The Effects of the Generosity of the Sickness Insurance System on Sick Leave Duration:

Approach Based on Collective Bargaining Agreements.

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Abstract:

In France, wage-replacement benefits to cover employee absences due to illness are financed by a multi-tier system. The first compulsory, universal tier includes daily sickness benefits paid by the National Health Insurance scheme and supplementary benefits paid by the employer. The second-tier benefits, examined in this study, are provided for in collective bargaining agreements and are the source of considerable disparity among employees.

This study proposes an empirical estimation of the effect of generosity in the first two tiers of sickness benefit provision on the occurrence and duration of sick leave. We enrich the HYGIE database, a unique source of microeconomic information on sick leave, with information extracted from the 46 most represented collective agreements covering almost 60% of employees. After having presented the global architecture of the sickness benefits system, we use second-tier disparities created by collective agreement provisions to estimate the effect of the benefit system on sick leave duration. To achieve this, an indicator of generosity is calculated for each collective agreement and each sick leave and introduced in a piecewise constant proportional hazard duration model taking into account a broad range of influencing parameters, notably geographical, and controlling for unobserved individual heterogeneity.

The estimations confirm the effect of individual variables previously studied: gender gap, age, socio-professional category, health status, regional (departmental), and establishment variables. Beyond the effect of these variables, the generosity of collective agreement provisions has a very significant and negative effect on the likelihood of leaving the sickness absence state (a positive effect on this state). This effect, globally negative on the probability of leaving the sickness absence state, varies according to the sub-period of sickness absence taken into account.

Key words: absenteeism, collective agreements, daily sickness benefits
JEL: I18, J22, J31, C41

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1. Introduction

Every year, almost one out of five employees will have a spell of absence from work as a result of illness. The number of days leave taken for non-work related illness has increased steadily over the last ten years. The number of paid sick days funded by the National Health Insurance Fund for Salaried Workers (CNAMTS) has increased from 180 million in 2008 to 205 million in 2011. In parallel, the cost of statutory sick-pay covered by the general health insurance scheme has increased from 4.3 billion euros in 2000 to 6.4 billion euros in 2011. These expenditures thus constitute a key issue for public finances.

This study empirically estimates the effects of a generous statutory sickness insurance system on the occurrence and duration of sickness absences. In this study, we restrict our attention to sick leave spells lasting less than or equal to 90 days. This duration is representative of the majority of sick leave spells guided by specific principles compared to long-term sick leave.

Employees on sick leave will receive daily sickness benefits (IJ) (cf. annex 1) aimed at partially maintaining income levels during their absence from work. Daily benefits thus have a significant impact on labour supply. The French sickness benefit system is a multi-tiered system involving different players at each level. At basic social security level, provision of a statutory 'universal' minimum benefit is shared between the National Health Insurance scheme and employing firms; under certain conditions the employer will pay supplementary benefits to complete the daily sickness benefits paid by the Social Security system. This is in turn often completed by collective agreement provisions constituting the second-tier benefits, and occasionally by employer-provided complementary health insurance (third-tier benefits not treated in this study).

Legislation covering first-tier benefits has been reformed over the last few years, in particular Law n° 2008-596 of June 25th 2008 'on the modernisation of the labour market' concerning the period from 2005 to 2008 covered by this study. This Law considerably modified the provisions relative to supplementary benefits paid by employing firms in terms of employee eligibility criteria (the Law of 2008 reduced required number of years' service from 3 years to 1 year and the waiting period from 10 to 7 days, annex 1).

To our knowledge, this is the first study to broach the second tier of the sickness benefit system constituted by collective bargaining agreement (CBA) provisions. In this study, CBA is understood in its broadest sense as a legal level based on inter-professional agreements: either national-level agreements (e.g. concerning temporary workers), or specific status agreements (e.g. concerning different public services employees).

The Court of Auditors (2012) note that despite the level of expenditures at stake and the marked cyclical fluctuations[1], few studies have focused on the economic role played by sickness benefits. In particular, available information is extremely fragmented concerning sickness benefits that supplement those provided by the Social Security system. This fact was reiterated in the last National Assembly report of 2013[2] deploring the lack of evaluation on these questions. It notes that in France, the amount of supplementary sickness benefit paid by employers within the framework of the national inter-professional agreement on monthly payments is currently unknown and there are no statistical resources enabling the identification and detailing of supplementary sickness benefit provisions paid by employers.

The remainder of the paper is organized as follows. Section 2 provides a review of the existing literature on absenteeism for health reasons. Data is presented in section 3. Section 4 describes the French daily sickness benefit system. Section 5 contains some descriptive statistics and a non-parametrical analysis of the data. Section 6 presents the econometric model. The empirical results

[1]National Health Insurance expenditures in daily sickness benefits increased from 4.3 billion euros in 2000 to 6.4 billion euros in 2011. In this respect they also constitute a public finances sustainability challenge, especially when work-related accident and diseases expenditures are added.

[2] Information report (2013), n° 986: 'Evaluation and control of social security funding mission:Work absences: for a fairer, more transparent system'

regarding the impact of the sickness insurance system on the occurrence and duration of sick leave are presented in Section 7.

In Section 7, day by day indicators of generosity were constructed for each collective bargaining agreement (CBA) and each sick leave spell in order to exploit the significant differences between CBAs in terms of sickness benefit provisions. The impact of these indicators of generosity was then estimated using a piecewise constant proportional hazard duration model. Several specifications of the model were tested taking into account a broad range of factors and controlling for unobserved individual heterogeneity.

2. Literature

Daily sickness benefits are the insurance response to the question of absenteeism for health reasons, a long-standing issue in labour economics (Brown and Sessions, 1996). Economic research on absenteeism can be grouped into three categories (Afsa and Givord, 2009). The first group falls within the classic work-leisure trade-off model (Allen, 1981). Employees seek to maximise their utility function under budgetary constraints. Periods of absenteeism are adjusted according to the loss of earnings and applicable monetary penalties. This result is confirmed by an empirical study conducted on French medico-administrative data showing that current wage has a negative effect on the duration of sick leave and that high wage increases over the long term tend to reduce sick leave duration among men and increase duration among women (Ben Halima and Regaert, 2013). The second group follows the Shapiro and Stiglitz (1984) model that distinguishes the utility of work attendance from the utility of non-attendance. Employees will chose the level of effort that guarantees an income level that maximises their utility. Absenteeism can thus represent the difference between the effort expended and the contracted working hours. As employers are unable to fully understand an employee's reasons for missing work due to sickness (due to a lack of awareness of the worker's effort and health status), they are consequently confronted with the classic problem of moral hazard. The third category encountered in the economic literature attempts to reintroduce the notion of health status as a decisive variable in taking sick leave. Without being totally absent in the first two groups (Allen, 1981; Barmby et al., 1995, Sessions and Treble, 1994), the health status dimension is not a core element of their paradigm. Health-related absenteeism is no longer an individual choice (work-leisure trade-off; effort function) but can be the result of a deteriorated health status, either through illness or difficult working conditions[3] (Ose, 2005). Recent studies (Afsa and Givord, 2009; DARES 2013) have effectively underlined the significant role played by working conditions in employee absenteeism. Grignonand Renaud (2007) dissociated sick leave, the result of employee choice (*ex post* moral hazard) from absenteeism due to working conditions, under the responsibility of the employer, by controlling for health status (*ex-ante* moral hazard). The models presented below attempt to understand employees' supply of labour. It should not be forgotten that absenteeism disrupts labour demand (Allen, 1983) and can also generate important costs (loss of production, adjustment costs).

Among the factors advanced by the literature to account for the occurrence and duration of sick leave, are insurance parameters and more especially, daily sickness benefit systems (Allen, 1981; Dragoand Wooden, 1992; Barmby et al., 1995; Per and Mårten, 1996; Chaupin-Guillot and Guillot, 2009; Ben Halima and Regaert, 2012). In France, several agents are involved in this system. The guaranteed minimum benefit, jointly involving the Social Security and employing firms, is often completed by collective agreement provisions that increase this guaranteed minimum. Collective agreement provisions vary considerably from one branch to another and eligibility is often determined by employee characteristics. Several studies have revealed the role played by the generosity of sickness benefit systems in explaining the gaps in sick leave rates within the European Union (Bonatoand Lusinyan, 2004; Osterkamp and Röhn, 2007). Empirical results show a positive relationship between degree of generosity and sick leave rates (Bonato and Lusinyan, 2004, Chaupain-Guillot and Guillot, 2009), the number of days sick leave (Osterkamp and Röhn, 2007; Malo, 2005), or sick leave duration (Johansson and Palme (2005), Ben Halima and Regaert, 2012)]. The latter effectively note that employees adapt their sick leave behaviour to the generosity of the health insurance system. Meyer et

[3] Difficult working conditions can be compensated by higher wages (Rosen, 1974).

al. (1995), Galizzi and Boden (2003) and Spierdijk et al. (2009) observed that wage replacement benefit rates have a positive effect on the duration of sick leave spells. Other empirical studies have shown that the relationship between the generosity of the sickness benefit system and the work absence rate could be explained by a company's production methods. Using data from the labour force costs and wage structures survey, Lanfranchi and Treble (2010) showed that companies using just-in-time production methods were the least generous in terms of sickness benefits.

3. An original and detailed source of information on sick leave: the HYGIE database

The HYGIE database provides a detailed description of sick leave spells for a representative sample of General Health Insurance scheme beneficiaries. It constitutes a unique source of information that has its origins in the study of the mechanisms of sick leave in the private sector conducted by the Institute for Research and Information in Health Economics (IRDES) following a call for tender launched by the Ministry of Health Directorate for Research, Studies, assessment and Statistics (DREES).The database was created in order to carry out the required research and contains necessary information both on employees' sick leave behaviour and associated healthcare consumption, employees' individual and professional contexts and a number of characteristics concerning the companies employing them.

The 2005-2008 HYGIE data are issued from the merger of Pension Fund (CNAV) data and Health Insurance Fund for Salaried Workers (CNAMTS) data. More specifically, files were extracted from the National Career Management System (SNGC) grouping together all private sector employees in France, and the National Statistical Beneficiary System (SNSP) grouping together all private sector retirees, matched with sickness benefits data taken from the National Health Insurance Inter-regime Information System (SNIIR-AM). CNAV data constituted the point of entry with a random sample of beneficiaries aged from 22 to 70 years old having contributed to the general pension fund at least once during their lives. The CNAMTS data concerns both primary and secondary beneficiaries of the General Health Insurance scheme who received sickness benefits for at least one spell of sick leave during the year 2004 and/or 2005. Matching CNAV and CNAM-TS data sources enabled the construction of the HYGIE database panel composed of 538,870 beneficiaries from 2005 to 2010.

The panel constitutes a representative sample of private sector employees and includes precise information on employees, the companies employing them and their healthcare consumption. This weighting was used to estimate global cost (not the econometric estimates).

4. A compilation of sickness benefit parameters from the main collective bargaining agreements (CBA)

Sickness benefits: a multi-tier system

In France, the sickness benefit system is a multi-tiered system. Social protection systems were often constituted on a professional basis and the generalisation and standardisation of social security coverage was based on the provision of a universal guaranteed minimum whilst maintaining the generosity of complementary systems negotiated on a professional basis.

The sickness benefit system follows the same logic and is constituted of several benefit levels. The first tier, guaranteeing the statutory universal minimum benefit is jointly covered by the Social Security and employing firms. The Social Security covers the wage replacement benefit; up to 50% under certain conditions and within the limits of the 1/720th of the Social Security annual threshold after a three day waiting period (annex 1). Still under certain conditions, the employer is charged with paying a supplementary benefit from the 11th day of sick leave (for the period studied, annex 1)[4]so as

[4]The 8th day of sick leveepuis le 20 juillet 2008

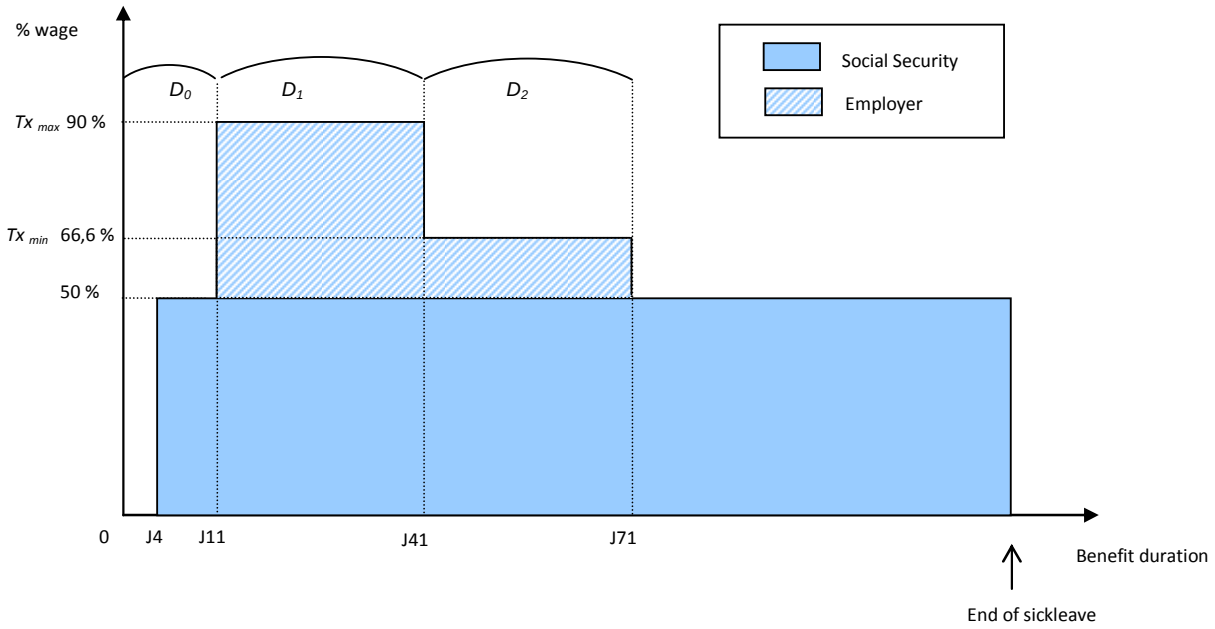
to reach a global wage replacement rate of 90% for the first 30 days, then 66.6% for the following 30 days (annex 1)

The second-tier benefits are provided for by the collective agreement on which the employee depends. Third-tier benefits are optional and will depend on the provisions made by employer-provided complementary health insurance. The employer can also make provision for a more advantageous scheme.CBA provisions thus provide, if not an exact estimate, at least a lower bound for real conditions under which employees are entitled to sickness benefits.

In this study we restrict our attention to the first two tiers of the system, the first of which has already been the subject of different studies. If the first tier is the same for all employees, CBA provisions vary in their degree of generosity which also depend on employees' qualifications and years of service. Depending on the collective agreement negotiated at industrial level, firms may cover all or part of the Social Security 3 day waiting period, reduce the employer 10 day waiting period or increase the wage replacement rate. Thus, in the majority of collective agreements, the provision of supplementary sick-pay consists in, after a waiting period D_0, completing the employee's sickness benefits at a very favourable replacement rate (Tx_{max}) over an initial period D_1, then at a lower rate (Tx_{min}) over a period D_2.

Prior to July 2008, using the same notation, the guaranteed minimum benefit is expressed as follows: (D_0=10, Tx_{max}=90%, D_1=30,Tx_{min}=66%, D_2=30).

Figure 1: Guaranteed statutory wage-replacement rate for employees with 3 to 8 years of service

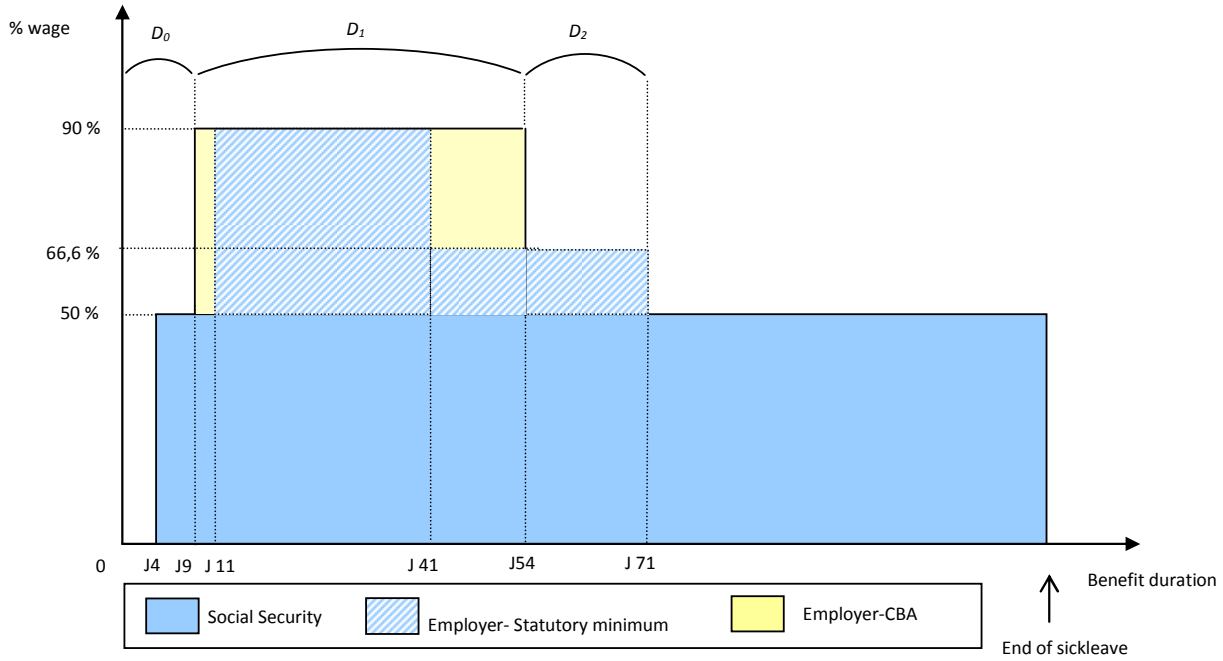


Reading: Benefit plan for an employee with 3 years of service on the first day of non-work related sick leave according to the statutory minimum before June 27th2008.Several phases can be distinguished. After a 3 day waiting period, the Social Security pays a 50% wage replacement rate. The employer, always under certain conditions, is charged with paying *a supplementary benefit* from the 11th day of sick leave so as to reach a global wage replacement rate of 90% over a period of 30 days, and 66% over the following 30 days.

In general, CBAs are more generous towards executives both in terms of waiting periods, wage-replacement rates and benefit duration (Figure 3). None of the 10 main collective agreements (i.e. covering the greatest number of employees) make provision for a waiting period for executives with over three years of service. These 10 CBAs guarantee a 100% wage replacement rate for a minimum period of two months for executives with 3 years of service (from 1 year in 8 out of the 10 collective agreements), and at least during the first 3 months of sick leave (often four months) for executives with over five years of service.

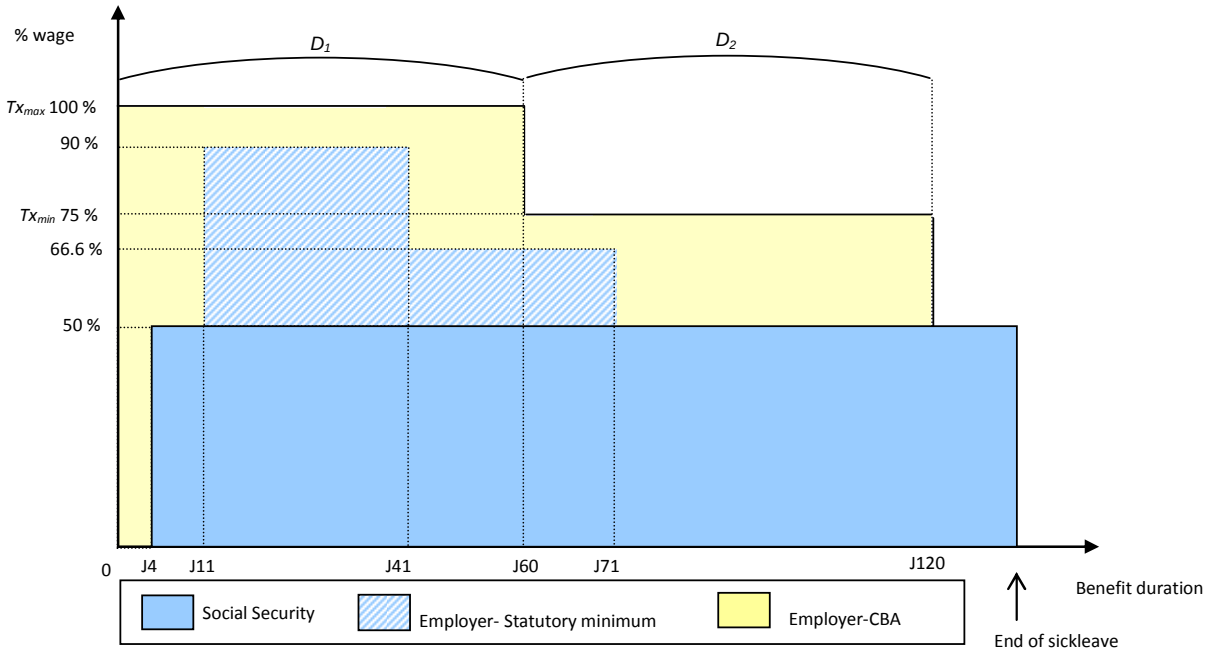
On the contrary, provisions made by certain collective agreements, particularly those concerning clerical and production staff, are occasionally less favourable in terms of benefit duration than the statutory guarantees (Figure 2). In this case, the firm must continue paying benefits up to the statutory period corresponding to the employee's seniority at the minimum legal rate.

Figure 2: An example of a standard sickness benefit plan for clerical and production staff



Reading: Benefit plan for clerical and production staff with 1 year of service on the 1st day of non-work related sick leave, with the collective agreement IDCC 2216 (Predominantly food-based retail and wholesale trade) (version in force between 2005 and 2008)

Figure 3: An example of a standard sickness benefit plan for an executive



Reading: Benefit plan for an executive with 1 year of service on the 1st day of non-work related sick leave covered by the collective agreement IDCC 493 (National collective agreement for wines, ciders, fruit juices, syrups, spirits and liquors of France)

Enhancement of the HYGIE database with information regarding collective agreement provisions

Over forty legislative texts relating to collective bargaining agreements were analysed. For the HYGIE database observations concerning these CBAs, it was thus possible to recreate the sickness benefit levels day by day in terms of wage-replacement rate for the first two tiers of the system (statutory guaranteed benefits on the one hand, supplementary scheme as a result of a CBA on the other). With this information, it is possible to exploit sickness benefit variability as a determining factor of sick leave duration. This legislative analysis covered a sufficiently representative sample of collective agreements, including the specificities of the Alsace-Moselle insurance scheme[5]. Enhancing the HYGIE database with information concerning CBA provision for sickness benefits was carried out in several phases.

a) A collective agreement identifier based on the DADS

To enrich the HYGIE database with establishment information, data matching was conducted with DADS data (Annual Declaration of Social Data) and establishment data. The data base thus contains information on individual beneficiaries, their career paths, healthcare consumption and sick-leave spells, reimbursements received from the National Health Insurance schemes, their professional context and a number of characteristics concerning the firms employing them. Using this database, we were thus able to study the relationships between health, work, professional career and firms' characteristics.

The HYGIE database was further enhanced for this study with microeconomic data on CBA provisions for supplementary sickness benefits. In an initial phase, using the Annual Declaration of Social Data (DADS) and the establishment identification number (SIRET) from the HYGIE database, and taking into account each employee's socio-professional category, it was possible to allocate a collective agreement code for over 90% of observations (Table 1, figure 4)

Figure 4: HYGIE, DADS and collective agreement data-matching diagram

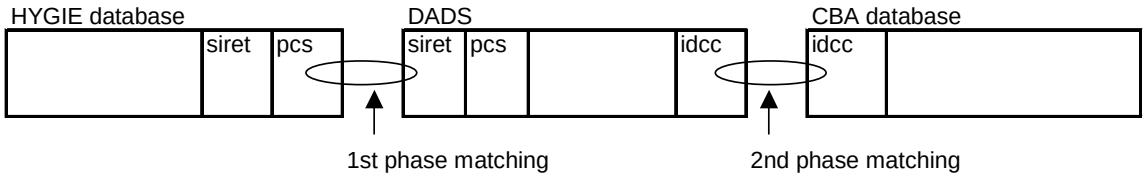


Table 1: Collective agreement identifier code (IDCC) allocation rate

	2005	2006	2007	2008
Employee with at least one sick leave spell	89%	93%	93%	94%
Total employees in the HYGIE database	84%	86%	88%	89%

b) A collective agreement database including sickness benefit parameters

In the second phase, we constructed a database including the main collective agreements and describing the conditions under which employees are eligible for supplementary benefits for each

[5] Private sector employees in the Alsace-Moselle region covered by local, regional labour rights, inherited from German labour law that makes provision for total wage replacement benefits from the employer without a waiting period and without seniority conditions in the case of absence from work as the result of sickness.

CBA. This involved a considerable number of analyses concerning the **46 collective bargaining agreements,** all read in detail**.** In the majority of cases, CBAs make provision for different sickness benefit plans according to employee category. Each agreement was thus separated into its different categories. In total, 7**9 different legislative schemes** *(including the 'statutory minimum benefit' scheme and modifications that may have occurred during the period under study)*, covering 54.9% of non-retirees in the HYGIE database (58% of sick leave spells) were reproduced. In priority, we studied CBAs covering the largest number of employees in the database. Employees are effectively highly concentrated within the major collective agreements whereas CBAs for more minor sectors of activity cover only a small percentage of employees. Improving the completeness of the HYGIE database regarding the conditions for compensation in collective agreements thus becomes more and more difficult as one goes into smaller CBAs.

c) The addition of compensation parameters in the IJ (daily sickness benefit) database

The CBA database grouped together all the legislative information necessary to recalculate, for each sick leave spell covered by the list of main collective agreements, the complete sickness benefit profile for a given CBA, day after day. To do this, a certain number of indicators were collected for each legislative scheme: durations (D_0, D_1, D_2), wage-replacement rates (*Taux_max*, *Taux_min*).

From this information, the wage-replacement rates for each day of sick leave were calculated: TAUX1, TAUX2,.., TAUX90[6]. In order to reduce the number of descriptive variables, these rates were grouped together in sub-periods and averaged for each sub-period. The sub-periods were chosen in such a way as to respect the most frequent dates on which legislative changes to the sickness benefit system occurred (Annex 2).

5. Descriptive statistics and non-parametric analysis

Descriptive statistics

The econometric analysis was conducted on two samples separately. The first sample (E_1) includes all individuals absent from work due to illness during the period 2005-2008. The second sample (E_2) is composed solely of individuals for whom we have collected information on the collective agreement[7]concerning them.

Our sample E_1 (E_2)is thus composed of 403 428 (233 352) sick leave spells for 167 416 (103 295) individuals of which 0.9 % (0.85%) are right censored. The average duration of a sick leave spell is 15.6 days (15.7 days) overall, with an average duration of 15.1 days (15.1 days) in 2005 and 15.8 days (16 days) in 2008 (*cf.* table 1). The gender analysis shows that the average duration of a sick leave spell is 16.3 days (16.4 days) for women against 14.7 days (14.8 days) for men. The sick leave duration analysis according to the French private sector employee age pyramid reveals that individuals aged 55-65 have the longest sick leave spells at 18.2 days (18 days).

Sick leave duration among part-time workers is longer on average than among full-time workers [17.2 days (17 days) against 15.1 days (15.3 days)]. This result is also true in the sub-populations of men and women considered separately. The average duration of sick leave spells among men and women working full time are shorter than among those working part-time. The distribution of sick leave duration according to sector of activity reveals considerable disparities. Individuals working in the manufacturing industries record the lowest average with 13.3 days (13.1 days), against 18.2 days (18.3

[6] Within the framework of this study, we are only interested in work absences as a result of sickness (non-work related) lasting less than 90 days.

[7]The current collective agreement database does not contain information on the daily wage replacement rates for 58% of the individuals in the initial sample. Separate estimates were carried out on the two samples E_1 and E_2 so as to compare the stability of the coefficients of the different models estimated.

days) in the transport and communications sectors. On average, the duration of sick leave spells decreases the larger the size of the company. Large companies (over 1000 employees) record an average duration of 14.3 days (14.3 days) against 19.7 days (18.4 days) in small companies (less than ten employees). The South of France records the highest average sick leave duration at 16.8 days (16.7 days) whilst the lowest average duration is recorded in the North of France with 14.5 days (14.6 days).

The duration of sick leave spells is subject to marked seasonality. For both men and women, a sick leave spell beginning on a Sunday is the longest with an average of 22.6 days (22.2 days) for women and 22.8 days (22.5 days) for men. On the other hand, the shortest sick leave spells are those that begin on a Tuesday with an average of 14.9 days (15 days) for women and 13 days (13 days) for men.

Finally, certain typical durations appear with a particularly high incidence rate. These modal durations correspond to changes in the payment of daily sickness benefits either at the first tier (Social Security waiting period and employer waiting period), or the second tier(typical benefit duration periods at *Taux_max* or *Taux_min* occurring for several major collective agreements, annex 2).

Table 2: Descriptive statistics of the duration of sick leave spells (< 3 months)

	Sample (E_1)			Sample (E_2)		
	Women	**Men**	**Global**	**Women**	**Men**	**Global**
AGE25-34	16.27	13.21	14.94	16.38	13.42	15.20
AGE35-44	15.59	14.31	14.97	15.67	14.43	15.13
AGE45-54	16.78	15.90	16.35	16.73	15.96	16.41
AGE55-65	18.19	18.25	18.22	17.93	18.25	18.07
Age of entry into the labour market: under 18 years old	17.38	16.06	16.65	17.49	16.30	16.91
Age of entry into the labour market: 19-22 years old	16.17	14.27	15.29	16.22	14.50	15.51
Age of entry into the labour market: 23-26 years old	16.00	14.04	15.17	16.14	14.00	15.29
Age of entry into the labour market: over 27 years old	16.38	14.96	15.83	16.11	14.43	15.53
Full-time work	15.83	14.47	15.11	15.95	14.62	15.30
Part-time work	17.52	16.65	17.28	17.26	16.10	17.00
Alsace Moselle Scheme	14.44	13.06	13.76	14.61	13.30	14.06
Complementary CMU beneficiary	17.18	16.96	17.09	17.24	16.32	16.86
Change of status vis-à-vis the CMU-C	16.94	16.81	16.89	16.95	16.21	16.65
Agriculture, Fisheries	16.77	15.38	15.62	17.35	13.54	14.31
Mining Industries	15.42	13.54	14.20	15.60	13.67	14.45
Manufacturing industries	15.26	13.10	13.46	15.11	13.08	13.19
Production and distribution of electricity, gas and water	15.68	15.04	15.17	14.94	12.63	13.22
Construction	16.55	15.03	15.22	16.59	14.31	14.48
Commerce, car and domestic equipment repairs	17.43	15.33	16.57	17.58	15.23	16.61
Hotels and restaurants	14.69	14.85	14.79	14.99	15.19	15.12
Transport and communications	18.57	17.54	18.22	18.83	17.41	18.34
Financial activities	14.15	13.01	13.63	14.38	12.96	13.66
Real estate, rentals and business services	14.77	14.04	14.53	14.77	14.29	14.65
Public administration	15.65	15.73	15.68	15.62	16.24	15.81
Education	15.65	14.63	15.29	15.50	14.41	15.12
Health and social services	16.89	15.76	16.35	17.11	15.91	16.53
Collective, social and personal services	14.78	16.43	15.41	14.56	14.82	14.61
Extra-territorial activities	17.00	14.39	16.48	16.91	14.21	16.34
Company size [1; 9]	19.00	17.99	18.47	20.18	18.89	19.70
Company size [10; 49]	18.07	16.92	17.56	18.02	16.82	17.46
Company size [50; 499]	16.52	14.87	15.74	16.63	14.99	15.93
Company size [500; 999]	15.66	13.85	14.82	15.93	14.00	15.14
Company size [1000; +]	15.22	13.29	14.37	15.64	13.54	14.87
Quarterly wage less than 3 500€	20.92	20.26	20.72	20.85	19.46	20.44
Quarterly wage between 3 500 € and 5 000 €	15.68	15.53	15.52	16.29	15.92	16.16
Quarterly wage between 5 000 € and 6 500 €	13.34	13.16	13.24	13.66	13.38	13.52
Quarterly wage over 6 500 €	12.97	12.92	12.94	13.05	12.95	13.00
Sick leave start day: Sunday	22.63	22.87	22.75	22.22	22.54	22.37
Sick leave start day: Monday	15.04	13.36	14.21	15.12	13.40	14.36
Sick leave start day: Tuesday	14.98	13.06	14.08	15.04	13.08	14.21
Sick leave start day: Wednesday	16.62	14.62	15.70	16.71	14.72	15.89
Sick leave start day: Thursday	17.13	15.50	16.41	17.13	15.58	16.53

Sick leave start day: Friday	17.71	16.29	17.11	17.63	16.08	17.04
Sick leave start day: Saturday	18.35	17.91	18.15	18.34	18.10	18.24
Year 2005	15.89	14.29	15.14	15.78	14.23	15.14
Year 2006	16.74	15.10	15.97	16.67	15.04	15.98
Year 2007	16.34	14.88	15.66	16.41	14.96	15.80
Year 2008	16.61	14.86	15.80	16.80	15.05	16.07
Total	**16.38**	**14.77**	**15.63**	**16.41**	**14.82**	**15.74**

The CBAs differ strongly in their generosity and lead to strong disparity among workers

CBAs are the source of considerable disparity among employees. To see this, we have computed the day-by-day replacement rate provided by the first two tiers of sickness benefits provision, for each worker in the sample E2 (for which we have detailed information on the CBA). The detailed results are presented in annex 4. In the first 3 days of sickness, around 70% of the workers receive no benefit and around 30% have their wage fully replaced. From days 4 to 10, they fall into two roughly equivalent groups, with replacement rates of 50% and 100%. From days 11 to 40, we also see two main groups (with replacement rates 90% and 100%). The situation is more contrasted from days 41 to 70, with significant groups appearing around 3 values of the replacement rates: 65%, 75% and 100%. After day 70, modal values of the replacement rate are 0%, 50%,75% and 100%.

Moreover, the distribution of sick leave duration is noticeably different from one group of workers to another, depending on the level of generosity of their CBA (Annex 4).

Semi-parametric analysis: Kaplan-Meier estimator

To complete the descriptive analysis of the sample E_1, we estimated the survival function in the sick leave state by applying the non-parametric analysis using the Kaplan-Meier[8]estimator according to several individual variables: gender, quarterly wage 'sample E_1'. Additional analyses using information supplied by the collective agreements 'sample E_2', were conducted following the indicators of generosity of employer-provided sickness benefits. Two types of indicator were used: a global average generosity indicator and average generosity indicators calculated for the first three months of sick leave.

The non-parametric estimate of survival function shows a profile gap between men and women (*cf.* Figure 1). The two non-parametric estimates show that the longer the duration of sick leave, the lower the probability that the work absence spell will be extended for both men and women. The survival function for both genders is subject to a considerable decline: 75% of women and 74% of men are likely to have a sick leave spell lasting longer than 4 days. The estimated survival function for women is always higher than that for men[9]. However, the probability of a prolonged absence is almost identical for men and women for the first four days of sick leave. Beyond that, women survive longer in the state than men[10].

The non-parametric estimates of survival function according to quarterly wage quartiles reveal that wage level has an especially discriminating effect on the duration of sick leave (*cf.* Figure 2). We thus note that the dispersion of survival rates is stronger and tends to be accentuated under the effect of the age of the sick leave. The highest rate is observed among individuals with a quarterly wage of less than 3 500 €. On the contrary, the shortest duration for sick leave spells is observed among individuals

[8]The probability distribution of the duration T can be specified by the cumulative distribution function $F(t) = P(T < t)$ representing the probability that the duration of sick leave will be at least t periods. The survival function is defined by: $S(t) = 1 - F(t) = P(T \geq t)$; $S(t)$ designates the probability that T is not concluded after t units of time.

[9]A Wilcoxon test was also carried out to test the equality of the two survival functions (men/women). The value of the chi test *2(1) = 157,80* allows us to reject the null hypothesis and as a result, to validate the alternative hypotheisis according to which there are significant differences between the two survival functions.

[10]A test of homogeneity to evaluate a divergence in the two distributions amounts to a test in differences in variance between the two distributions of men and women. This test involves calculating the ratio *R=Var[men] / Var[women]* on the assumptions *H_0: R=1* against *H_1: R≠1*. This ratio obeys a Fisher's law on degrees of freedom N_men-1 and N_women-1. According to the test for differences in variance, we reject the equality of variance hypothesis at the 5 % threshold. The observed gender differences in the non-parametric estimations are thus significant.

belonging to the third and fourth income quartiles (that is to say with a quarterly wage of over 5 000 €). If the two groups of individuals have similar profiles in terms of survival in the sick leave state, a significant gap to the advantage of individuals belonging in the second income quartile (between 3 500 € and 5 000 €) is, however, observed. Finally we note an inversion in the survival rate curves between individuals with a low quarterly income (less than 3 500 €) and individuals with a high quarterly income (over 5000 €), beyond the 4th day of sick leave. This result confirms the existence of supplementary guarantees provided for by collective agreements with comprehensive coverage of short-term sick leave spells for individuals in the higher income brackets. On the contrary, individuals on low wages benefit from a less generous coverage which explains the difference in behaviour during the first days of sickness absence.

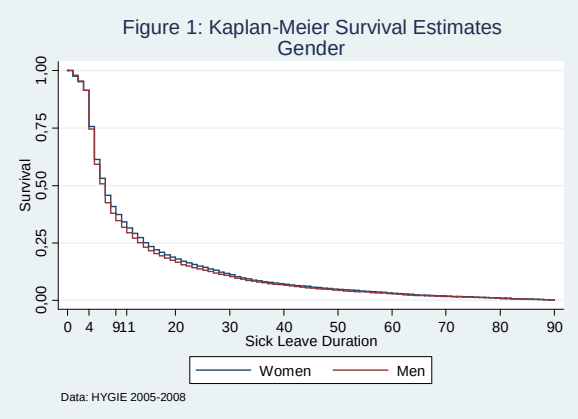
Figure 3 compares the survival function of employees benefitting from the Alsace Moselle insurance scheme to those benefitting from the National Health Insurance scheme in the rest of France. Private sector employees in Alsace-Moselle, identified in the HYGIE database as benefitting from the Alsace-Moselle regime, are covered by the local labour law, inherited from German labour law which provides that an employer will maintain an employee's income in its totality during spells of sick leave, without a waiting period and without conditions of service. The results of non-parametric estimates show that employees under the Alsace-Moselle scheme have a much higher survival rate in the sick leave state than employees in the rest of France. Income losses due to sick leave are lower for Alsace Moselle employees than those in the rest of France. They register shorter spells of sick leave but tend to be absent from work due to illness more often (Ben Halima et al., 2012). The median spell of sick leave is 6 days for Alsace-Moselle employees against 7 days for employees in the rest of France. The same difference is noted for longer sick leave spells: Alsace Moselle employees have a 25% greater probability of having a sick leave spell lasting over 12 days whereas the corresponding duration is of 13 days for employees in the rest of France. The Wilcoxon tests carried out to test the equality of the two survival functions and the tests of homogeneity for the different distributions (Alsace-Moselle/other) show that difference between the two survival functions is significant and the assumption of the equality of variance in the two distributions is rejected.

Beyond the standard replacement rate guaranteed by first-tier benefits (Statutory Health Insurance + employer supplementary benefits), complementary benefits provided for by collective agreements vary considerably from one employee to the next. On the sub-sample E2 for which we have the sickness benefit parameters provided for by CBA, we define a global level of generosity for each separate sick leave spell. This corresponds to the global wage-replacement rate *for the sick leave spell concerned,* estimated by means of the wage-replacement rate profile specific to the collective agreement on which the employee depends (annex 1 and Figure 4). Level of generosity is calculated using a similar logic to that of Frick and Malo (2008), but using an adapted methodology applied at a finer collective agreement level, whereas Frick and Malo only take into account first-tier sickness benefit systems in different European countries.

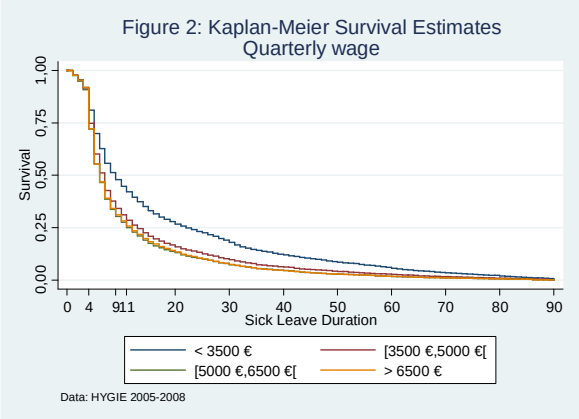
From this indicator, three levels of generosity were retained: 'ungenerous' (average replacement rate less than 66.66%), 'not very generous'(average replacement rate between 66.66% and 90%), and 'very generous' (average replacement rate equal to or over 100%). We thus observe that, all other things being equal, survival in the sick leave state is on average longer among employees benefitting from a better replacement rate from 'not very and very generous' collective agreements than for other employees belonging to an 'ungenerous' collective agreement with a low replacement rate. This result confirms that a very generous sickness benefit system tends to extend survival in the sick leave state and to increase the average duration of work absences due to illness. The results also confirm the outcomes of Henrekson and Persson (2004) and Frick and Malo (2008) empirical studies. The median sick leave spell is of 6 days for individuals covered by an 'ungenerous' collective agreement against a significantly longer spell of 27 days for those covered by a 'not very generous' collective agreement and 7 days for a 'very generous' collective agreement. This gap according to generosity level widens the longer the duration of the sick leave spell. Individuals covered by an 'ungenerous' collective agreement are 25% more likely to have a sick leave spell of over 8 days, against 42 days and 14 days for individuals covered by a 'not very' or 'very generous' collective agreement.

These estimates are however calculated under the assumption of a homogeneous population and must therefore be supplemented by an analysis of sick leave durations taking individual heterogeneity into account. To do this, we conducted a semi-parametric estimation using a discret time proportional hazard model.

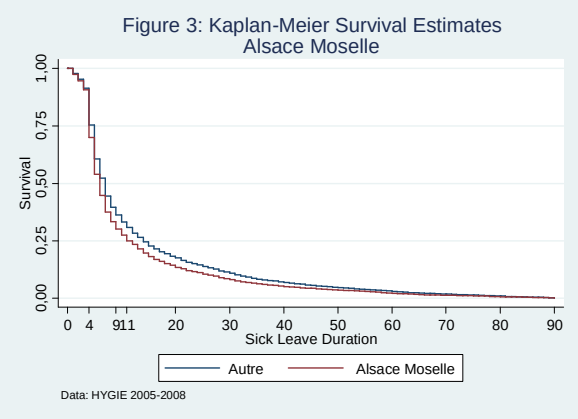
Analysis of the survival function of sick leave duration



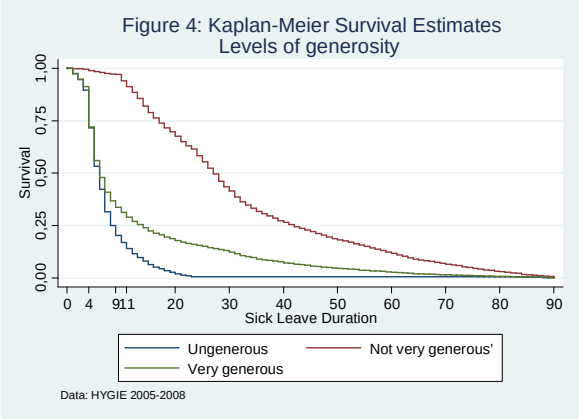
Wilcoxon Test for equality of survival functions
*chi2(1) = 104,78****



Wilcoxon Test for equality of survival functions
*chi2(1) = 3944.72****



Wilcoxon Test for equality of survival functions
*chi2(1) = 176,41****



Wilcoxon Test for equality of survival functions
*chi2(1) = 24176,64****

6. Econometric model

The econometric analysis is based on a discrete time proportional hazard model using the formulation proposed by Allison (1982). The same econometric framework was used by Jenkins (1995). The baseline hazard was specified using a semi-parametric approach (piecewise constant hazard) by specifying the duration dependence terms representing the duration of sick leave. In the work absence decision process, individual behaviours are totally heterogeneous. This heterogeneity is made up of observable (individual characteristics and past history on the labour market) and non-observable characteristics[11]. Individual heterogeneity leads to an unequal hazard rate of duration dependence in the work absence state. In this context, the determinants of the duration of sick leave cannot be studied without taking into account observable and non-observable heterogeneity factors. This difficulty is at the source of numerous developments concerning duration models presented in recent econometric literature (Lancaster, 1979; Heckman and Singer, 1984). Modelling the probability of leaving the state of work absence can be fully parametric; in this case, it is advisable to select the probability law

[11]The quantity of non-observable information could be reduced by conducting more detailed surveys; inversely, a proportion of non-observables will always exist.

followed by the baseline hazard affecting all the individuals. This approach requires the econometrist to define a parametric law for the baseline hazard. An inappropriate choice of law will result in biased estimators. An alternative solution is to consider the time interval in which the individual left the work absence state (if the agent notifies absence from work at time $t-1$ and renews the work presence state at time t, we know that the individual left the work absence state during the time interval $[t\text{-}1, t)$. In this case, we refer to semi-parametric models that have the advantage of not imposing the specification of a hazard function, thus authorising greater flexibility[12].

Within the framework of proportional hazard models, it is possible to take the discrete nature of data into account while preserving continuous duration. This approach allows for the removal of parametric assumptions concerning duration distribution. We thus obtain a so-called 'semi-parametric' model (Prentice and Gloeckler; 1978), introducing a method of analysis for these 'grouped' data based on Cox's (1972) continuous time model. Meyer (1990) expands upon the analysis method by introducing parametric or non-parametric heterogeneity and Han and Hausman (1990) by generalising it to concurrent risk models.

We situate this study within the framework of proportional hazard models in which the hazard rate for an individual *i* at a moment in time $t > 0$ is written

$$\lambda_{it} = \lambda_0(t)\exp(X'_{it}\beta)$$

In this formula, *t* signifies the duration of the work absence spell, $\lambda_0(t)$ is the 'baseline' hazard, X_{it} is the vector of individual characteristics for the individual i and β is the vector for parameters to be estimated. The return to work following a sick leave is only observed in disjointed time intervals $j = [a_{j-1}, a_j)$. The probability of leaving the work absence state during the j^e time interval is written

$$\text{prob}(T \in [a_{j-1}, a_j]) = \text{prob}\,(T \geq a_{j-1}) - \text{prob}(T \geq a_j)$$

The survival function at the beginning of the j^e time interval is written

$$\text{prob}(T \in [a_{j-1}, a_j]) = S(a_{j-1}; X_{it})$$

The probability of leaving the work absence state during the interval j^e for a given individual i is thus written

$$\text{prob}\,(T \in [a_{j-1}, a_j]) = S(a_{j-1}; X_{it}) - S(a_j; X_{it}).$$

The hazard rate during the time interval, that is, the probability of leaving the work absence state during the interval j^e knowing that the state was not left previously, is written

$$h_j(X_{it}) = \text{prob}\left(T \in [a_{j-1}, a_j]/T \geq a_{j-1}\right) = \frac{S(a_{j-1}; X_{it}) - S(a_j; X_{it})}{S(a_{j-1}; X_{it})} = 1 - \frac{S(a_j; X_{it})}{S(a_{j-1}; X_{it})}$$

Given the proportional hazard assumption, the survival function can be presented in discrete form in the following manner:

$$S(a_j; X_{it}) = \exp\left[-\int_0^t \lambda(\tau, X_{it})d\tau\right] = \exp[-\exp(X'_{it}\beta + \delta_j)]$$

$$\text{with } \delta_i = \log(H_t) \text{ for } j = 1, \ldots, k.$$

[12] Semi-parametric models facilitate the inclusion of time-varying explanatory variables.

The δ_j parameter represents the temporal dependence parameters defining the baseline hazard. They are treated as parameters to be estimated directly and are interpreted as the hazard logarithm on the j^e interval.

$$H_t = \int_0^t \lambda_0(\tau)d\tau$$

If the intervals have a duration of 1 day, then the duration registered for each individual corresponds to the interval $[t_i - 1, t_i]$. We equally define a censoring indicator c_i. It takes the value 1 if the work absence spell is completed; otherwise the value is 0. The log-likelihood for the sample is thus written

$$LogL(\beta, \delta) = \sum_{i=1}^{n} \{c_i log[S(t_{i-1}; X_{it}) - S(t_i; X_{it})] - (1 - c_i) logS(t_i, X_{it})\}.$$

The discrete time hazard in the j^e interval is written

$$h_j(X_{ij}) = 1 - \exp[-\exp(X'_{ij}\beta + \gamma_j)]$$

$$\text{with} \quad \gamma_j = \log \int_{a_{j-1}}^{a_j} \lambda_0(\tau)d\tau.$$

Given the expressions, the log-likelihood function for the hazard model becomes

$$LogL = \sum_{i=1}^{n} \left\{ c_i \log \left\{ h_i(X_{it}) \prod_{s=1}^{t_i - 1} [1 - h_s(X_{is})] \right\} + (1 - c_i) \log \left\{ \prod_{s=1}^{t_i} [1 - h_s(X_{is})] \right\} \right\}.$$

The indicator variable takes the value $y_{it} = 1$ if the individual i leaves the state of work absence during the time interval $[t - 1, t]$; otherwise, $y_{it} = 0$. The log-likelihood equation (equation 14) thus becomes

$$LogL(\beta, \delta) = \sum_{i=1}^{n} \sum_{j=1}^{t_i} \{y_{ij} \log[h_j(X_{ij})] + (1 - y_{ij}) \log [1 - h_j(X_{ij})]\}.$$

This expression represents the log-likelihood of the preliminary version of the final model. This preliminary version does not take the unobserved heterogeneity between individuals into account and implicitly assumes that any heterogeneity among agents will have been measured and integrated in X_i.

It is nevertheless probable that numerous variables (such as moral hazard and adverse selection of individuals) are unknown to the econometrist, even if they influence the process of leaving the work absence state. Not taking this unobservable heterogeneity into account may result in a negative bias in the estimation of the temporal dependence parameter. This bias, due to the “mover-stayer" phenomenon, can be schematised as follows: if the population studied is composed of homogeneous groups with a constant (though different) baseline hazard, then the population structure remaining in a state of work absence will change over time and will consist of increasing numbers of individuals with a low hazard rate (stayers) and decreasing numbers of individuals with a high hazard rate (movers). As a result, the temporal dependence parameters, rather than indicating a constant hazard rate, will indicate a decreasing rate with the time spent in a state of work absence. To take the unobserved heterogeneity of agents into account, we introduce a multiplicative function into the hazard equation ϵ_i distributed according to a Gamma distribution with a mean 1 and variance $\sigma^2 \equiv \upsilon$ (Lancaster (1979), Han and Hausman (1990), Dolton and O'Neill (1996) and Stewart (1996). The instantaneous hazard rate for the equation is now specified as follows:

$$\lambda_{it} = \lambda_0(t)\epsilon_i \exp(X'_{it}\beta) = \lambda_0(t)\exp(X'_{it}\beta + \log(\epsilon_i))$$

The discrete time hazard function is written

$$h_j(X_{ij}) = 1 - \exp\left[-\exp\left(X'_{ij}\beta + \gamma_j + \log(\epsilon_i)\right)\right]$$

The log-likelihood function for the second version of the model can be written (Meyer 1990, Jenkins 1997)

$$LogL = \sum_{i=1}^{N} \log\{(1 - c_i)A_i + c_i B_i\}$$

$$A_i = \left[1 + \upsilon \sum_{j=1}^{t_i} \exp\left(X'_{ij}\beta + \theta(j)\right)\right]^{-\frac{1}{\upsilon}}$$

$$B_i = \begin{cases} \left[1 + \upsilon \sum_{j=1}^{t_i - 1} \exp\left(X'_{ij}\beta + \theta(j)\right)\right]^{-\frac{1}{\upsilon}} - A_i & \text{si } t_i > 1 \\ 1 - A_i & \text{si } t_i = 1 \end{cases}.$$

Furthermore, we possess information on the censoring of work absence spells. In the following analysis, we also take into account the right censoring of individuals since some of them were still on sick leave at the end of 2008. The unit of time retained to measure the duration of the work absence spell is the day and the period of observation between 2005 and 2008. In this study, we restrict our attention to work absences lasting less than 3 months for two reasons. Firstly, beyond 90 days, the Social Security systematically carries out controls obliging both the individual and the physician to justify the reasons for prolonging sick leave[13]. This should have the effect of limiting *ex post* moral hazard. Secondly, long-term work absences are not very frequent (7.4 %). The specification of the piecewise constant baseline hazard retained for our model is as follows: the baseline hazard is constant in three day intervals from the 1st to the 9th day, 10 day intervals from the 10th to 29th days, and 15 day intervals from the 30th to the 59th day, and finally one interval up to the 90th day. This model allows us to measure the effect of the generosity of sickness benefit systems negotiated in CBAs on the hazard function.

7. Results

This section is devoted to the analysis of the results provided by the different models estimated on the global sample (E_1) and the sample (E_2) composed solely of individuals for which we have collected information on the collective agreement, taking unobserved heterogeneity into account[14].

Through the use of different models, we more particularly analyse the influence of individual characteristics, employment characteristics and region on the duration of work absence spells (Table 3, Column 1-3). Numerous variables are taken into account within the framework of this analysis. A first group of variables refers to individual characteristics (age, gender, insurance regime (CMU), age of entry into the labour market and socio-professional category, health status (as *proxy* number of visits

[13] The National Health Insurance medical services can carry out the following checks: control continuous work absences including short-term or repetitive absences, invite the beneficiary for a medical examination carried out by the Social Security medical officer in cases of frequent prescription of sick leave. When sick leave duration extends beyond three months, the sickness fund medical officer in liaison with the general practitioner can call on the occupational physician for advice concerning the beneficiary's ability to return to work.

[14] The rate of leaving the work absence state is not only affected by the employee's observed characteristics but also by unobserved characteristics such as moral hazard and adverse selection. Control for the effect of unobserved heterogeneity is represented by the *Gamma factor*. The positive and significant effect of the variance-Gamma distribution, for men and women, indicates the existence of unobserved factors with a positive effect on the rate of leaving the work absence state.

to a general practitioner, number of days hospitalisation, having a long-term illness). A second group of variables represents employment characteristics (wage, working time, sector and size of the company). A final group of regional variables is introduced so as to measure the effect of economic context (region of residence, unemployment rate per department). Finally, two types of variable specific to the sick leave start date are introduced in the estimations: the day of the week on which sick leave began and a second variable measuring the closeness of this start date to a day before or following an official public holiday.

We then evaluate the impact of the generosity of collective agreement provisions concerning sickness benefits on survival in the sickness state. We then evaluate the impact of collective agreement benefit generosity on survival in the state of sickness. We thus estimate 4 models (Table 4, Column 1-4)by first separately introducing the four variables of generosity relative to the sickness benefit systems and secondly, crossing piecewise constant baseline hazards with the following generosity variables:

- Average global benefit generosity proper to each sick leave duration and each collective agreement (t_{moy});
- Benefit generosity proper to each collective agreement and calculated for each baseline hazard interval ($t_{c[d1,d2]}$: *d1* and *d2* representing the respective start and end dates of the baseline hazard interval;
- Alsace Moselle, variable used as a *proxy* for a very generous, standard sickness benefit system

The specification of the piecewise constant baseline hazard retained here assumes a constant hazard in three day intervals from the 1st to the 15th day (interval 1-5), then in 15 day intervals from the 15th to the 90th day (interval 6-10) (*cf.* Jenkins, 1995). Intervals 1 to 10 are temporal *dummies* defining the baseline hazard[15].

The first results of the different estimates carried out on the global sample (E_1) are presented in table3 taking into account unobserved heterogeneity. Controlling for the effect of unobserved heterogeneity is represented by the *Gamma* factor. The positive and significant effect of variance-*Gamma* distribution indicates the existence of unobserved factors that positively influence the rate of leaving the state of sickness absence.

The aim of accounting for the risk dependence of leaving the state of work absence vis-à-vis the duration of sick leave is to identify the date on which the spell of sick leave was concluded and the impact of collective agreement replacement rate variability on the rate of leaving the work absence state.

The terms of the baseline hazard do not appear to vary monotonically with the duration of sickness absence. Despite the negative and significant effects of the majority of the baseline hazard coefficients (column 1-3, Table 3), we observe a strong continuous growth in the estimated hazard coefficients from the 4th to the 30th day.

The terms of the baseline hazard with a short-duration, between 1 and 3 days, have a negative and significant effect on the instantaneous rate of leaving the work absence state. This trend remains the same for longer work absence spells (from the 6th to the 30th day) but the effects are weaker. This tends to significantly reduce the duration of the sickness absence spell and consequently increases the likelihood of returning to work up to the end of the first month. Beyond the first month, the negative effect of the baseline hazard tends to decrease and thus reduces the likelihood of leaving the sickness absence state.

This first result drives us to deepen the analysis according to the benefit generosity of collective agreements so as to identify differences in individual behaviour.

[15]The constant was not included so as to avoid perfect co-linearity with the temporal *dummies* (Jenkins, 1995).

Regarding individual variables, the outcome of the econometric estimates show that men have significantly shorter spells of sickness absences from work than women. These results are consistent with those obtained in several empirical studies (Allen, 1981; Bridges et Mumford, 2001; Ose, 2005).

Age has a negative and significant effect on the rate of leaving the sickness absence state. This result appears to confirm the existence of an incremental relationship between age and sick leave duration. In relation to individuals in the 25-34 age group the duration of sick leave spells among individuals aged over 34 are significantly longer[16]. This effect increases with age; that is to say, the rate of leaving the work absence state decreases with age. All other things being equal, individuals aged over 55 thus reduce their likelihood of concluding a sick leave spell by 28 %[17] in relation to individuals aged less than 34 (column 2, Table 3).Two main factors can explain this relationship between age and sick leave duration: first, there is correlation between age and health status such that a longer duration corresponds to a deteriorated health status. Secondly, in France as in a number of other industrialised countries, ceasing work as a result of sickness can be one of the ways of withdrawing from the labour market for elderly employees (Behagel et *al.* 2011). Longer absences from work can thus appear to be the result of employees' more or less constrained choices concerning their labour market participation. This age effect also exists concerning the likelihood of being on sick leave (Ben Halima et *al.*, 2012).

Concerning employment characteristics, individuals working part-time or from home have a 5% higher likelihood of leaving the work absence state than individuals working full time, all other things being equal (column 2, Table 3).

Socio-professional category seems to play a significant role on sick leave duration. All other things being equal, supervisors, employees or workers have significantly shorter sick leave spells than executives. The first effect is of greater magnitude (column 2, Table 3).

Compared to the early entrants to the labour market (under 18 years old), later entrants have considerably shorter spells of work absence. This variable can be considered as a proxy for age on leaving the education system (column 1-3, Table 3). From that point, young people entering early into the labour market are essentially characterised by a low level of human capital. It is thus probable that they hold less prestigious jobs requiring fewer skills characterised by poorer working conditions. On the contrary, late entrants to the market who register significantly shorter work absence spells generally have a higher level of education and have jobs with more responsibility and autonomy, better rewards and better working conditions (Ose, 2005).

The variables used as a proxy for health status do not have the same effect on the rate of leaving the sickness absence state. As expected, a high number of visits to a specialist in year (t-1), tends to significantly reduce an individual's likelihood of leaving the sickness spell and extends the duration of sick leave. On the other hand, an increase in the number of visits to a general practitioner in year (t-1) has a negative and significant effect on the duration of the work absence spell as a result of sickness (column 3, Table 3). We can thus conclude that general practitioners play an important and efficient role alongside occupational physicians in terms of improving health at work since it is the GP that is most frequently consulted when workers have health problems. Numerous work situations can alter patients' state of health and certain diseases have repercussions on individuals' ability to work (Ineps, 2009).

Concerning the regional variables, our results reveal a negative and significant relationship between '*departement*' unemployment rate and sickness absence duration. As a result, the frequency and gravity of health-related absenteeism should be lower in periods of economic downturn. Several empirical results confirm this theory such as those obtained by Henrekson and Persson (2004) and Johansson and Palme (1996, 2002) who show that sickness absence spells are shorter during periods of high unemployment. Localisation in the west, south and south-west employment areas reduce the duration of sickness absence compared the employment areas in the Paris region. On the other hand,

[16] A negative and significant effect of the coefficients corresponds to a reduction in the rate of leaving the work absence state and the prolongation of sick leave duration.

[17] 28 % = 1 -exp(-0,335).

individuals living in the north increase their likelihood of leaving the sick leave state by 5% (column 2, Table 3).

The 'day of the week' effect (Friday being the reference), and the day prior to or following an official public holiday reveals significant effects on the rate of leaving the sickness absence state (column 2-3, Table 3). In effect, sick leave duration is significantly longer when the start day is a Saturday or Sunday or the day prior to or following an official public holiday. This weekend and public holiday effect can be explained by the fact that the majority of these sickness absences can be the result of an individual choice to prolong a weekend or an official public holiday (Broström, Johansson and Palme, 2004). We observe the opposite effect, however, for the other days of the week.

Compared with individuals working in small companies counting less than 10 employees, those working in medium or large companies (over 50 employees) take shorter periods of sick leave. From a certain threshold, we can thus conclude that sickness absence is negatively correlated to company size. Employees working in companies counting from 10 to 49 employees however, have a higher probability of having longer work absence spells than those working in small companies since their likelihood of leaving the sickness state is reduced by 4% (column 2, Table 3). Two reasons can be forwarded to explain this relationship. The first is that large companies have developed more effective means of controlling individual employees, and the production methods adopted do not encourage employees to prolong sick leave as it carries the risk of replacement or job modification (Lanfranchi and Treble, 2010).

In relation to the commercial sector, the manufacturing industries, construction sector, hotel and catering sector, financial activities, real estate, rental and business services, public administration, health and social services and extra-territorial activities have positive and significant effects on the rate of leaving the work absence state. As a whole, employees in these sectors have significantly shorter sickness absence spells than those in the commercial sector. On the contrary, individuals working in the transport and communications sector have significantly longer sick leave spells (column 2-3, Table 3). This result appears to confirm the existence of more generous branch and sector agreements regarding sickness insurance benefits than others that would explain these differences.

This sectorial analysis will be extended according to the different collective agreements in an attempt to dissociate individual employee effects from those related to the sickness benefit system provided by the company.

Effect of the generosity of the sickness benefit system:

Table 4 (column 1-3) presents the results of the discreet time proportional hazard model using different indicators of the generosity of the sickness benefit system estimated from sample (E_2). Table 4 only presents the results specific to the baseline hazard intervals so as to identify variations in individual behaviour resulting from changes in the level of generosity during the episode of sick leave.

Column 1 indicates that the level of generosity pertaining to each sick leave, calculated from the collective agreement parameters and sick leave duration, has a significant and negative effect on the rate of leaving the work absence state and thus has the effect of prolonging the sickness absence spell. A 1% increase in the generosity of sickness benefits reduces the likelihood of leaving the sickness absence state by 2,8%. This result appears to confirm the conclusions obtained by Frick and Malo (2008), showing that an increase in sickness insurance replacement rates tends to increase the number of days absence by 2.6 days.

When we cross the level of generosity proper to each sick leave ($\boldsymbol{t_{mean}}$) with the different baseline hazard time intervals (column 2, Table 4),all the terms of the baseline hazard have a significant and negative effect on sickness absence duration with an almost similar effect on all the intervals.

The results of crossing the baseline hazard with the level of generosity proper to each collective agreement provision calculated on three day intervals from the 1st to the 15th day and then by 15 day intervals from the 15th to the 90th day (column 3, Table 4), show that the risk does not vary

monotonically according to duration. The terms of the first baseline hazard with a short-duration of between 1 and 3 days, crossed with level of generosity have a negative and significant effect. Thus, a 1% increase in the level of generosity during the 3 day waiting period reduces the rate of leaving the work absence state by 3%. On the other hand, this tendency is inverted for longer periods of sick leave, lasting between 4 and 15 days for which the respective terms of the baseline hazard terms have a positive and significant effect. We conclude that a high level of generosity during this period of sickness absence from work does not encourage individuals to prolong their work absence spell and consequently increases the probability of a return to work. This result can be explained by the fact that during this period of sickness absence, the employer is legally obliged to pay supplementary sickness benefits from the 11th day of sick leave so as to attain a global wage replacement rate of 90% for a period of 30 days. This legal obligation to compensate wage loss at a high minimum rate does not induce a significantly stronger variability in level of generosity according to individual or the specific collective agreement to which they belong. For longer spells of sick leave, from the 16th day up to two months, very generous collective agreement provisions have a negative effect on leaving the work absence state and thus significantly increase the duration of the work absence spell during these periods. The drop in the legal daily sickness benefit rate to 66.6% during this period leaves room for strong variability in levels of generosity as collective agreement provisions for sickness benefits can reach a 100% replacement rate in certain cases. Therefore, during this sickness absence spell, there is a positive relationship between levels of generosity of sickness insurance systems on the duration of sick leave. For spells of sick leave lasting over two months, a high level of generosity does not tend to prolong the work absence state.

In the case of a standard and generous sickness insurance system such as the Alsace-Moselle system, the econometric results (column 4, Table 4) show that the effects on the terms of the baseline hazard according to the duration of the work absence spell is non-significant. Thus, a relatively high standard replacement rate over the whole sickness absence spell does not generate individual behaviour patterns regarding the risk of different illnesses.

Conclusion:

The sickness benefits system has a significant influence on the duration of sick leave. This effect has been revealed in several recent studies examining the first-tier universal minimal benefits provided by the National Health Insurance Fund. Our study, focusing on the very diverse benefit provisions provided for in collective agreements (second-tier benefits) resulting from branch-level negotiations, confirm these results. To do this, over forty collective agreement texts were analysed and formalised on the basis of certain parameters proper to each collective agreement, which had never been done before.

Contrary to first-tier benefits, the second-tier collective agreement provisions create considerable disparities between employees in terms of daily benefit entitlements; disparities which in turn have an effect on employee behaviour. The level of generosity thus varies considerably, not only from one collective agreement to another, but also by sub-period; the generosity of each collective agreement thus varies according to the length of the sick leave spell: some will be generous over a long period after a certain waiting period whereas others waive the waiting period but are generous over a shorter period of time.

The established results have several consequences regarding public policy. First, the considerable disparity between employees in terms of benefit provision raises the question of equity. These differences in benefit provision may be founded if they are a means of compensating differences in working conditions, notably in physically demanding jobs. This type of approach is all the more important in that it has repercussions on key variables in the Social Security system (health status, pension levels) and because the correlation between collective agreement generosity and difficult working conditions is – as a matter of fact - not immediately obvious.

As sickness benefit systems have an influence on labour supply, this question should be studied from the economic performance and the organisation of production angle. There effectively exists a trade-off between two economic goals. The first consists in inducing effort within the framework of companies' control over employees which tends to reduce the generosity of sickness benefits. The second, at the origin of the workers' compensation insurance system[18], aims at preserving employees' health and thus their level of productivity. Whereas collective agreement provisions are in the main part due to the weight of history, this trade-off raises the economic question regarding an optimal level of generosity and the gap between this level and actual practices.

Finally, the results obtained in this study suggest that the optimality of a sickness benefits system should not just be examined globally, but also in relationship with sick leave duration. Generous collective agreement provisions do not appear to increase the overall number of sick leave days but lead to more frequent and shorter spells of sick leave. Employees with good sickness insurance coverage appear less reluctant than others in taking short spells of sick leave, but the generosity of their collective agreements does not seem to encourage unduly prolongation of the work absence spell. On the contrary, poorly covered employees foregoing short spells of sick leave is likely to generate higher delayed costs as it relates to the problem of foregoing healthcare. As a preventive measure, it might thus be more effective to favour short spells of sick leave. The question of the effectiveness of short spells of sick leave (in terms of health and productivity) thus remains as does the question of the social costs of foregoing sick leave.

[18]The social protection of workers against illness and accidents at work was first implemented on a national basis in Germany by Chancellor Bismark's administration. The aim was to protect workers, but also to enhance their productivity, improve the economic performance of German firms and at the same time thwart the rise of Socialism.

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Table 3: Results of the Discreet Time Proportional Hazard Model Estimates

	Sample E_1		
	(1)	(2)	(3)
Baseline risk terms			
Interval 1 [1; 3]	-4.131***	-4.867***	-4.804***
Interval 2 [4; 6]	-1.994***	-2.634***	-2.681***
Interval 3 [7; 9]	-2.226***	-2.719***	-2.800***
Interval 4 [10; 12]	-2.510***	-2.936***	-2.998***
Interval 5 [13; 15]	-2.605***	-2.952***	-3.027***
Interval 6 [16; 30]	-2.948***	-3.171***	-3.246***
Interval 7 [31; 45]	-3.022***	-3.054***	-3.136***
Interval 8 [46; 60]	-3.008***	-2.887***	-2.963***
Interval 9 [61; 75]	-2.674***	-2.385***	-2.485***
Interval 10 [76; 89]	-1.897***	-1.424***	-1.538***
Gender			
Male	0.108***	0.050***	0.034***
Age (Ref: [25; 34])			
[35; 44]	-0.011**	-0.100***	-0.096***
[45; 54]	-0.092***	-0.228***	-0.228***
[55; 65]	-0.204***	-0.335***	-0.335***
Age of entry into the labour market (Ref.: under 18 years old)			
19-22 years old	0.050***	0.063***	0.059***
23-26 years old	0.056***	0.049***	0.046***
Over 27 years old	0.048***	0.120***	0.119***
Working time (Ref.: part-time)			
Beneficiaries of the Alsace Moselle regime	0.031***	0.042***	0.051***
Having a long-term illness	0.146***	0.152***	0.164***
CMU-C beneficiary	0.012	0.029	0.052*
Having changed status vis-à-vis the CMU-C	0.075***	0.124***	0.123***
Socio-professional category (Ref: executive)			
Employee	0.009*	0.016**	0.014**
Supervisor	0.017**	0.027***	0.026**
Worker	0.011*	0.020**	0.022**
Company size (Ref.: [1; 9])			
[10; 49]		-0.047***	-0.034***
[50; 199]		0.051***	0.059***
[200; 499]		0.105***	0.114***
[500; +]		0.102***	0.108***
Sectors of activity (Ref: Commerce)			
Agriculture. Fisheries		-0.015	-0.031
Mining industries		0.082***	0.089***
Manufacturing industries		0.096*	0.120*
Production and distribution of electricity. gas and water		-0.009	-0.013
Construction		0.026**	0.025**
Commerce. car and domestic equipment repairs		0.046***	0.060***
Hotels and restaurants		-0.044***	-0.044**
Transport and communications		0.067***	0.079***
Financial activities		0.034**	0.038**
Real estate. rentals and business services		0.074***	0.086***
Public administration		-0.002	0.007
Education		0.078***	0.072***
Health and social services		0.108***	0.110***
Collective. social and personal services		0.053***	0.046***
Quarterly wage (Ref: less than 3 500€)			
Between 3 500 € and 5 000 €		0.360***	0.352***
Between 5 000 € and 6 500 €		0.570***	0.574***
Over 6 500 €		0.642***	0.650***
Region of residence (Ref : Paris)			
North		0.075***	0.065***
West		-0.029***	-0.039***
South-West		-0.053***	-0.064***
South		-0.063***	-0.074***
South-East		-0.004	-0.009
East		0.004	-0.006

Leave start day (Ref : Friday)			
Sunday		-0.223***	-0.198***
Monday		0.334***	0.325***
Tuesday		0.442***	0.433***
Wednesday		0.196***	0.179***
Thursday		0.120***	0.110***
Saturday		-0.070***	-0.069***
Start day on a public holiday (Yes/No)		-0.449***	-0.438***
Economic context			
Unemployment rate		0.007***	0.011***
Panel year			
Year 2006		-0.019**	
Year 2007		-0.017**	
Year 2008		-0.061***	
Medical care consumption			
Number of G.P consultations (or visits) in t-1			0.002***
Number of specialist consultations (or visits) in t-1			-0.007***
Number of days hospitalisation in t-1			-0.000
Gamma heterogeneity	0.069***	0.311***	0.305***
Number of observations	6 194 046	5 937 607	4 447 110
Number of episodes	396 392.000	380 146.000	281 533.000
Log-Likelihood	-1 386 512.58	-1 316 909.77	-978 606.76

Table 4: Results of the Discreet Time Duration Proportional Hazard Model Estimates –Effect of Generosity

	Sample E_2			
	(1)	(2)	(3)	(4)
Terms of the baseline hazard				
Interval 1 [1; 3]	-3.390***			
Interval 2 [4; 6]	-1.041***			
Interval 3 [7; 9]	-0.969***			
Interval 4 [10; 12]	-1.103***			
Interval 5 [13; 15]	-1.093***			
Interval 6 [16; 30]	-1.342***			
Interval 7 [31; 45]	-1.402***			
Interval 8 [46; 60]	-1.427***			
Interval 9 [61; 75]	-1.174***			
Interval 10 [76; 90]	-0.466***			
Interval 1 [1; 3] * $t_{c[1,3]}$			-0.012***	
Interval 2 [4; 6] * $t_{c[4,6]}$			0.010***	
Interval 3 [7; 9] * $t_{c[7,9]}$			0.007***	
Interval 4 [10; 12] * $t_{c[10,12]}$			0.004***	
Interval 5 [13; 15] * $t_{c[13,15]}$			0.002***	
Interval 6 [16; 30] * $t_{c[16,30]}$			-0.001***	
Interval 7 [31; 45] * $t_{c[31,45]}$			-0.003***	
Interval 8 [46; 60] * $t_{c[46,60]}$			-0.004***	
Interval 9 [61; 75] * $t_{c[61,75]}$			0.001*	
Interval 10 [76; 90] * $t_{c[76,89]}$			0.000*	
Interval 1 [1; 3] * t_{mean}		-0.098***		
Interval 2 [4; 6] * t_{mean}		-0.048***		
Interval 3 [7; 9] * t_{mean}		-0.050***		
Interval 4 [10; 12] * t_{mean}		-0.052***		
Interval 5 [13; 15] * t_{mean}		-0.052***		
Interval 6 [16; 30] * t_{mean}		-0.055***		
Interval 7 [31; 45] * t_{mean}		-0.056***		
Interval 8 [46; 60] * t_{mean}		-0.056***		
Interval 9 [61; 75] * t_{mean}		-0.053***		
Interval 10 [76; 90] * t_{mean}		-0.044***		
Interval 1 [1; 3] * Alsace Moselle				-8.005
Interval 2 [4; 6] * Alsace Moselle				-5.562
Interval 3 [7; 9] * Alsace Moselle				-5.861
Interval 4 [10; 12] * Alsace Moselle				-6.199
Interval 5 [13; 15] * Alsace Moselle				-6.240
Interval 6 [16; 30] * Alsace Moselle				-6.555
Interval 7 [31; 45] * Alsace Moselle				-6.717
Interval 8 [46; 60] * Alsace Moselle				-6.798
Interval 9 [61; 75] * Alsace Moselle				-6.488
Interval 10 [76; 90] * Alsace Moselle				-5.750
Global average level of generosity t_{moy}	-0.028***			
Gamma variance heterogeneity	0.229***	0.218***	0.249***	0.251***
Number of observations	3 536 597	3 536 597	3 536 597	
Number of episodes	223 979	223 979	223 979	
Log-Likelihood	-744 654.79	-757 179.09	-805 627.55	-834 903.22

Note: *** p<0.001, ** p<0.05, * p<0.1

The models estimated from sample E_2 (column 1-4, Table 4) include the following variables: age, gender, insurance scheme (CMU), age of entry into the labour market and socio-professional category, wage level, company sector and size, region of residence, unemployment rate per department, sick leave start end days and public holiday.

Annex 1: Regulations concerning daily sickness benefits under the National Health Insurance System[19]

In France, the sickness insurance system is multi-tiered. The first, universal tier includes daily sickness benefits paid by the National Health Insurance Fund and supplementary benefits paid by the employer.

The General Health Insurance scheme makes provision for the payment of daily sickness benefits from the 4th day following the medical intervention prescribing sick leave. This daily allowance corresponds to 50% of gross daily income for a maximum duration of three years (within a 360 day limit). The wage base used to calculate daily sickness benefits is limited to 1/720thof the annual Social Security ceiling for the period being studied. For information, this ceiling was amended to 1/730 of the annual Social Security ceiling (reassessed on January 1st of each year) from December 10th 2010 (Circular of November 25th 2010 relative to certain modes of calculating daily benefits), then to 1.8 times the minimum wage (SMIC) the 1st of January 2012 (Decree n° 2011-1957 of December 26th2011 relative to the modes of allocating daily sickness benefits entitled under the health insurance system), limiting the daily benefit to 41.38 € on January 1st2012.

Eligibility for daily sickness benefits is subject to registration under the compulsory national health insurance scheme but also to a minimum contribution rate equivalent to 200 hours worked over the last three months or 800 hours over a year.

The conditions under which daily sickness benefits are allocated are expressed in the number of hours worked but also in equivalent wage subject to social security contributions, that is 1 015 times the hourly minimum wage over the last six months for the 200 hours and 2 030 times the hourly minimum wage over the last 12 months for the 800 hours.

The calculation of daily sickness benefits is based on earnings during the last three months preceding the sick leave spell whether the duration of the sick leave spell is under or over six months, but for certain cases over the last twelve months , ??

In any event, a percentage of the working population does not benefit from coverage against the risk of sickness absence. It concerns workers that have not worked 200 hours over the course of the last three months (or paid contributions equivalent to 1 015 times the hourly minimum wage over the course of the last six months) and do not meet the conditions of eligibility to daily sickness benefits. This mobile population in precarious employment has never been estimated even though the situation in the job market and the resulting increase in the number of employment gaps on the career path tend to aggravate this type of situation.

The employer is legally obliged to complete, under certain conditions subject to waiting period, the benefits paid by the Health Insurance scheme with a supplementary benefit. The conditions for eligibility and the waiting period have been amended by Law n° 2008-596 of June 25th 2008 'concerning the modernisation of the labour market'. The employee must justify a minimum number of years' service in the employing company or establishment (3 years until June 26th 2008, reduced to 1 year by Law n° 2008-596 of June 25th 2008 'concerning the modernisation of the labour market'). Furthermore, supplementary benefits do not apply to employees working from home, seasonal workers, casual or temporary employees. The benefit was paid from the 11th day of sick leave prior to the Law of 2008 and from the 8th day following this reform. It aims to reach a global replacement rate of 90% over 30 days. In the event of successive work absences over a period of 12 months, the total duration of benefits is limited to the maximum duration. These are increased according to number of years' service.

[19]Source : http://vosdroits.service-public.fr/F3053.xhtml

Annex 2: Information Collected and Indicators Calculated from Collective Agreements

The necessary process of analysing collective agreement texts

As underlined in several recent reports, there are no available statistics on supplementary sickness benefits and in particular those relative to collective agreement provisions. The texts of the collective agreements are available on the *LégiFrance* web site, but the information has not been formatted. The different collective agreements do not include the same level of detail, are not presented in a homogeneous manner and the basic texts have often been amended by subsequent agreements.

This is why it was necessary to undertake a considerable amount of research and analysis on these legal texts. The texts of the 46 collective agreements most represented in the HYGIE database were analysed. Taking into account the different provisions according to employee category and amendments applicable during the course of the period studied, it represents 79 different benefit provisions.

List of collective agreements for which the texts were analysed

IDCC	Title	Number of different provisions
00016	Road transport	3
00018	Textile industries	3
00029	Private Hospitals: non-profit private care, cure and assistance hospitals (FEHAP)	3
00044	Chemical industries	4
00045	Rubber	3
00054	Metal industry Paris Region	1
00086	Advertising	1
00176	Pharmaceutical industry	1
00184	General printing industry and print media industry graphic	2
00218	Social Security agencies	1
00292	Plastics processing	2
00413	The disabled: establishments and services for disabled persons	1
00573	Wholesale trade	3
00650	Metal industry executives	1
00675	Retail clothing outlets	3
00787	Chartered accountants	1
00843	Artisan bakeries and confectioners	1
01043	Building watchmen, caretakers and building management employees	1
01090	Automobile services	2
01147	Medical surgeries	1
01258	Home assistance or support organisations	1
01266	Contract catering sector	1
01351	Prevention and safety	3
01413	Temporary work–permanent employees	1
01486	Engineering and design consultancies SYNTEC	3
01501	Fast food industry	1
01516	Training organisations	1
01517	Non-food retail trade	1
01518	Animation	2
01527	Real estate	1
01596	Construction workers up to 10 employees	1
01597	Construction workers over 10 employees	1
01672	Insurance companies	1
01702	Civil engineering workers	1
01810	Cleaning industry	3
01979	Hotels Cafés Restaurants	1
01996	Retail pharmacies	3
02098	Service sector service providers	2
02120	Banks	1
02216	Predominant food retail and wholesale trade	3
02264	Private for-profit hospitals	4
02378	Temporary work–casual workers	1
02408	Administrative and economic personnel, educational personnel, and librarians in private schools	1
05003	FPE (non-tenured)	1
05021	FPT (non-tenured)	1
05516	La Poste-Telecom	1
Total		**79**

Construction of a statistical database describing the benefit provisions for each collective agreement:

For each of the collective agreements, the parts of the text concerning sickness benefit provision were analysed. Information concerning the payment of daily sickness benefits was collected in the form of datasheets.

These datasheets were then used to construct a database on the collective agreements including a certain number of parameters regarding sickness benefit eligibility in force during the period 2005-2008 for each socio-professional category:

- Seniority required
- Waiting time (D0)
- Maximum benefit rate and benefit duration at maximum rate (Tmax and Dmax)
- Minimal benefit rate and benefit duration at minimal rate (Tmin et Dmin)
- Links to articles of reference.

A fist analysis of legal data revealed a certain number of typical rates and durations corresponding to amendments in collective agreement benefit schemes. We also noted the particular importance of certain sub-periods beyond which the benefits system changes in certain collective agreements. This led to a relatively fine division of time periods for the first three months of benefits (which will be slightly modified for use in the model depending on the statistical results):

- Sub-period 1: 1 to 3 days,
- Sub-period 2: 4 to 6 days,
- Sub-period 3: 7 to 9 days,
- Sub-period 4: 10 to 12 days,
- Sub-period 5: 13 to 15 days,
- Sub-period 6: 16 to 30 days,
- Sub-period 7: 31 to 45 days,
- Sub-period 8: 46 to 60 days,
- Sub-period 9: 61 to 75 days,
- Sub-period 10: 76 to 90 days.

Annex 3: Example of an analysed text (extracts)

Concrete example of an article concerning daily sickness benefits in the national collective agreement for accounting and auditing firms of December 9th 1974; IDCC 787.

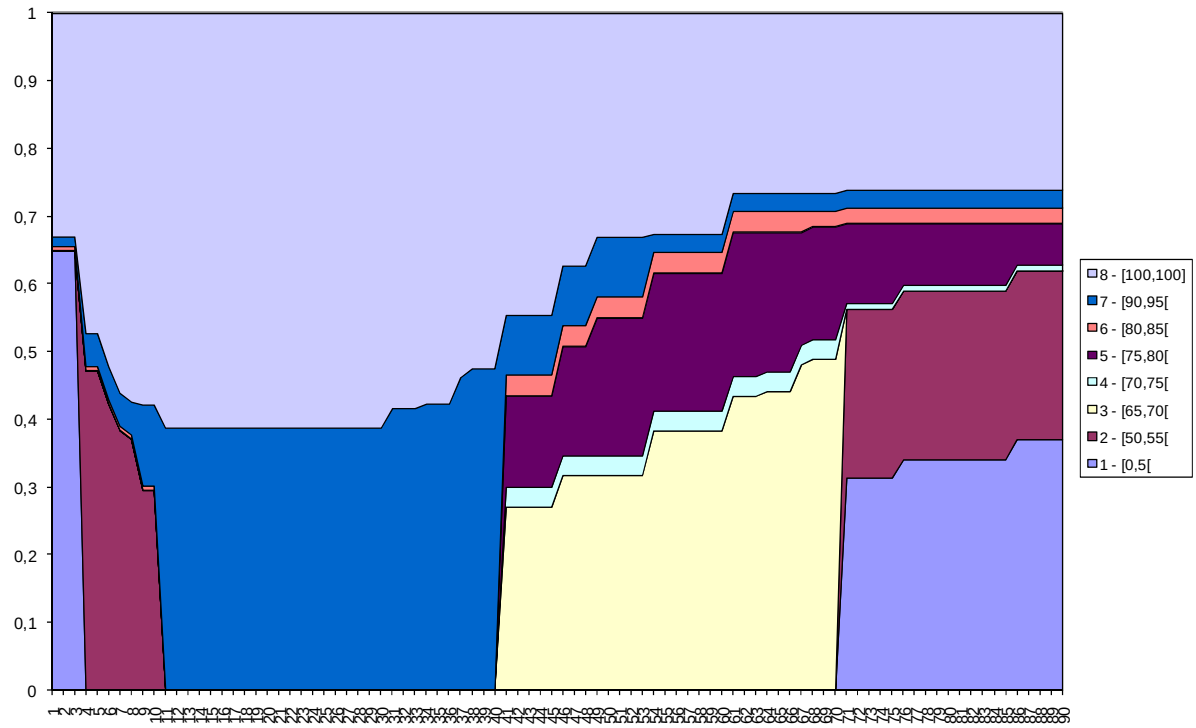
An article: 7.3. Guaranteed income in the case of illness or work-related accident [….]
After a year of service in the firm, employees' and executives' income level is maintained in the case of illness, occupational accident or non-work related accident under the following conditions:
Entitlement to sickness benefit is subordinate to the daily sickness benefits paid by the general health insurance scheme. The total duration of work absences, including waiting time defined in the following sub-paragraph below, with benefits entitlement cannot exceed thirty calendar days per illness or occupational accident. If several sickness or occupational accident leaves with benefit entitlement occur during the same calendar year, the total benefit duration will not exceed thirty calendar days;
The net value of benefits, calculated from the fourth calendar day of absence, will complete the daily sickness benefit paid by the Social Security so as to concur with the net employment salary;
In the case of personnel on proportional remuneration, the supplementary benefit defined in the preceding paragraph will be calculated on the basis of a net employment salary corresponding to the net average earnings over the last twelve months preceding work absence.'
The elements underlined provide the essential facts for our datasheet:

- The way in which sickness and accidents are covered whether work-related or not. In this case there is no distinction between non-work related and work related accidents, there is no explicit distinction concerning illness (ambiguity), work-related illness seems to be (implicitly) classed with work-related accidents, or else simply as illness with no distinction.
- Years service required: one year
- Socio-professional categories, here grouped into employees and executives
- Waiting period: 'from the fourth calendar day of absence' ; thus, 3 days
- One can also guess the identity of the financer (the company) AND the 100% replacement rate (50% company and 50% social security) 'salary rate will be maintained' but for the financer, it is the article concerning the Welfareand Pension scheme which confirms this as it has a different compensation system to that of the company
- Maximum benefit duration: '30 calendar days'; thus 1 month
- The Welfare and Pensions scheme thus operates separately, defined in one of the articles of the collective agreement. The following extracts allow us to elaborate the welfare section of the datasheet:

'Firms must subscribe an insurance policy though a certified body covering all employees with a minimum of one year service in the firm, against death, inability to work and disability (…)'
This extract informs us that in order to benefit from the Welfare plan, employees must have a minimum of one years' service.
'In the case of absence resulting in the inability to work for a period of over one month, the insurance scheme will pay a gross daily benefit equal to 80p. 100 of gross income after deduction of daily sickness benefits paid by the general social security scheme.'
This extract indicates that the Welfare Plan will finance complementary benefits (50% of salary subject to a ceiling) annual Social Security ceiling) for the Social Security, the remaining benefits will be paid by the Welfare Plan)
'This compensation will be paid from the thirty first day of work absence and for the whole duration of temporary invalidity benefits paid by the Social Security, including beyond the eventual termination of the employment contract.'
This passage clearly indicates that the Welfare Benefits Plan takes over from the company in financing benefits, cf. above where the company finances sick leave for a maximum period of 30 calendar days (and can initiate a dismissal procedure if the prescribed leave requires suspending work for a period of over six months).
Furthermore, the insurance plan only finances as long as the Social Security does.
Collective agreements the most represented in the HYGIE database

Annex 4: some statistics on the CBAs

Distribution of the replacement rate in the HYGIE database, day by day



Reading: the replacement rate resulting from the first two tiers of sickness benefit provision (including CBA level) have been computed for each worker of the HYGIE database (This figure represents day by day the distribution of the replacement rate of the sick leave. For example, for the first 3 days, around 30 % of the workers receive no sick leave benefit (3 day waiting period) while around 70% are fully compensated by their CBA.

Distribution of sick leave duration and the generosity of CBA

Sick leave duration	T1_3=0	T1_3=100	T4_10=50	T4_10=100	65<=T41_70<70	70<=T41_70<80	T41_70=100
0(no sick leave)	83,2%	80,1%	85,6%	79,7%	85,4%	81,3%	80,3%
1-3	0,8%	1,0%	0,7%	1,0%	0,7%	0,9%	0,9%
4-10	7,8%	11,0%	6,9%	10,6%	6,9%	9,1%	10,0%
11-20	3,1%	3,3%	2,6%	3,5%	2,7%	3,4%	3,4%
21-40	2,2%	2,1%	1,9%	2,4%	1,9%	2,3%	2,4%
41-70	1,2%	1,0%	1,0%	1,2%	1,0%	1,2%	1,2%
>70	1,7%	1,5%	1,4%	1,7%	1,5%	1,8%	1,8%
Total	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Reading: lines represent the duration of the sick leave. Columns represent subpopulations of workers who differ in the generosity of their CBA. T1_3=0 represent the workers for which the replacement rate is 0% in the first 3 days. T1_3=100 are fully compensated during the same period.

83,2% of the first group and 80,1% of the second have no sick leave. The degree of generosity of the CBA also modifies the whole distribution of the sick leave durations.