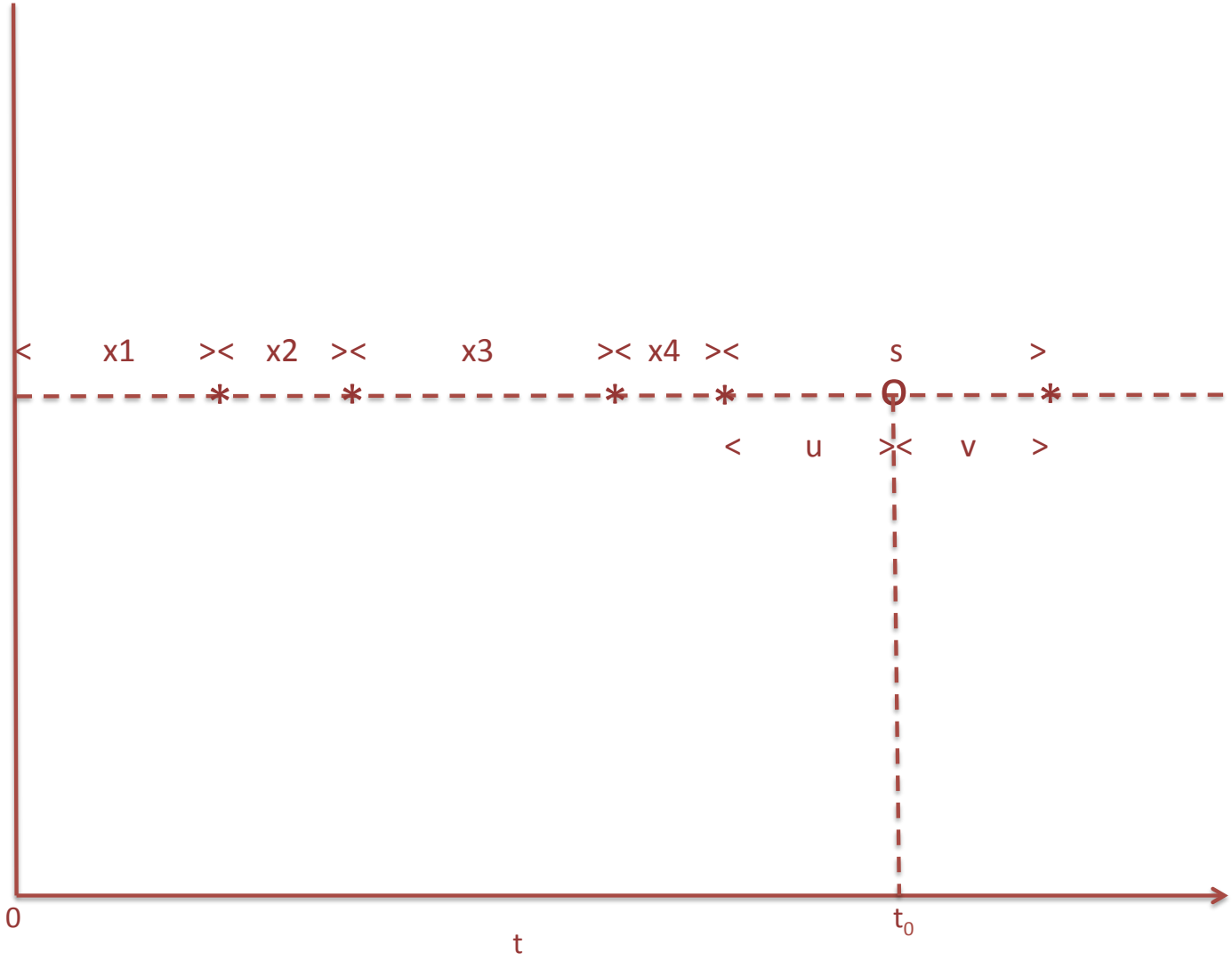
where the weights are

$$w(\omega_i, z_i) = \frac{\mu(z_i)}{\omega_i}$$

with $\mu(z_i) = E(\omega|z_i)$, the conditional mean distribution of the completed durations. $\mu(z_i)$ is estimated via an OLS regression using durations that were completed in the interval (between october t and october t+1).

Simulation: Stock sampling with follow up

Renewal processes



Method - "Weighted censored quantile estimator"

Table: **Simulation results**

		Exponential Distribution	Log-Normal Distribution
(1)	Median (S)	1.39	1
(2)	S	3.36	2.7
(3)	S (correcting for lenght bias)	1.39	0.99
(4)	S with 60% right censoring (correcting for lenght bias)	1.3	1.09

Note: Simulation results based in 100.000 observations using the exponential distribution and the log-normal distribution to simulate the duration data. S is the population duration. In line (1) are reported the true unconditional results obtained for both simulations. Line (2) reports the estimation results for the duration of the population. Line (3) reports the estimation results for the true population correcting for the length bias. Line (4) shows the 50th quantile estimator for the durations with 60% right censoring correcting for length bias.

Method - *M&M* algorithm

The *M&M* algorithm is as follows:

1. Generate p_i, $i \in \{1, \ldots, m\}$ from a standard uniform distribution;
2. Estimate the corresponding $\hat{\beta}^t(p_i)$, i.e. estimate the pth regression quantile of ω on z_i;
3. Generate a random sample of size m from a given $g(z)$; denoted $z(t)_i^*$, $i \in \{1, \ldots, m\}$.
4. Obtain $\hat{Q}(p_i|z(t)_i^*) = g(z(t)_i^{*'} \hat{\beta}^t(p_i))$, which is a random sample from the marginal distributions of durations times implied by the model postulated for the quantile process and by the assumed joint distribution of the covariates.

Method - *M&M* algorithm

In *M&M*, Machado and Mata propose a method to decompose the changes in a given distribution(ω) in two periods (indexed by 0 and 1) in several factors contributing to those changes: that is, an BO type decomposition for the entire distribution,

$$\text{distrib.}\omega(0) \rightarrow \text{distrib.}\omega(1) = \begin{cases} \text{distrib.}z(0) \rightarrow \text{distrib.}z(1) \\ \\ \text{cond. distrib.}\omega(0)|z \rightarrow \text{cond. distrib.}\omega(1)|z \end{cases}$$

Main results: Aggregate - structural and composition

	Marginals			Aggregate contributions		
	1994	2005	Change	Covariates	Coefficients	Residual
20 th quant.	13.670	11.280	-2.391	-1.379	-2.060	-1.048
	13.261;14.080*	10.863;11.696*	-2.982;-1.800*	-1.998;-0.760*	-2.275;-1.844*	
50 th quant.	67.894	71.275	3.381	3.842	-0.198	0.262
	66.853;68.935*	70.142;72.408*	1.880;4.882*	2.217;5.466*	-0.709;0.3130	
80 th quant.	194.975	192.825	-2.150	2.021	-3.293	0.877
	192.283;197.668*	190.463;195.188*	-5.718;1.4190	-1.260;5.3010	-4.357;-2.229*	

Notes: (i) confidence intervals are under the coefficient results which are reported in months.

Main results: Individual covariates

	External services	17-25	35-45	45-55	55+	Male
20 th quant.	-2.39	0.68	0.21	0.41	0.04	0.01
	-2.684;-2.095*	0.496;0.868*	0.076;0.344*	0.252;0.571*	-0.073;0.1560	-0.027;0.0540
50 th quant.	-8.06	6.99	2.46	3.32	1.14	0.05
	-8.783;-7.339*	6.245;7.737*	1.875;3.046*	2.715;3.934*	0.701;1.581*	-0.153;0.2540
80 th quant.	-9.7	24.1	13.57	16.42	5.04	-0.04
	-10.936;-8.455*	22.486;25.706*	11.934;15.201*	14.582;18.257*	3.811;6.270*	-0.365;0.2820

Notes: (i) confidence intervals are under the coefficient results which are reported in months.

Main results: Individual coefficients

	Constant	Firm size	External services	No Schooling	Schooling 12 years	Schooling bachelor
20 th quant.	2.87	-1.53	-1.94	-0.03	0.46	0.49
	2.731;3.007*	-1.654;-1.400*	-2.141;-1.743*	-0.055;0.0010	0.381;0.547*	0.400;0.587*
50 th quant.	16.38	-10.4	-3.59	-0.16	2.53	2.34
	16.087;16.664*	-10.797;-10.007*	-3.967;-3.223*	-0.257;-0.054*	2.200;2.867*	1.963;2.726*
80 th quant.	38.72	-30.27	-2.6	-0.59	4.95	1.68
	37.845;39.595*	-31.142;-29.403*	-3.245;-1.947*	-0.870;-0.314*	4.282;5.610*	1.266;2.090*

Notes: (i) confidence intervals are under the coefficient results which are reported in months.

Robustness checks

- The effect might be driven by the choice of years. We checked years:
  - with different firm and worker flows
  - different stages of the Business Cycle
- We could be overweighting long job durations:
  - Flow analysis (vs Stock analysis)
  - 1994 (365.711 observations) and 2005 (484.561 observations)

Conclusions

- There is a decrease in job durations
- Both compositional changes and structural changes play a role, albeit in opposite directions
- We find that the decrease in job duration is an illusion brought about by the bigger share of external services industry and by the changing relationship between firm-size and job duration

We tentatively argue that it seems that the news of the death of jobs for life is premature

Appendix: Quantile Regression - Year 1994

	Quantile Regression									
	Q10		Q25		Q50		Q75		Q90	
Firm size	0.108	(0.002)*	0.154	(0.001)*	0.128	(0.001)*	0.086	(0.001)*	0.056	(0.001)*
Construction	-1.451	(0.011)*	-1.935	(0.008)*	-1.210	(0.008)*	-0.670	(0.007)*	-0.393	(0.007)*
Services commerce	-0.612	(0.008)*	-0.772	(0.006)*	-0.465	(0.006)*	-0.252	(0.006)*	-0.146	(0.005)*
Services transports	-0.506	(0.019)*	-0.603	(0.013)*	-0.367	(0.015)*	-0.273	(0.014)*	-0.207	(0.013)*
Services finantial (except external services)	1.281	(0.017)*	0.228	(0.014)*	-0.128	(0.018)*	-0.140	(0.017)*	-0.115	(0.017)*
Services educ health	-0.680	(0.012)*	-0.703	(0.008)*	-0.384	(0.009)*	-0.222	(0.008)*	-0.134	(0.008)*
External services	-1.428	(0.017)*	-1.925	(0.012)*	-1.225	(0.012)*	-0.740	(0.011)*	-0.514	(0.010)*
Schooling no reading	0.051	(0.019)*	0.064	(0.013)*	0.021	(0.015)0	-0.001	(0.014)0	-0.021	(0.013)0
Scholling 12 years	0.123	(0.010)*	0.099	(0.007)*	-0.040	(0.008)*	-0.122	(0.007)*	-0.144	(0.007)*
Schooling bachelor	-0.292	(0.014)*	-0.376	(0.009)*	-0.373	(0.010)*	-0.344	(0.009)*	-0.258	(0.009)*
Foreign capital	-0.088	(0.011)*	-0.141	(0.008)*	-0.130	(0.009)*	-0.108	(0.008)*	-0.089	(0.008)*
17-25	-0.509	(0.008)*	-0.781	(0.006)*	-0.723	(0.006)*	-0.712	(0.006)*	-0.718	(0.005)*
35-45	0.503	(0.009)*	0.690	(0.006)*	0.742	(0.007)*	0.650	(0.006)*	0.549	(0.006)*
45-55	1.050	(0.011)*	1.241	(0.007)*	1.077	(0.008)*	0.928	(0.008)*	0.793	(0.007)*
55+	1.493	(0.016)*	1.575	(0.011)*	1.299	(0.012)*	1.127	(0.011)*	0.987	(0.011)*
Male	-0.005	(0.007)0	-0.033	(0.005)*	-0.057	(0.005)*	-0.020	(0.005)*	0.000	(0.005)0
Constant	1.590	(0.012)*	3.023	(0.008)*	4.006	(0.009)*	4.621	(0.008)*	5.011	(0.007)*
Observations	1259965		1073743		758176		529225		425113	

Notes: source: QP.

Appendix: Quantile Regression - Year 2005

	Quantile Regression									
	Q10		Q25		Q50		Q75		Q90	
Firm size	0.071	(0.002)*	0.124	(0.001)*	0.084	(0.002)*	0.047	(0.002)*	0.027	(0.002)*
Construction	-1.460	(0.011)*	-1.917	(0.007)*	-1.217	(0.011)*	-0.753	(0.012)*	-0.447	(0.010)*
Services commerce	-0.916	(0.008)*	-1.033	(0.006)*	-0.594	(0.010)*	-0.354	(0.010)*	-0.219	(0.009)*
Services transports	-0.901	(0.016)*	-0.987	(0.011)*	-0.602	(0.018)*	-0.384	(0.019)*	-0.275	(0.017)*
Services finantial (except external services)	-0.146	(0.015)*	-0.465	(0.011)*	-0.409	(0.019)*	-0.322	(0.020)*	-0.220	(0.019)*
Services educ health	-0.975	(0.011)*	-0.881	(0.008)*	-0.525	(0.013)*	-0.348	(0.014)*	-0.237	(0.012)*
External services	-2.047	(0.011)*	-2.999	(0.008)*	-2.259	(0.012)*	-1.297	(0.012)*	-0.775	(0.011)*
Schooling no reading	-0.206	(0.025)*	-0.300	(0.017)*	-0.239	(0.027)*	-0.109	(0.027)*	-0.066	(0.024)*
Scholling 12 years	0.260	(0.008)*	0.318	(0.006)*	0.152	(0.009)*	0.039	(0.009)*	-0.028	(0.008)*
Schooling bachelor	0.024	(0.010)*	0.045	(0.007)*	-0.102	(0.011)*	-0.182	(0.011)*	-0.237	(0.010)*
Foreign capital	0.169	(0.010)*	0.050	(0.007)*	-0.042	(0.012)*	-0.058	(0.013)*	-0.050	(0.012)*
17-25	-0.511	(0.009)*	-0.886	(0.006)*	-0.965	(0.010)*	-0.873	(0.010)*	-0.830	(0.009)*
35-45	0.307	(0.008)*	0.574	(0.005)*	0.589	(0.009)*	0.528	(0.009)*	0.477	(0.008)*
45-55	0.679	(0.009)*	1.093	(0.006)*	1.040	(0.010)*	0.939	(0.011)*	0.872	(0.009)*
55+	1.057	(0.014)*	1.462	(0.010)*	1.259	(0.016)*	1.105	(0.017)*	1.017	(0.015)*
Male	-0.019	(0.006)*	-0.036	(0.004)*	-0.023	(0.007)*	-0.020	(0.008)*	-0.007	(0.007)0
Constant	1.891	(0.010)*	3.293	(0.007)*	4.309	(0.011)*	4.883	(0.012)*	5.174	(0.011)*
Observations	1259901		1058685		715153		474288		364909	

Notes: source: QP.