Wages, Job Mobility, and Firm Performance: an analysis using matched employer-employee data

John M. Abowd, Cornell University, US Census Bureau, CREST, and NBER
Francis Kramarz, CREST-INSEE, CEPR, and IZA
Sébastien Roux, CREST-INSEE

January 2002

Acknowledgements

- Financial support from the National Science Foundation (SES-9978093 to Cornell University and SBER 96-18111 to the NBER).
- INSEE-CREST provided data to the Cornell Restricted Access Data Center.

- The data used in this paper are confidential but the authors' access is not exclusive.
  - contact kramarz@ensae.fr or john_abowd@cornell.edu

Outline of the Talk

- Motivation: many theories predict a relation between wages, turnover, seniority, and firm performance
- Can we find these relations in the data?
- Theoretical models
- Construction of the data set
- Statistical model
- Results

Motivation

- Job mobility?
  - Firms: impact of hiring, promotion, and separations (worker selection, more generally) on performance
  - Theoretical background: turnover and matching, accumulation of human capital, efficiency wages, selection, career concerns.
- Data: a large longitudinal linked employer-employee data-set (1976-1996)
- General project: joint examination of wage setting, firm-specific mobility policies, and firm performance in France and the US

Theoretical Models

- General v. Firm-specific human capital
  - A priori low v. high returns to human capital
- Rent-sharing
- Efficiency wages and costly turnover
  - Performance and turnover negatively related.
- Matching or screening
  - Quality matters, selection matters
- Career concerns, tournaments
  - Competition between workers within firms. Competition between firms
- Incentives
  - Pay and career tied to individual performance

Multiple Equilibria or Models

- Most models, either economic or econometric, assume homogeneity of effects between firms
- We posit extreme heterogeneity
  - Across firms
  - Unobserved to us
  - Each firm follows one model across time

A Model of Workers' Career

- Worker *i*, employed in firm *j* for *s* years has productivity :

$$p_{ij}^{st} = X_{ij}^{(1)t}\beta + X_{ij}^{(2)st}\beta_j + \phi_i + e_{ij}^{0} + \varepsilon_{ij}^{st}$$

  - $X^{(1)}$ corresponds to variables valued on the labor market (experience, …)
  - $X^{(2)}$ corresponds to variables valued in the firm
  - Individual effect, match effect

Wages

- Rent-sharing ?
  - Opportunity wage : $X_{ij}^{(1)t}\beta + \phi_i$
  - Rent to share : $X_{ij}^{(2)st}\beta_j + e_{ij} + \varepsilon_{ij}^{st}$
  - Hence :

$$w_{ij}^{st} = X_{ij}^{(1)t}\beta + \phi_i + \gamma_j\left(X_{ij}^{(2)st}\beta_j + e_{ij} + \varepsilon_{ij}^{st}\right)$$

Other interpretations : discrimination ?

From wages alone, one can identify only $\beta_j\gamma_j$

The firm seeks to maximize the intertemporal sum of rents deriving from employment

Sequence Within a Job

- Worker is hired : her fixed effect is observed
- Compensation at entry :
  - Observable Characteristics valued on the market
  - Firm-specific effect (incentives or general compensation policy)
  - Individual effect or match effect
- Employment duration (firm and worker decision)
  - Depends on firm's policy through the parameters of the law of duration
  - Workers can leave if prospects are unappealing
- Wage changes :
  - Productivity changes within the firm
  - Firm-specific compensation policy

Employment Duration

- Realized duration is tied to the firm and the workers behaviors
  - Firm looks at worker's productivity and potential abilities:
    - Expected correlation attendue with the individual and the match specific effect (a priori positive).
  - Internal market in the firm ?
    - Position in the age pyramid of the firm at entry
  - Potential attachment to the job :
    - Number of previous jobs
    - Duration in the previous job

Wage Changes

- Structure of wage changes :
  - Induced by the presence in the firm (duration, endogenous selection, firm-specific coefficients)
  - Related to changes in the rent conditional on $X^{(1)}$
  - Introduction of individual fixed effects:
    - Correlation between levels of pay and changes in pay
  - Introduction of the residual from the entry equation :
    - Match quality and wage changes

Statistical Model

- Initial wage
- Employment duration (potentially censored, Firm-specific)
- Employment duration depends on initial wage
- Wage changes (Firm-specific)
- Endogenous duration induces selection effects in the wage changes
- Dynamic effects of the initial wage on future wage changes in the firm

Initial Wage Equation

$$\left(\ln w_{iJ(i,t)} \middle| T_{iJ(i,t)} = 0\right) = X^{(1)}_{iJ(i,t)}\beta + \theta_i + \psi_{J(i,t)} + \varepsilon_{iJ(i,t)}$$

- where T is seniority
- where θ_ι is the individual effect in the entry equation
- où ψ_j is the firm effect in the entry equation
- Other variables: experience, year indicators, region, full-time indicator (all in full interaction with sex)
- Earnings :log of annualized earnings

Job Duration Equation
(firm-specific)

$$\ln T_{ij} = Z_{ij}\alpha_j + \eta_{ij}$$

- where ln *T* is total duration of *i* at employer *j* = J(*i,t*).
- other variables:
  - experience, sex, full-time indicator
  - position in the firm-specific age distribution (at entry, quartiles),
  - θ et ε,
  - Number of previous jobs, duration of the previous job
- Duration depends on initial wage

Wage-Change (firm-specific)

$$\ln w_{it} - \ln w_{it-1} = \Delta X_{it}^{(1)} \beta + \Delta X_{it}^{(2)} \beta_{\mathrm{J}(i,t)} + \nu_{it\,\mathrm{J}(i,t)}$$

- $X^{(1)}$ corresponds to the variables also present in the initial wage equation (experience in particular)
- $X^{(2)}$ corresponds to the variables valued in the firm : seniority with returns depending on
  - θ and ε interacted with seniority indicators
  - Sex, education
  - Full-time to part-time change in status
- Time Dummies
- Duration (selection effect) and initial wage are endogenous in the wage change equation

Likelihood

- Contrib. of job (i,j,t_{ij}) to the likelihood:

$$L_{ij}^{t} = f\left(w_{ij}^{0}, \Delta w_{ij}^{1}, ..., \Delta w_{ij}^{T_{ij}}, T_{ij} / I_{t-1}\right)$$

$$= f^{0}\left(w_{ij}^{0} / I_{t-1}, j\right) * f_{j}^{T}(T_{ij} > 0 / w_{ij}^{0}, I_{t-1}) * f_{j}^{w}(\Delta w_{ij}^{1} / T_{ij} > 0, w_{ij}^{0}, I_{t-1}) * \cdots$$

$$* f_{j}^{T}(T_{ij} = t_{ij} / T_{ij} > t_{ij} - 2, w_{ij}^{0}, I_{t-1}) * f_{j}^{w}(\Delta w_{ij}^{t_{ij}} / T_{ij} > t_{ij} - 1, w_{ij}^{0}, I_{t-1})$$

- I_{t-1} contains all past information
- J corresponds to the firm (model expressed firm by firm)
- Contribution of individual i to the likelihood:

$$L_i = \prod_{k=1}^{N_i} L_{ij(k)}$$

Likelihood (continued)

- Rewriting of the likelihood:

$$L_{ij}^{t} = f^{w}\left(w_{ij}^{0} / I_{t-1}\right) * f_{j}^{T}\left(T_{ij} = t_{ij} / w_{ij}^{0}, I_{t-1}\right) * \prod_{1}^{t_{ij}} f_{j}^{w}(\Delta w_{ij}^{k} / T_{ij} > k-1, w_{ij}^{0}, I_{t-1})$$

- which gives:

$$f^{w}\left(w_{ij}^{0}\right) = \varphi\left(\frac{\ln\left(w_{ij}^{0}\right) - X_{it}\beta - \theta_{i} - \psi_{j}}{\sigma_{w}}\right)$$

$$f_{j}^{T}\left(T_{ij} / \varepsilon_{ij}, Z_{ij}\right) = \varphi\left(\frac{\ln\left(T_{ij}\right) - Z_{ij}\alpha_{j} - \rho_{j}^{1}\varepsilon_{ij}}{\sigma_{j}^{T}}\right)^{d_{ij}=0} \overline{\Phi}\left(\frac{\ln\left(T_{ij}\right) - Z_{ij}\alpha_{j} - \rho_{j}^{1}\varepsilon_{ij}}{\sigma_{j}^{T}}\right)^{d_{ij}=1}$$

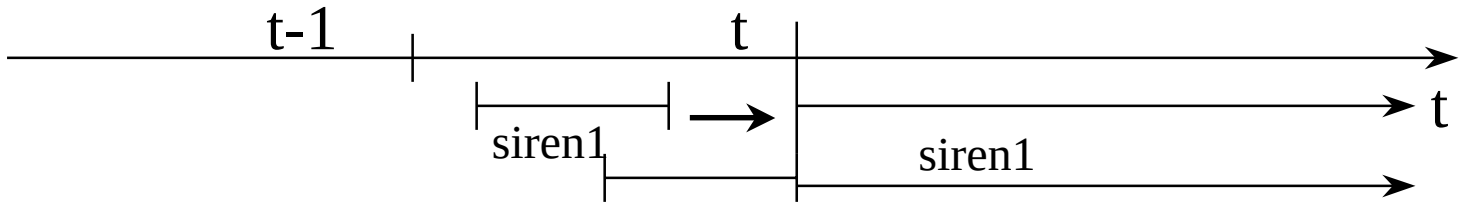
$$f_{j}^{\Delta w}\left(\Delta w_{ij}^{1}, \ldots, \Delta w_{ij}^{T_{ij}} / T_{ij}, \varepsilon_{ij}, X^{(1)}, X^{(2)}\right) = \prod_{s=1}^{E\left(T_{ij}\right)} f\left(\Delta w_{ij}^{s} - \Delta X^{(1)}\beta - \Delta X^{(2)}\beta_{j} / s < T_{ij}, \Delta X^{(1)}, \Delta X^{(2)}, \varepsilon_{ij}\right)$$

Parameter Estimation

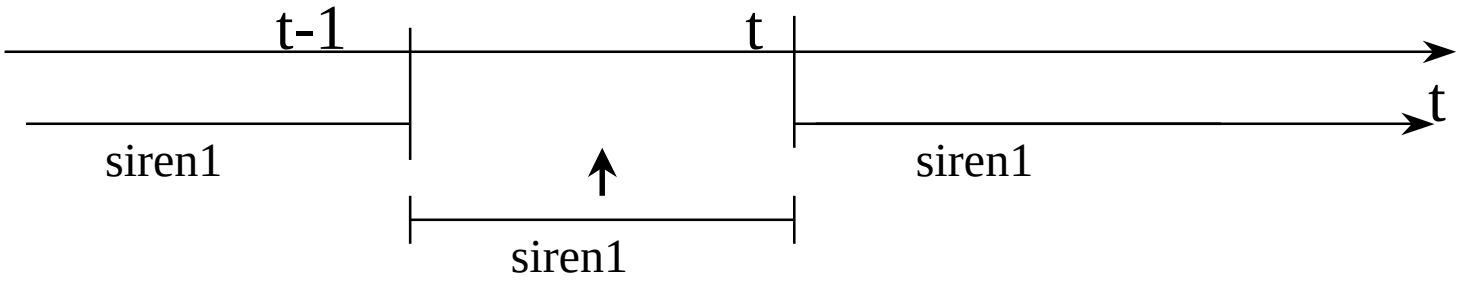
- Maximum likelihood ?
- Sequential Estimation procedure
  - Entry wage equation : Identification of β and of individual and firm effects, OLS
  - Job duration equation : Duration model with censoring, firm by firm, includes the individual residual from the entry wage equation
  - Wage change equation : OLS firm by firm
    - Wages corrected for $X^{(1)}$
    - Introduction of the entry wage residual
    - Introduction of the Mills ratio induced by the duration equation

Construction of individual data

- Years 1976-1996 except 1981, 1983 and 1990
- 1 observation corresponds to a NNI-SIREN-YEAR (person-firm-year)
- Construction des job spells

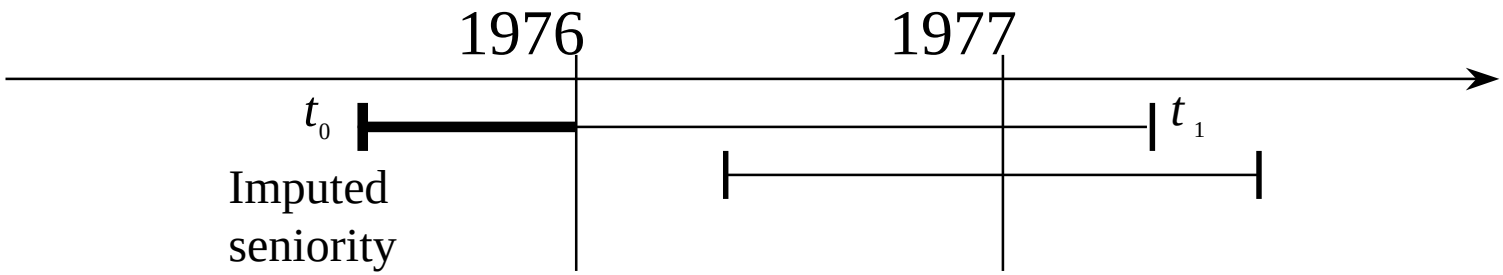


- Imputation for the NNI wrongly coded and the missing years



Job Seniority

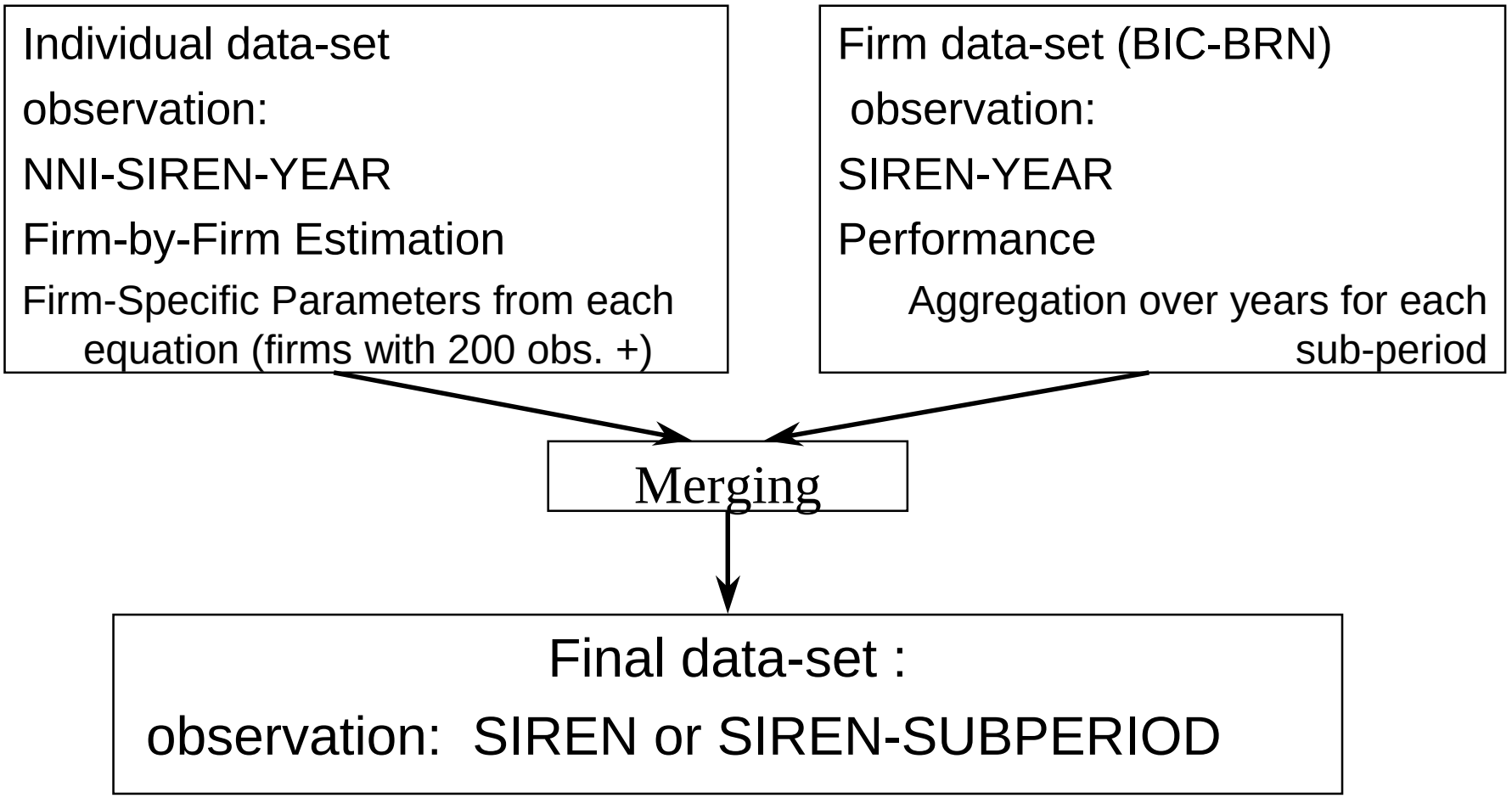
- Observed for all spells that start after 1976
- Statistical Imputation for all spells starting in 1976 using ESS 1978



Final Data Structure

- 13,770,082 observations (of which 4,886,669 are for entry jobs)
- 1,682,080 individuals
- 515,557 firms (with 6498 “firms” for which the full model was estimated including 189 “3-digit industries*Size” agregate firms)
- About 6,000 firms in the performance equations

Construction of the Firm-Level Data



Average Coefficients for the Starting Wage Equation Selected Variables		
Variable	Men	Women
Labor force experience	0,0973	0,0742
Experience^2/100	-0,5447	-0,4269
Experience^3/1000	0,1397	0,1192
Experience^4/10000	-0,0138	-0,0122
Paris	0,0870	0,1024
Full time job	0,8221	0,7834
Number	2 920 340	1 966 329
Note: Estimated using exact least squares (congugate gradient algorithm). The equation also includes year, person, and firm effects.		

All Entrants, Descriptive Statistics

Variable	Means	StDev
Ile de France	0.3134	
Job duration	1.0804	3.5061
Age at the end of schooling	18.3592	1.7543
male	0.5976	
Year	1985.4500	6.6716
Log earnings	3.3135	1.0661
Age at the end of schooling	30.9861	10.7513
Number of previous jobs	3.5570	16.3801
Duration of the previous job	1.8492	4.2156
Mobility	0.5259	0.4993
Low-education	0.5507	
Technical education	0.2865	
High-education	0.1628	

Standardized variables		
Log wage	0.0000	1.0657
Xbeta	0.0000	0.4522
Person effect	0.0000	0.5680
Firm effect	0.0000	0.4910
Residual	0.0000	0.6158

Correlation of Components of the Starting Wage Rate N=4,886,669	ln w	xβ	θ	ψ	Residual
Log annualized net salary (ln w)	1,000	0,473	0,486	0,449	0,578
Predicted by time-varying effects (xβ)	0,473	1,000	0,002	0,103	0,000
Person effect (θ)	0,486	0,002	1,000	-0,105	0,000
Firm effect (ψ)	0,449	0,103	-0,105	1,000	0,000
Residual	0,578	0,000	0,000	0,000	1,000

Distribution of job-duration equation coefficients									
	Mean	StDev	1pctle	5pctle	1st quartile	Median	3rd quartile	95 pctle	99pctle
Constant	-0.19	1.00	-2.31	-1.71	-0.79	-0.14	0.27	1.55	2.29
Year<=1980	0.30	0.76	-1.38	-0.45	0.10	0.22	0.48	1.38	2.73
1980<Year<=1989	-0.24	0.63	-1.53	-0.69	-0.41	-0.29	-0.11	0.59	1.24
Position in age distribution at entry:									
Age<=25centile	1.48	1.04	-0.92	-0.13	0.91	1.44	2.19	3.20	3.86
25centile<Age<=50centile	1.15	0.82	-0.76	-0.11	0.70	1.13	1.64	2.36	3.01
50centile<Age<=75centile	0.80	0.56	-0.54	-0.08	0.57	0.83	1.15	1.55	2.07
Full-time	0.43	0.67	-1.08	-0.33	0.16	0.43	0.64	1.32	2.19
Male	-0.17	1.15	-0.81	-0.47	-0.31	-0.19	-0.09	0.30	0.70
Experience	0.12	0.08	-0.06	-0.01	0.07	0.12	0.16	0.24	0.35
Experience ^2	-0.15	0.16	-0.66	-0.41	-0.20	-0.14	-0.08	0.03	0.17
Low-Education	-0.46	0.83	-2.28	-1.10	-0.63	-0.46	-0.33	0.27	1.32
High-Education	-0.26	1.06	-2.64	-1.30	-0.55	-0.21	-0.01	0.62	1.90
Duration of previous job	0.28	0.28	0.04	0.14	0.23	0.26	0.30	0.45	0.81
Number of previous jobs	-0.05	0.12	-0.42	-0.15	-0.05	-0.04	-0.03	-0.01	0.01
Individual effect	-0.06	0.31	-0.86	-0.47	-0.19	-0.07	0.12	0.33	0.82
Residual from the entry wage equation	-0.22	0.32	-0.83	-0.59	-0.35	-0.23	-0.13	0.23	0.83

Note : estimation based on 6611 firms (including 300 agregates)

Distribution of the Students of the Duration Equation Coefficients									
	Mean	StDev	1pctle	5pctle	1st quartile	Median	3rd quartile	95 pctle	99pctle
Constant	-42.56	127.89	-314.65	-314.65	-63.27	-12.17	9.00	42.95	118.88
Year<=1980	8.30	12.77	-23.50	-7.67	1.27	8.02	13.23	24.40	45.92
1980<Year<=1989	-12.64	40.62	-47.57	-44.82	-24.07	-9.56	-1.28	4.37	58.10
Position in age distribution at entry:									
Age<=25centile	30.68	30.81	-1.99	-0.47	4.68	20.78	52.33	113.68	113.68
25centile<Age<=50centile	29.31	31.37	-2.10	-0.65	3.72	19.71	50.78	121.80	121.80
50centile<Age<=75centile	26.40	28.33	-2.54	-0.87	3.46	18.13	41.43	110.20	110.20
Full-time	18.34	22.04	-19.72	-2.00	2.88	11.74	31.17	47.53	92.59
Male	-11.00	20.24	-41.71	-41.71	-19.24	-6.83	-0.84	2.25	6.29
Experience	29.02	27.44	-2.42	-0.20	5.26	22.55	49.11	93.83	93.83
Experience ^2	-14.09	19.19	-40.29	-40.29	-25.75	-11.88	-3.09	0.98	2.14
Low-Education	-9.58	10.70	-30.16	-30.16	-13.15	-6.77	-2.05	0.51	1.65
High-Education	-3.61	34.44	-26.34	-26.34	-5.13	-2.22	-0.14	2.14	16.73
Duration of previous job	86.28	83.57	1.43	3.78	19.95	63.80	129.73	252.20	252.20
Number of previous jobs	-29.68	34.73	-108.63	-108.63	-39.66	-17.04	-5.22	-1.02	0.50
Individual effect	-5.27	34.55	-48.48	-39.40	-10.84	-1.23	2.36	18.60	18.60
Residual from the entry wage equation	-18.70	44.77	-70.31	-70.31	-25.82	-11.53	-2.27	1.37	5.01

Note : estimation based on 6611 firms (including 300 agregates)

Results of the Job-duration equation

- Main Results :
  - Old hires stay less
  - Part-time hires stay less
  - Men stay longer than women
  - Low and high-education workers stay less in most firms
  - Experienced workers stay longer periods in most firms
  - The number of previous jobs and previous seniority are very important determinants of duration
- For all variables, coefficients are statistically different from 0 for 75% of all firms

Distribution of the wage change equation coefficients									
	Mean	StDev	1pctle	5pctle	1st quartile	Median	3rd quartile	95 pctle	99pctle
Constant	-0.006	2.26	-0.5884	-0.1431	-0.03372	-0.01439	0.00239	0.14941	0.5599
Year<=1980	0.009	0.11	-0.2839	-0.0714	-0.00059	0.00698	0.01549	0.10244	0.341
1980<Year<=1989	0.006	0.11	-0.3382	-0.0639	-0.00212	0.0073	0.0197	0.07301	0.3201
Seniority<=2	0.008	2.26	-0.3477	-0.1022	-0.00565	0.00914	0.03135	0.12844	0.4115
2 < Seniority <= 5	-0.014	1.69	-0.3654	-0.108	-0.02131	-0.00891	0.00131	0.06782	0.2838
5 < Seniority <=10	0	0.98	-0.282	-0.0827	-0.01126	-0.00393	0.00323	0.05458	0.2361
Change Part-Time to Full-Time	0.578	0.37	-0.0489	0.20137	0.44601	0.51536	0.64416	1.24671	1.9601
Individual effect*(sen<=2)	-0.195	0.15	-0.6423	-0.4456	-0.24773	-0.15691	-0.12349	-0.04902	0.112
Individual effect*(2<Sen<=5)	-0.043	1.73	-0.4392	-0.2108	-0.05483	-0.02807	-0.0154	0.07553	0.2898
Individual effect*(5<Sen<=10)	-0.027	1.99	-0.5098	-0.1856	-0.04497	-0.02665	-0.01156	0.0668	0.3193
Individual effect*(10<Sen)	-0.031	2.34	-0.4638	-0.1273	-0.03488	-0.02212	-0.00846	0.06487	0.3171
Male	0.011	0.12	-0.1486	-0.04	0.00057	0.01221	0.01993	0.06442	0.1642
Mills Ratio (transformed)	0.006	1.42	-0.1204	-0.0338	0.00112	0.00825	0.01896	0.07414	0.2224
Low-Education	-0.012	0.16	-0.423	-0.1282	-0.02637	-0.00906	0.00369	0.0905	0.3917
High-Education	0.059	0.38	-0.5114	-0.0894	0.02541	0.05272	0.08292	0.229	0.6736
Initial residual*(sen<=2)	-0.311	0.17	-0.8439	-0.6053	-0.38324	-0.28533	-0.23605	-0.10022	0.0668
Initial residual*(2<Sen<=5)	-0.047	0.71	-0.5756	-0.2801	-0.06452	-0.02382	0.00223	0.09678	0.308
Initial residual*(5<Sen<=10)	57.091	11056.34	-0.5899	-0.2579	-0.05218	-0.00919	0.00892	0.07126	0.3518
Initial residual*(10<Sen)	140.771	20415.61	-0.624	-0.205	-0.04138	0	0.03394	0.14149	0.4261
Standard Deviation of the residuals	0.527	0.21	0.1969	0.26859	0.41462	0.48394	0.58166	0.90553	1.444

Notes : Estimated using 6,598 firms (including agregates), returns to experience are substracted from wages

Distribution of the Students of the wage change equation coefficients									
	Mean	StDev	1pctle	5pctle	1st quartile	Median	3rd quartile	95 pctle	99pctle
Constant	-0.9807	2.0479	-5.9445	-4.3054	-1.9948	-0.7582	0.0874	1.615	5.339
Year<=1980	1.3357	3.3311	-9.1621	-1.9267	-0.0717	0.8862	2.2204	10.196	10.196
1980<Year<=1989	2.0798	6.9921	-11.791	-3.0929	-0.3361	0.9827	2.7318	23.203	23.203
Seniority<=2	1.3219	2.8989	-5.405	-3.1079	-0.2702	1.1407	2.2877	6.714	11.134
2 < Seniority <= 5	-1.2126	1.9752	-8.6364	-4.9146	-2.0998	-0.9958	0.055	1.492	2.946
5 < Seniority <=10	-0.5058	1.4398	-4.4459	-2.6147	-1.2587	-0.3005	0.2789	1.354	2.953
Change Part-Time to Full-Time	58.5302	50.432	-0.4382	2.439	11.9887	48.1005	85.8519	158.624	158.62
Individual effect*(sen<=2)	-19.5487	17.6551	-65.213	-59.113	-32.3868	-15.017	-4.4619	-0.517	0.784
Individual effect*(2<Sen<=5)	-3.2051	3.2881	-10.175	-10.175	-5.491	-2.3799	-0.644	0.838	1.927
Individual effect*(5<Sen<=10)	-2.487	2.5006	-7.1217	-6.4827	-4.4417	-1.941	-0.467	0.81	1.597
Individual effect*(10<Sen)	-2.5539	2.8666	-10.212	-9.9504	-3.8744	-1.7926	-0.431	0.828	2.002
Male	1.64	2.8517	-4.4001	-4.4001	0.0139	1.5174	3.2666	6.095	8.797
Mills Ratio (transformed)	0.0063	1.4189	-0.1204	-0.0338	0.0011	0.0083	0.019	0.074	0.222
Low-Education	-0.8393	1.366	-4.0692	-3.19	-1.6885	-0.6331	0.0705	1.039	1.954
High-Education	2.7451	2.955	-2.2255	-0.6928	0.5632	1.9874	4.0881	9.567	9.567
Initial residual*(sen<=2)	-27.9567	25.7496	-96.057	-96.057	-40.2169	-21.2785	-6.6026	-1.115	0.515
Initial residual*(2<Sen<=5)	-1.698	4.0379	-12.987	-6.3549	-3.4212	-1.4644	0.0917	3.838	8.446
Initial residual*(5<Sen<=10)	-0.6522	2.7152	-7.6591	-4.793	-1.9161	-0.3172	0.7653	3.15	5.034
Initial residual*(10<Sen)	0.6641	3.1899	-7.1074	-3.3688	-1.2508	0	2.9227	6.923	10.259

Notes : Estimated using 6,598 firms (including agregates), returns to experience are substracted from wages

Results of the Wage Change Equation

- Most coefficients have a symmetric distribution (around 0) but
  - Going to Full-time work always increase wage
  - High hiring wages always induce lower wage changes
  - Mills ratio is almost never significantly different from 0
- For all variables, 25% of the coefficients are significantly different from 0 (except for entry wage*seniority, 75%)

Correlation between the coefficients of the two equations

			Job-duration equation				Wage change equation					
									Individual effect (entry wage)			
			Cst	Male	Ind. Eff	Nber of jobs	Cst	Male	Sen<=2	2<Sen<=5	5<Sen<=10	10<Sen
Job-duraton equation		Cst	1.00	0.01	**0.25**	**-0.60**	-0.01	0.02	**0.09**	0.01	-0.01	0.00
				0.32	<,0001	<,0001	0.36	0.19	<,0001	0.30	0.62	0.99
		Male	0.01	1.00	0.01	0.16	0.00	0.00	0.00	0.00	0.00	0.00
			0.32		0.48	<,0001	0.92	0.89	0.93	0.99	0.91	0.87
		Ind. Eff	**0.25**	0.01	1.00	**-0.19**	0.00	0.00	**0.04**	0.00	0.00	0.00
			<,0001	0.48		<,0001	0.79	0.76	0.00	0.96	0.85	0.96
		Nber of jobs	**-0.60**	**0.16**	**-0.19**	1.00	0.00	-0.01	-0.02	0.00	0.00	0.00
			<,0001	<,0001	<,0001		0.97	0.64	0.16	0.97	0.88	0.88
Wage change equation	Individual effect (salaire d'embauche)	Cst	-0.01	0.00	0.00	0.00	1.00	**-0.08**	0.00	**-0.70**	**0.08**	**-0.25**
			0.36	0.92	0.79	0.97		<,0001	0.90	<,0001	<,0001	<,0001
		Male	0.02	0.00	0.00	-0.01	**-0.08**	1.00	**-0.10**	**0.09**	**-0.08**	-0.01
			0.19	0.89	0.76	0.64	<,0001		<,0001	<,0001	<,0001	0.62
		Sen<=2	**0.09**	0.00	**0.04**	-0.02	0.00	**-0.10**	1.00	-0.01	0.00	0.00
			<,0001	0.93	0.00	0.16	0.90	<,0001		0.51	0.84	0.83
		2<Sen<=5	0.01	0.00	0.00	0.00	**-0.70**	**0.09**	-0.01	1.00	-0.01	0.00
			0.30	0.99	0.96	0.97	<,0001	<,0001	0.51		0.33	0.87
		5<Sen<=10	-0.01	0.00	0.00	0.00	**0.08**	**-0.08**	0.00	-0.01	1.00	-0.01
			0.62	0.91	0.85	0.88	<,0001	<,0001	0.84	0.33		0.51
		10<Sen	0.00	0.00	0.00	0.00	-0.25	-0.01	0.00	0.00	-0.01	1.00
			0.99	0.87	0.96	0.88	<,0001	0.62	0.83	0.87	0.51	

		Value-Added			
		Parameter	Stderr	Parameter	Stderr
Structure	Intercept	4.80	0.06	4.84	0.06
	Capital	0.19	0.00	0.19	0.00
	Employment	0.73	0.01	0.72	0.01
Job-duration equation	ANC1			0.02	0.01
	ANC2			-0.02	0.01
	ANC3			0.01	0.01
	INDAN1			0.02	0.03
	INDAN2			-0.02	0.01
	INDAN3			0.00	0.00
	INDAN4			0.00	0.00
	PROGB			0.02	0.01
	PROGH			-0.03	0.01
	DCOMP			0.01	0.01
	DINT			0.01	0.01
	DMALE			0.02	0.00
	DAGE1			-0.03	0.01
	DAGE2			0.03	0.01
	DAGE3			0.01	0.01
	DANCPRE			0.11	0.02
	DNEMPPRE			0.18	0.03
	DPERSFE			-0.02	0.01
	DRESID			0.04	0.01
Wage change equation	PERS25	0.32	0.08	0.27	0.08
	PERS50	0.30	0.12	0.28	0.12
	PERS75	0.23	0.07	0.26	0.07
	XB25	0.21	0.06	0.22	0.06
	XB50	-0.10	0.09	-0.08	0.09
	XB75	-0.04	0.07	-0.04	0.07
	RES25	-0.40	0.05	-0.42	0.05
	RES50	0.52	0.12	0.52	0.12
	RES75	0.03	0.06	0.00	0.06

Conclusions

- Employment Policies are very heterogeneous
- Returns to Seniority are very heterogeneous
- Persons with large person effects have lower returns to seniority (in particular, in the first years).
- Persons with unusually high starting wage rates on a particular job have lower returns to seniority (same remark).
- Turnover and employment policies matter for productivity more than compensation policies