

Working conditions and work-related chronic diseases : A career-long retrospective study

Work in progress

Thomas BARNAY* & Éric DEFEBVRE**

*Créam, Rouen University and Érudite, Paris-Est Créteil University

**Érudite, Paris-Est Créteil University

Pôle Santé et Société - June 10th, 2015

Context

- Is work good for your health? Among people declaring work has an impact on their health... (EWCS 2010)
 - ...25% of workers declare a detrimental impact
 - Only 7% answer it has a positive impact
- Growing use of new technologies, management methods, activity controls...
- ... and therefore new and increasing tensions on employees (Askénazy *et al.*, 2006)

Law in January 2015

Exposure to detrimental physical working conditions is now taken into account (sort of) in the pension calculation

The impact of working conditions on health

Physical and mental health are affected by different work strains :

- Impact on physical health...
 - Physical work demands (heavy loads, ...)
 - Noise, vibrations, extreme temperatures
 - Repetitive work
- ... as well as on mental health
 - Contract (part time vs. full time)
 - Working time (overtime, night work, ...)
 - Work environment (equipment, ICT usage, colleagues)
 - Job demands, job control, social support



Llena-Nozal, 2009 ; Robone *et al.*, 2011 ; Charbotel *et al.*, 2009 ; Afssa *et al.*, 2009 ; Cottini *et al.*, 2013 ; Askénazy *et al.*, 2006 ; Blanchet *et al.*, 2007 ; Pisljar *et al.*, 2011

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Biases in the relationship

The relationship between work and health status suffers from endogeneity biases, generating methodological difficulties.

- Endogeneous sorting : choosing a job isn't random
 - Self-selection
 - Discrimination towards unhealthy people
 - Healthy worker effect
- Unobserved factors
 - Individual factors : preferences, risk aversion behaviors
 - Temporal factors: shocks, crises, conjuncture (time horizon)



Cottini *et al.*, 2013; Ehlert *et al.*, 2011; Adams *et al.*, 2003

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Our contribution & Aim of the paper

- We consider a large body of working conditions (physical, organizational and psychosocial strains)
- Handle biases coming from selection and unobserved factors
- We take into account duration/cumulative effects of exposures
- We consider the whole career of individuals (from the end of their initial studies to the date of the survey, 2006)
- We benefit from extensive data including childhood events

Goal

To determine the impact of working conditions on worker's self-declaration of chronic diseases, taking into account for their nature and their cumulative and lagged effects on health

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The Health and Professional Route survey (Sip)

- Representative data on 5,500 individuals aged 20-74
- Comprehensive socioeconomic characteristics
- 10 physical and psychosocial working condition indicators
- Biographical lifetime information on professional route and significant life events
- Reconstruction of retrospective panel data
 - Yearly working conditions
 - Yearly health status indicators

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Aim of the methodology

- Exact matching
 - Comparing similar individuals, except some faced detrimental working conditions while others did not
 - ... so that we can identify the effect of working conditions only
- Difference in differences : handles the selection induced by unobserved characteristics
 - Health-related characteristics
 - Non health-related characteristics which influence both employment and health status (risk aversion behaviors, individual preferences, shocks, conjuncture)

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Working conditions definition : the Treatment

Annual counters of work strains inspired from the law: treated if **8 years of single exposure** or **4 years of poly-exposure**, and declaring being **always** exposed

- **Physical treatment** : night work, repetitive work, physical load and exposure to toxic materials
- **Psychosocial treatment** : full skill usage, working under pression, tensions with the public, reward, conciliation between work and family life, relations with colleagues
- **Overall treatment** : the 4 physical + the 6 psychosocial strains considered altogether

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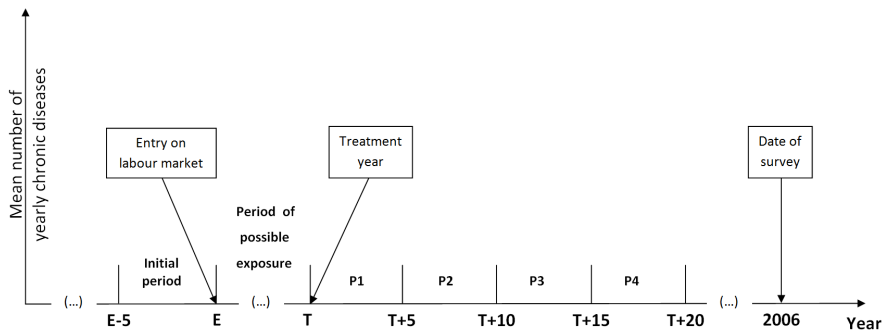
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Outcome definition : indicator of chronic diseases

Mean number of yearly chronic diseases over 5-year timespans :
according to their onset and end dates, we sum chronic diseases
episodes each year and get the mean over 5 years



Matching variables & Stratification

The control variables X_i :

- Demography
 - Age, education, ethnicity
- Childhood events
 - Childhood health problems, parents health status, violences, poor living conditions, separation from family
- To be added?
 - Early socio-professional category and activity sector, indicator for career stability

Stratified modelizations

Our models are stratified by gender

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Methodology (1) : first difference

We take care of **non-time dependant unobserved individual characteristics** like preferences and risk aversion behaviors using panel data and temporal differences

- [1] Comparison of the health status of **exposed individuals** before and after they reach our exposure threshold to detrimental working conditions
 - We obtain the health capital depreciation rate due to natural causes (age, etc.) + specifically due to work strains
- [2] Comparison of the health status of **non-exposed individuals** at similar periods (periods being equivalent to before and after exposure for exposed people)
 - We obtain the natural health capital depreciation rate between the two periods (independently from working conditions)

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Methodology (2) : second difference & Matching

- And **unobserved time-dependant characteristics** (shocks, crises, conjunctural effects) by subtracting [2] to [1]:
 - (**Exposed** natural depreciation rate + Work-related depreciation rate) – (**Non-exposed** natural depreciation rate) = Effect of working conditions on chronic diseases
- These differences are to be made on similar people, according to their observable characteristics :
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Sample descriptive statistics

Variables	Percentage
Gender	
Men	44.77
Women	55.23
Age (2006)	
20-34	8.38
35-49	26.47
50-64	42.99
65-74	22.15
Education	
Primary	11.02
Secondary	55.10
BAC	14.01
Superior	17.81

Treatment descriptive statistics

Variables	Percentage		
	Physical treatment	Psychosocial treatment	Global treatment
Prevalence	35.91	28.45	50.59
Mean year of treatment	1979	1982	1980
Gender			
Men	44.00	30.16	57.29
Women	29.34	27.08	45.14
Age (2006)			
35-49	29.12	22.98	45.10
50-64	41.91	34.06	57.08
65-74	46.67	35.00	61.24
Education			
Primary	54.61	33.39	64.65
Secondary	44.89	30.95	58.13
BAC	18.31	24.32	35.77
Superior	10.16	20.22	27.54

Health status (physical treatment sample), by periods

Variables	Periods				
	Initial	P1	P2	P3	P4
Mean	0.18	0.33	0.46	0.63	0.85
Gender					
Men	0.16	0.29	0.40	0.55	0.75
Women	0.19	0.36	0.50	0.70	0.92
Age (2006)					
20-34	0.59	0.16	0.27	0.43	0.64
35-49	0.24	0.32	0.47	0.65	0.87
50-64	0.11	0.35	0.46	0.63	0.84
65-74	0.08	0.37	0.52	0.71	0.90
Education					
Primary	0.12	0.29	0.41	0.58	0.77
Secondary	0.12	0.34	0.47	0.64	0.86
BAC	0.25	0.36	0.49	0.68	0.91
Superior	0.33	0.33	0.46	0.63	0.83
Treatment					
Treated	0.10	0.32	0.44	0.61	0.81
Non treated	0.22	0.34	0.47	0.65	0.86

Health status (psychosocial treatment sample), by periods

Variables	Periods				
	Initial	P1	P2	P3	P4
Mean	0.18	0.40	0.56	0.75	1.03
Gender					
Men	0.16	0.37	0.51	0.69	0.96
Women	0.19	0.44	0.61	0.81	1.09
Age (2006)					
20-34	0.58	0.23	0.36	0.54	0.81
35-49	0.24	0.38	0.53	0.72	0.98
50-64	0.11	0.41	0.56	0.75	1.04
65-74	0.08	0.49	0.68	0.88	1.16
Education					
Primary	0.12	0.40	0.55	0.74	0.99
Secondary	0.12	0.41	0.57	0.77	1.05
BAC	0.26	0.42	0.58	0.79	1.05
Superior	0.33	0.41	0.55	0.72	0.99
Treatment					
Treated	0.13	0.42	0.55	0.73	0.99
Non treated	0.20	0.40	0.57	0.76	1.05

Unmatched Difference in differences results

Treatment /Gender	Baseline			Follow-up			Diff-in-Diff	N (Treat./Tot.)
	Control	Treated	Diff.	Control	Treated	Diff.		
Physical treatment								
Men								
P1				0.32	0.27	-0.05**	0.07**	1067/2425
P2	0.22	0.09	-0.12***	0.44	0.36	-0.07***	0.05	
P3				0.60	0.50	-0.09***	0.03	
P4				0.80	0.69	-0.11***	0.01	
Women								
P1				0.35	0.39	0.04	0.16***	878/2992
P2	0.22	0.11	-0.11***	0.49	0.54	0.05	0.16***	
P3				0.68	0.74	0.05	0.17***	
P4				0.91	0.96	0.06	0.17***	
Psychosocial treatment								
Men								
P1				0.38	0.33	-0.05*	0.02	714/2367
P2	0.18	0.11	-0.08***	0.53	0.45	-0.09**	-0.10	
P3				0.72	0.63	-0.09**	-0.01	
P4				0.99	0.88	-0.11**	0.04	
Women								
P1				0.41	0.50	0.09***	0.15***	798/2947
P2	0.21	0.15	-0.06***	0.59	0.65	0.06	0.12***	
P3				0.80	0.83	0.03	0.10**	
P4				1.09	1.10	0.01	0.07	

A few elements of interpretation (initial situation)

- Treated self-reports significantly lower chronic diseases than non-treated for men and women at baseline
 - -0.12 (Men, Physical T.); -0.11 (Women, Physical T.)
-0.08 (Men, Psychosocial T.); -0.06 (Women, Psychosocial T.)
- People meeting the hardest working conditions later initially have a higher health capital (*Healthy worker effect*)
- Reporting biases by social class or asymmetric information (some chronic diseases are not yet known by the individual)
- Endogeneous sorting on the labour market depending on health status seems verified

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A few elements of interpretation (follow-up)

- The difference between treated and non-treated is **getting smaller** (lower for men, statistically null for women)
- Differences in declarations of chronic diseases observed at baseline is attenuated by the exposure to treatment variables
- Treated started with a higher health capital than non-treated, but **degrading faster** due to exposure to detrimental working conditions

A few elements of interpretation (Diff-in-diff)

- In men,
 - Physical working conditions increases (+0.07) their chronic diseases the first 5 years following the treatment
 - No impact of psychosocial exposure
- In women,
 - Much bigger impact of the treatment on chronic diseases
 - Physical working conditions have a long term, constant and significant effect (+0.16/0.17) on chronic diseases
 - Psychosocial working conditions also have an effect, especially during the first five years after the treatment (0.15), but also during the second (0.12) and third period (0.10), before completely fading during the fourth period

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Discussion

- What we do (?)
 - Individual unobserved characteristics
 - Time-dependant characteristics
 - Initial health status taken into account
- What we don't do yet
 - Matching methods to compare very similar individuals
 - Better use of observed characteristics

Conditional Independence Assumption

For this methodology to be valid, the health capital depreciation rate of exposed people must be the same as the one of non-exposed people in case they would not have been exposed

- Robustness checks (thresholds, periods, *etc.*)

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