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Sick Leaves: Understanding Disparities Between French Departments

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Abstract: The purpose of this publication is to better understand disparities between the proportions of sick leaves granted among various departments in France. The Hygie database was used for this study. It was created by merging a number of administrative files of employees in the private sector in France in 2005. This database allows for the determination of «employer/employee» relations, the impact of the characteristics of firms on the health of their employees and the interactions between health and work.

After briefly reviewing the various determinants for the effect of composition and the effect of context, as well as sick leaves and their importance for understanding geographic differences, we present a three-phase empirical analysis: a descriptive analysis to detect differences between departments, a multivariate analysis to highlight explanatory factors of probability of being on sick leave and, finally, an analysis of determinants of differences between departments.

Our different models explain a significant portion of the disparities between departments. The effects of composition and effects of context account for approximately two-thirds of the mean squared error. The variables describing the medical supply (density of general practitioners), monitoring by National Health Insurance and patient age when the professional career began best explain the disparities between departments concerning sick leave. In contrast to other compositions or contexts included in our model, the percentage of sick leaves verified and the density of general practitioners are important factors with respect to health policies. Our research shows that they could be used as public policy instruments aimed at reducing geographic disparities.

Keywords: Sick leave, Geographic disparities, Effect of context, Effect of composition, Absenteeism.

JEL Classification: I18, J21, J29, C25.

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Arrêts maladie : comprendre les disparités départementales

Résumé : L'objectif de cet article est de comprendre les disparités interdépartementales en termes d'arrêts maladie. Nous utilisons la base de données Hygie, construite à partir de la fusion de différents fichiers administratifs de salariés du secteur privé en France en 2005, qui permet de prendre en considération : les relations « employeurs/employés », l'impact des caractéristiques des entreprises sur la santé de leurs employés mais aussi les interactions entre la santé et le travail.

Après avoir rappelé les différents déterminants, entre effet de composition et effet de contexte, des arrêts maladie et leur importance pour comprendre les différences géographiques, nous menons une analyse empirique en trois temps : une analyse descriptive pour mettre en évidence les différences interdépartementales, une analyse multivariée pour mettre en avant les facteurs explicatifs de la probabilité d'être en arrêt maladie et enfin une analyse des déterminants des différences entre les départements.

Nos différentes modélisations explicitent une grande partie des disparités interdépartementales. Les effets de composition et les effets de contexte constituent approximativement la moitié de l'écart absolu et les deux tiers de l'erreur quadratique moyenne. Ce sont les variables décrivant l'offre médicale (densité d'omnipraticiens), les contrôles de l'Assurance maladie et l'âge d'entrée sur le marché du travail qui permettent le plus d'expliquer les disparités interdépartementales en matière d'arrêts maladie.

Contrairement à d'autres variables de composition ou de contexte qui ont soit une inertie d'évolution temporelle certaine (par exemple : le taux de natalité, le secteur industriel,…), soit des variables pour lesquelles la politique publique de santé a peu d'effets (par exemple : politique de rémunération des entreprises, taux de chômage), le pourcentage d'arrêts de travail contrôlés et la densité d'omnipraticiens sont déjà des leviers importants des politiques de santé. Notre recherche montre qu'ils pourraient être utilisés comme des instruments d'une politique publique visant à la réduction des disparités géographiques.

Mots-clefs : Arrêt maladie, Disparités géographiques, Effet de contexte, Effet de composition, Absentéisme.

Codes JEL : I18, J21, J29, C23.

Contents

1. Introduction

In 2008, the amount paid out by compulsory National Health Insurance in France for daily sick leave benefits[1] was € 11.3 billion of which 54% was for illness, 24% for maternity leave and 22% for occupational accidents. Accordingly, that is more than 5% of the total health expenditures. This amount, of course, varies with the economic situation, the regulatory context and the outbreaks of epidemics (flu, gastroenteritis,...). Between 1995 and 2003, the total amount of daily sick leave benefits increased by 4.3% whereas between 2003 and 2008, it decreased by 0.5% on average. These benefits are in the field of the National target of spending (ONDAM[2]) whose evolution is passed in Parliament. Since 2008, the amount of compensation tends to rise again which has the effect of increasing health insurance costs. Thus, identifying determinants of sick leaves taken is important. In addition, daily sick leave benefits as insurances' response to the question of absenteeism for health reasons have long been an issue in labor economics. This classic problem generally uses the model of Shapiro-Stiglitz (1984) that distinguishes the utility of working from the utility of being absent. Costs of these sick leaves[3] are not borne totally by the National Health Insurance as both the firm and the worker pay direct and/or indirect costs. Numerous studies have identified the diversity of individual factors for explaining absenteeism including gender (Allen, 1981; Bridges and Mumford, 2000; Ose, 2005), age (Barmby and Stephan, 2000), salary (Leigh, 1991; Barmby, Orme and Treble, 1995) and working conditions (Case and Deaton, 2003).

Aside from changes over time and various explanatory factors, sick leaves in France are marked by a large geographic heterogeneity and departmental heterogeneity. In our context, a department is an administrative area, and there are 95 such departments in France. Thus, in 2005, the proportion of employees with at least one daily sick leave benefit (DSLB) ranged from approximately 13% in the Hautes-Alpes Department to more 28% in the Ardennes Department. In its 2006 report on National Health Insurance, the Financial Courts stated that "the considerable geographic differences that exist and that still vary by a factor of 3 can hardly be explained by the socio-professional structure of the working population of the Departments". Our task, then, becomes an attempt to understand the origin of these differences between departments. Both sociologists and economists have often studied problems of geographic segregations resulting in differences in terms of both employment and health. Many publications have demonstrated the existence of external economic factors, but few publications have attempted to understand the relations between geographic differences and the rates of absenteeism or sick leaves. Ichino and Maggi (2000) proposed six potential reasons to explain differences between regions: (1) differences in characteristics among populations, (2) differences due to mobility between regions, (3) differences in production sectors and existing amenities, (4) sociological differences on the value of work, sick leaves and levels of needs, (5) differences in discrimination or acceptance of sick leave between departments and (6) differences in supply and demand of local markets that condition entry into the labor market or different types of jobs.

1 Daily sick leave benefits for an illness in France are paid every 14 days by National Health Insurance for each day not worked, including weekends and holidays, starting on the 4th day of work stoppage, i.e., after a waiting period of 3 days.

2 The National target expenditures (ONDAM) is the estimated amount established annually for expenses of health insurance in France. It is a tool for regularization of expenditure of health insurance.

3 In what follows, we use the term "sick leave" as a synonym for work stoppage with payment of daily sick leave allowance by compulsory health insurance.

To correctly conduct our analysis of the understanding of differences between departments, we dissociate the effects of compositions which encompass factors at the individual or at the firm level (differences in ages, health status, salaries, working conditions, sectors of activity and characteristics of firms between departments) and effects of context. The latter encompass a broad range of factors at the departmental level such as economic factors (unemployment rate, birth rate), medical supply factors (density of general practitioners), factors related to verifications by National Health Insurance and variables characterising firms(indicators of severity of workplace accidents, relative salaries). Once the importance of these factors in the understanding of the probability of having been a factor in at least one sick leave in 2005 is validated, we will see if these factors can further explain disparities between departments. This publication involves four parts. The first is a literature search and review on absenteeism to better understand potential differences among regions. The second part is a description of the Hygie database and the methodology used to elucidate determinants of being on sick leave and to measure the importance in the understanding of differences between departments. Third, we analyse determinants of sick leaves. The fourth and last part is devoted to the analysis of determinants of differences between departments.

2. Effect of composition or effect of context

To explain the differences between departments, two phenomena can be considered. The first results from differences in the demographic, economic and social structure of the population from one department to another. We call this phenomenon "the effect of composition". This effect is characterised by variables specific to each employee or to the firm. The second phenomenon is that there may exist geographic differences that can be imputed to the characteristics of each department after adjusting for the characteristics of individuals. We call this phenomenon "the effect of context". This effect is characterised by variables at the level of the department without being specific to each individual

2.1. Effect of composition

Variables explaining the effect of composition can be clustered in three groups: "individual" and "corporate" characteristics in which people work and "insurance-related" characteristics.

Several individual characteristics have been widely used in the economic literature to study determinants of sick leaves. According to Ose (2005) and Allen (1981), women take more sick leaves than men. This gender effect generally increases if there are young children in the household (Chaupain-Guillot and Guillot, 2007). Age is often a determinant of sick leaves, as increasing age significantly raises the probability of sick leaves (Livanos and Zangelidis, 2010). According to Depardieu and Lollivier (1985), age can be used as a proxy for the health status of individuals: as the health status of a person becomes more fragile with growing age, the probability of being on sick leave also increases. Rhodes and Stears (1984) confirm the positive connection between health status and work absenteeism. The observed differences between departments for sick leaves can, thus, be explained by the proportions of women in the work force, the age of workers or the health status. These factors are all very heterogeneous depending on the Department.

The second aspect of the effect of composition is all of the additional characteristics of the firm such as size, sector of activity, and salary. Allen (1981), Leigh (1983) and Barmby and Stephan (2000) found that firm size had a significant influence on sick leave. Employees of smaller firms are absent much less frequently than those working in large firms. According to Livanos and Zangelidis (2010), absence due to sick leave is more frequent is some sectors than in others. Based on a panel of 26 European countries studied between 2004 and 2006, it was determined that there was a higher risk of absenteeism in the industrial sector than in the agricultural sector. Barmby *et al.* (1995) showed a strong negative effect of salary on absenteeism. Many labor market theories can be invoked to explain the relations between salary and absenteeism, in particular between salary and sick leaves. For example, in the "shirking model", salary is a major determinant of sick leaves. In the efficiency wages model of Shapiro-Stiglitz (1984), salary levels maintain an increasing relationship with employee productivity. Leigh (1991) showed the existence of a salary effect, validating the theory of efficiency wages: workers making more money tend to take fewer sick leaves. Differences between Departments can be explained by the fact that the sectors of activity are not identically distributed throughout the country and that there are salary differences for the same job in the same sector of activity depending on the department.

The third group of variables explaining effects of composition is what we call "insurance-related" variables. The phenomenon of moral hazard could be one of the main determinants of sick leaves. One aspect of this is the adaptation of the insured worker's efforts with respect to the generosity of the Health Care Insurance Scheme and coverage of financial losses resulting from sick leaves. The employer supports a sick leave without a total understanding of the health status of his employee. The hazard, on the basis of known elements, is related to the individual once he is insured. A person with better coverage will have fewer losses to bear when on sick leave, implying that these individuals will be on sick leave more often (Allen, 1981). Several empirical studies have attempted to demonstrate this behavior pattern. Chaupain-Guillot and Guillot (2007) and Engellandt and Riphahn (2005) used the type of labor contract (temporary versus permanent contracts) to show that temporary contract workers are less likely to take sick leaves than those with permanent contracts. When a person is in an unstable labor market position and fears that his professional situation will not be stabilised by a permanent contract, he takes fewer sick leaves. Aiuppa and Trieschniann (1998) considered that going through successive periods of unemployment incites the person to take fewer sick leaves for fear of once again being unemployed. There is, nevertheless, a link between poor health and episodes of unemployment; therefore, there could very well be a positive effect of unemployment on the frequency of sick leaves. Moral hazard may also be the result of the characteristics of the French National Health Insurance system. For instance, workers covered by Alsace and Moselle Health Insurance (special plan) or those with supplementary private insurance benefit from advantages not offered by statutory health insurance. Costs resulting from a sick leave absence are therefore lower. People covered by more generous sick leaves insurance plans could be tempted to increase their consumption of health care and, thus, take more sick leaves. Henrekson and Persson (2004) used Swedish data from 1955 to 1999 to show that reforms that made the health insurance system more generous for reimbursing sick leaves led to increased rates of absenteeism. Similarly, Johansson and Palme (2002, 2005) used individual data to assess the Swedish reform for reimbursing sick leaves in 1991 and concluded that the frequency and length of workplace absence decreased when the cost of the absence to the worker increased. Finally, Puhani and Sonderhof (2010) reported that in Germany the reduction in salary of sick leave reimbursement from 100% to 80% reduced the average number of days of employee absence by approximately 2 days a

year. These determinants can explain the differences among French Departments either by the existence of geographic systems or by specificities.

2.2. Effect of context

To our knowledge, there are no French studies showing the possible effect of context on sick leaves although this issue is dealt with extensively in foreign publications. Ekblad and Bokenblon (2010) used Swedish data to determine the impact of effects of cultural and geographic contexts on sick leaves. The data concluded that geographic location played a major impact on sick leaves. The proportion of sick leaves, in fact, increased for people moving from a region with a low rate of sick leaves to a region with a higher rate of sick leaves. In addition, work by Ichino and Maggi (2000), Little (2007) indicated that, after controlling for individual characteristics, effects of context can explain the differences in sick leaves. Sick leave disparities between Departments could, thus, be due primarily to the structure of the economy and employment in the Departments in question. There are three types of variables explaining the effect of context: socio-economic variables (unemployment rate and birth rate), firm environment variables and insurance and medical supply variables.

Concerning economic variables, the unemployment rate is one of the principal factors explaining sick leaves. An unfavourable economic context characterised by high unemployment implies a reduction in sick leaves (Leigh, 1985; Arai and Thoursie, 2005; Fahr and Frick, 2007, Livanos *et al.*, 2010). This is a discipline effect of the workforce. Askildsen *et al.* (2000) confirmed this effect in a study of Norwegian data in 1992 (high unemployment rate) and 1995 (low unemployment rate). In better economic times (1995), workers took more sick leaves. Bliksvaer and Helliesen (1997), on the other hand, showed that national unemployment and absenteeism for reasons of illness were independent of the other. At the level of the individual, however, they found a significant relationship between past unemployment and absenteeism rates that was positive for Slovenia and Spain and negative for Luxemburg and the United States. Other work using the labor-leisure trade-off model (Barmby and Treble, 1991) showed another effect of composition of the labor force: in periods of high unemployment, unsatisfied or disgruntled workers tended to take more sick leaves. They all remained on their jobs, whereas they undoubtedly would have changed jobs if the economic situation was more conducive to mobility.

The effect of context is also seen in those variables that characterise the firm environment in terms of relative salary, working conditions and job security. In contrast to firm characteristics discussed with respect to the effects of composition, in this case we compare the situation of the employee's firm to that of other firms in the same sector and in the same Department. For example, Ose (2005) added a new variable to the basic model of efficiency wages of Shapiro Stiglitz (1984) that reflects working conditions and sick leaves related to, poor working conditions. He first indicated a negative effect of salary only on short sick leaves; yet he also indicated that long absences are closely linked to poor working conditions. Another effect of context that could explain sick leaves is the physical difficulty of work associated with a particular sector. Sick leaves are, in fact, more frequent in jobs characterised by strenuous and repeated physical efforts (Case and Deaton, 2003). Olsson (2009) tested the impact of a Swedish law of 2001 on job protection for firms with no more than 10 employees and found that absences due to illness decreased by 13% in the most highly protected firms.

A number of variables related to medical supply may be linked to an effect of context for individual behavior concerning sick leaves. Based on the theory of physician-induced demand (Rice, 1983), the density of physicians per department could explain the disparity of sick leaves. Two explanations have been advanced (Expert, 2007). The first is intuitive. A department with a high density of physicians implies easier access to care and, thus, a higher frequency of sick leaves. The second is related to the physician-induced demand theory. A department with a high medical density (i.e., there is elevated competition among physicians), where physicians' remuneration depends on the number of medical acts they conduct, could have an increase in the number of medical prescriptions. In addition, to limit increased sick leaves and to limit abuses, the National Health Insurance conducts a number of verifications of those individuals claiming sick leaves. Based on the labor economics' "shirker-model", in the framework of the theory of agency, the principal levies a penalty such as layoff when it is found that the agent does not provide expected efforts (Ross, 1973; Lazear, 1979). Therefore, the National Health Insurance will profit by limiting deviant behavior with regard to taking sick leaves. This can be done by implementing controls and verifications of either benefit recipients on sick leave or on the physicians prescribing them. These controls will increase the probability of identifying "shirkers" and, thus, reduce the number of sick leaves (Kusnik-Joinville *et al.*, 2006).

3. Database and econometric method

3.1. Construction of the database

Our study is based on data from the merger of two administrative files, one from National Health Insurance (CNAM-TS) and the other from the national retirement fund (CNAV), for 2005. Thus we have a database containing information on benefit recipients in private sector, their professional careers, medical consumptions and sick leaves, as well as the employee's professional context and some characteristics of their employers. Using this base (called Hygie), we can examine relations between health, work, professional career and firm characteristics. Kuhn *et al.* (2009) used information from a similar Austrian database to examine the impact of the economic situation on health expenditures. This type of database for examining these different aspects does not exist in France.

The Hygie database was created using CNAV data as the starting point. The CNAV is a sampling of individuals taken from files of the National Career Management System (SNGC), a system that comprises all private sector employees in France, and from the National Statistical Beneficiary System (SNSP), a system that comprises all private sector[4] retirees in France. The SNGC was used to extract information on the careers of benefit recipients, and the SNSP provided information on their retirement. These two sources were used to obtain individual data, such as date of birth and sex. This sample was paired with illness data of the CNAM-TS obtained from National Health Insurance Information of different insurance plans (SNIIR-AM). Thus, we have data on all reimbursements by various branches of the National Health Insurance. The CNAM-TS also provided information on recipients' firms so we have information that characterises the employer. We now have a file that is representative of private sector

4 CNAV manages the retirement of General System of Social Security, namely the basic pension for employees of industry, commerce and services.

employees in France with precise information on employees, their firms and their healthcare consumptions. The scope of the studies with this database is very broad: we are at the boundary of "employer/employee" studies on the labor market, studies on the impact of firm characteristics on the health of their employee (Kuhn et al., 2009) and studies on the relationships between health and work (Strauss and Thomas, 1998).

This database is very well suited for studying differences between departments. We focused our analysis on private sector employees living in France (95 departments) between 25 and 65 years of age. Retirees were excluded from the study. Our database includes 262,998 benefit recipients in 146,495 firms. The Department of Paris had both the most recipients (4.4%) and the most firms (3.9%). At the opposite end, the Lozère Department had the fewest recipients (0.1%) and firms (0.1%) but, nevertheless, accounted for 267 individuals and 194 firms.

We are dealing with two levels of variables: individual and departmental. Individual variables are provided by the Hygie database: sex, age, type of health insurance. Departmental data (unemployment rate, birth rate, density of general practitioners) were taken from "Eco-Santé" (health economics) databases. In addition, we created an "indicator of relative salary"[5]. This is the ratio between the worker's salary and the average salary per sector of activity and per department. This logic is the same used in the efficiency wages theory of Shapiro-Stiglitz (1984), which expresses average wages paid by the firm in comparison to average wages in comparable enterprises. We used this to create an "indicator of severity"[6] that is used as a proxy for physical difficulty of the job or for the risky nature of certain firms. It is defined by the ratio of the number of days lost for work accidents and occupational diseases by the total number of hours worked in the firm compared to the average severity per sector of activity and per department.

5 Indicator of relative salary:
$\forall\ l = 1,\ldots, L$: firms
$\forall\ j = 1,\ldots, J$: departments
$\forall\ a = 1,\ldots, A$: sectors of activity
$M_{ljа}$: Payroll of firm l belonging to department j in sector a.
$n_{ljа}$: total number of hours worked in firm l, sector a in department j.

We define hourly wage ($w^*_{ljа}$) as the payroll divided by the number of hours worked in firm l, sector a, department j:

$$w^*_{lja} = \frac{M_{lja}}{n_{lja}}$$

We calculate the indicator of relative salary by comparing the situation of each firm to the situation of firms in the same sector a in the same department j:

$$WR_{lja} = \frac{w^*_{lja}}{\overline{w^*_{l \in ja}}}$$

6 Indicator of severity:
$\forall\ l = 1,\ldots, L$: firms
$\forall\ j = 1,\ldots, J$: departments
$\forall\ a = 1,\ldots, A$ sectors of activity
$TG_{l\ j\ a}$: number of days lost for work accidents or occupational diseases in firm l, sector a in department j.
$n_{ljа}$: total number of hours worked in firm l, sector a in department j.

We define severity as the number of days lost for work accidents and occupational diseases divided by the number of hours worked in firm l, sector a, department j:

$$TG^*_{lja} = \frac{TG_{lja}}{n_{lja}}$$

We then calculate the index of severity of firm l by comparing the situation of each firm to the situation of firms in the same sector a in the same department j:

$$IG_{lja} = \frac{TG^*_{lja}}{\overline{TG^*_{l \in ja}}}$$

3.2. Econometric method

There are two major groups of variables. The first includes composition variables involving personal data, such as age, sex, type of health insurance, work status (illness, unemployment), age when entering the labor market and job characteristics (salary, sector, firm size). The second includes context variables describing the situation of each department, such as unemployment rate, birth rate, density of general practitioners, percentage of chronic diseases, relative salary indicator, risk indicator and number of sick leaves verified by the National Health Insurance.

To calculate the effect of variables on the explanation of differences between departments, we divided each group into three sub-groups. This allowed us to measure the impact of personal data (age when entering the labour market, work status of the beneficiary in 2004 and 2003, job characteristics), of firms (firm size, sector of activity) and of insurance-related aspects, such as being part of the Alsace-Moselle system, receiving a free complementary health insurance (CMU-C[7]), changing status for CMU-C or having a chronic disease. The effect of context is measured by several sub-groups of variables involving the economic context (unemployment rate, birth rate), medical supply (density of general practitioners) health insurance (percentage of chronic disease, percentage of monitoring) and enterprises (relative salary per sector of activity and department, risk indicator per sector of activity and per department).

Similar to the procedure of Bolin (2008) and Debrand and Sirven (2009), the influence of each group of variables on the explanation of differences between departments was calculated using relative difference (variance between departments). This was done in two steps. The first step of the analysis involved estimating sick leave model with daily sick leave benefit (DSLB). Given the list of independent variables used, nine different models[8] will be estimated. Our reference model uses the variables age and sex. For the first estimate (e1 - e3), we introduce variables alternately individual, insurance and institutions. Composition effects are estimated in the fourth model simultaneously introducing three dimensions. For the following estimates (e5 - e7), we add to the variables of references, socioeconomic variables, insurance and offers and companies alternately. The effects of contexts are estimated by the estimation 8. We add to the model references all context variables. The final model (e9) gives us an estimate of the global model, which we take into account all the variables mentioned above.

The second step involved measuring the relative differences between situations of different departments, and we used the predictions obtained from the

7 CMU-C : Couverture Maladie Universelle Complémentaire is a means-tested plan who provides full coverage without out-of-pocket expenditures.

8 The nine estimations are as follows. Our reference variables were age and sex
Estimation 1: Reference + individual variables
Estimation 2: Reference + insurance-related variables
Estimation 3: Reference + firm variables
Estimation 4: Effect of composition: reference + individual + insurance-related + firm
Estimation 5: Reference + socio-economic variables
Estimation 6: Reference + healthcare supply variables
Estimation 7: Reference + enterprise variables
Estimation 8: Effect of context: reference+ socio-economic + healthcare supply + enterprise
Estimation 9: Total effect: effect of composition + effect of context

nine different estimations that depend in the explanatory variables of the model:

$$\begin{cases} P_{.,j}^{ref} = \dfrac{1}{n_i}\displaystyle\sum_{i=1}^{n_i}(P_{i,j}^{ref}) \\ P_{.,j}^{est_k} = \dfrac{1}{n_i}\displaystyle\sum_{i=1}^{n_i}(P_{i,j}^{est_k}) \end{cases}$$

$P_{.,j}^{ref}$ is the mean proportion estimated on reference variables (age and sex) of individuals (*i*) having had a sick leave in department *j* while $P_{.,j}^{est_k}$ is the estimated mean proportion (*k*) of individuals (*i*) having had a sick leave in department *j*.

We calculate the difference between these two mean proportions and the mean weighted by the population of each department (is the population of one of these departments and the total population of the J departments):

$$E_{.,j}^{k} = P_{.,j}^{ref} - P_{.,j}^{est_k} \text{ and } E_{.,.}^{k} = \frac{1}{J}\sum_{j=1}^{J}\frac{n_i}{N}\left(E_{.,j}^{k}\right)$$

We can now determine the mean squared error[9] (MSE) and the relative indicator of differences between departments:

$$MSE^k = \frac{1}{J}\sum_{j=1}^{J}\left(E_{.,j}^{k} - E_{.,.}^{k}\right)^2 \text{ and } I_{rel}^{k} = 100\left(1 - \frac{MSE^k}{MSE^{ref}}\right)$$

We thus have a relative indicator (I_{rel}^{k}) that is an indicator of variance evolutions between departments. If differences between departments are due only to differences in the distribution of characteristics of the different models, then the values of these indicators should be zero. If, on the other hand, the value of indicator is different from zero and is changed by introducing new variables, the latter are explanatory factors of differences between departments.

4. Descriptive statistics and determinants of sick leaves

4.1. Descriptive statistics

23.1% of our population took at least one sick leave in 2005 (see table1). The distribution of the proportion of sick leaves per department was highly unequal, as it ranged from 13.1% in the Hautes-Alpes Department to 28.9% in the Ardennes Department.

Table 1. Proportion of sick leaves

	Proportion of sick leaves (%) in the sample	Minimum according to Departments (%)	Maximum according to Departments (%)
At least one daily sick leave benefit	23.1	13.1	28.9

9 As a result of the construction of this indicator, it is very close to the calculation of a within variance.

The male/female distribution is classical, with 55.1% men and 44.9% women (see table 2). Disparities between departments are again present: in the Ardennes Department, proportion of males among employees that have sick leaves reached almost 62.7% employees versus. only 49.5% in the Hautes-Pyrenées Department. On average, women took slightly more sick leaves than men (23.7% versus 19.1%). The distribution of benefit recipients per age corresponded to the population pyramid of private sector employees in France. Here again there were substantial disparities between departments. The Paris Department, with 26.1% of its employees younger than 30, was the youngest department, and the Meuse Department was the oldest with 26.6% of its employees older than 50. The proportion of sick leaves increased with the age of employees. In addition, there was a decrease in the 60-65 year-old segment as we are in the presence of the phenomenon of "only healthy workers still on the job".

Two-thirds (68.4%) of employees entered the labor market before their 22nd birthday. The Eure-and-Loir and Cantal Departments had the highest proportion of benefit recipients among young adults in the labor market (38.8% for the under 18 group and 55.4% for the group between 19 and 22 years). The Paris Department had the largest number of recipients older than 23 at the moment they entered the labor market. It is important to note the special case of the population older than 27 entering the labor market. This may involve recipients with long educational careers, but it also includes those who never entered the labor market for a variety of reasons and then entered it many years later, such as housewives after their children enter school or new residents in France. New entrants to the labor market take more sick leaves than others. The proportion of sick leaves for those entering before the age of 18 is 27.5% and for those entering after the age of 27 is 17.2%.

In 2004, 11.2% of all employees went through a period of unemployment and 8.1% were in this situation in 2003. In 2004, disparities between departments were large, with a minimum unemployment rate of 7.7% in the Yvelines Department and a maximum unemployment rate of 18.3% in the Hautes-Pyrenées Department. Successive periods of unemployment do not seem to affect sick leaves.

Moreover, five percent of individuals in our sample had a sick leave in 2004. This decreased to 1.2% if these events occurred in 2003 and 2004.

The different health insurance plans of benefit recipients changes the proportion of sick leaves. In our population, 4.2% of the totals are covered by the special Alsace-Moselle insurance plan, which is limited to the Bas-Rhin, Haut-Rhin and Moselle Departments, and the proportion of sick leaves was 28.2% versus 22.9% for those not covered by this plan. The insurance plan for the rest of the country, CMU-C could have an effect on taking sick leaves; 2.3% of our population benefited from CMU-C. The proportion of sick leaves was 14.9% while it reached 23.3% for non-recipients. In addition, the geographic distribution of those covered by UHC-C is skewed in France, with a minimum of 0.3% in the Hautes-Alpes Department and a maximum of 5.4% in the Pyrenées-Orientales Department.

The two principal sectors of activity are services (69.2%) and industry (21.2%). There are large disparities between departments in the industrial sector with 6% of employees in the Hautes-Alpes compared to 39.6% in the Haute-Marne. There are also considerable differences in the services sector with 49.2% in the Haute-Marne Department and 85.4% in the Paris Department. The proportion of sick leaves thus varies considerably

Table 2. Descriptive statistics of individuals of the sample

	Study sample (%)	Minimum (%) according to departments	Maximum (%) according to departments	Percentage of the population with one sick leave
Sex				
Male	55.1	49.5	62.7	20.7
Female	44.9	37.3	50.5	25.9
Age				
[25 30[	16.3	11.4	22.1	21.5
[30 35[	16.8	12.7	20.1	23.3
[35 40[	16.3	12.7	20.0	22.7
[40 45[	15.2	12.2	18.9	22.1
[45 50[	13.5	9.7	19.8	23.4
[50 55[	11.9	8.8	15.6	25.2
[55 60[	8.8	7.0	12.1	25.4
[60 65[	1.3	0.4	3.5	18.6
Age when entering the labour market				
Younger than 18	24.4	8.2	38.8	27.5
19-22	44.0	28.8	55.4	24.3
23-26	22.6	13.8	40.1	18.3
Older than 27	9.1	3.7	22.9	17.2
Work status: undergone an episode of unemployment				
No unemployment in 2004	88.8	81.7	91.5	23.9
Unemployment episode in 2004	11.2	7.7	18.3	16.7
No unemployment in 2003 and 2004	91.9	86.1	94.6	23.6
Unemployment episode in 2003 and 2004	8.1	5.4	13.9	17.5
Work status: having been on sick leave				
No sick leave in 2004	95.0	92.0	97.3	21.7
Sick leave episode in 2004	5.0	2.7	8.0	48.9
No sick leave in 2003 and 2004	98.8	97.0	99.8	22.6
Sick leave episode in 2003 and 2004	1.2	0.2	3.0	60.7
Recipient of old-age insurance for parents at home (OIPH)				
No OIPH benefits in 2004	96.1	93.7	98.0	23.1
Top OIPH in 2004	3.9	2.0	6.3	23.4
No OIPH benefits in 2003 and 2004	96.9	94.5	98.6	23.1
Top OIPH in 2003 and 2004	3.1	1.4	5.5	22.9
Work time				
Full time	74.6	57.6	81.3	23.7
Part time, at home and other	25.4	13.2	38.1	21.4
Type of health insurance				
Special Alsace Moselle plan	4.2	0.0	87.1	28.2
General French plan (excluding Alsace-Moselle)	95.8	12.9	100.0	22.9
Recipient of universal health coverage (CMU-C)	2.3	0.3	5 .4	14.9
Not benefiting from CMU-C	97.7	94.6	99.7	23.3
Status changed with CMU-Cduring the year	1.9	0.4	3.9	32.9
Status not changed with CMU-C	98.1	96.1	99.6	22.9
With a chronic disease	6.5	4.6	10.2	42.7
Without a chronic disease	93.5	89.8	95.4	21.7
Sector				
Industry	21.2	6.0	39.6	28.1
Agriculture	0.0	0.0	0.6	19.6
Construction	6.1	1.7	11.4	20.2
Services	69.2	49.2	85.4	22.1
Total	**262,998**	**267**	**11,638**	**60,675**

according to the sector of activity. The agricultural sector, the smallest in our database, had the highest proportion of long sick leaves (4.7%).

Table 3 contains departmental context data. The average unemployment rate per department is 9.5%. The unemployment rate in 25% of the departments for the 1st quartile is lower than 8.3% while 25% in the 3rd quartile are higher than 10.5%. The Herault Department has the highest unemployment rate at 14.6% while the Lozère Department has the lowest at 5.8%. The mean birth rate per department is 11.8% (1st quartile = 10.5%; 3rd quartile = 12.8%), but geographic distribution is highly unequal, as the birth rate in Seine-Saint-Denis Department is 18.2% versus 8.9% for the Creuse Department. The mean density of general practitioners is 158.4 per 100,000 inhabitants (1st quartile = 143.5; 3rd quartile = 169.8). The density of general practitioners in the Eure Department is much lower than in the Paris Department with 117.3 versus 313.3 general practitioners per 100,000 inhabitants. Concerning monitoring by National Health Insurance, the average percentage of short-term sick leaves verified is 13.4 but varies substantially from one department to another. The lowest verification percentage is in the Mayenne Department and the highest is in the Nièvre Department (9.7% versus 17.3%).

Table 3. Descriptive statistics of Department variables

	Mean	1st quartile	3rd quartile
Salary of benefit recipients	€ 20,300.40	€ 10,640.50	€ 25,274.20
Number of workers in the firm	268	10.7	188.1
Mean annual unemployment rate	9.5	8.3	10.5
Birth rate	11.8	10.5	12.8
Indicator of relative salary	1.3	0.9	1.3
Indicator of severity of accidents	-0.04	-0.09	0.03
Percentage of chronic disease	13.3	12.1	14.3
Percentage of sick leaves verified	13.4	11.2	14.8
Density of general practitioners	158.4	143.5	169.8

4.2. Determinants of sick leaves

We have focused on the interpretation of the estimation results of the probit (probability unit) model that model the probability of being on sick leaves. The result obtained with the probit model is shown in table 4. We will first comment on the impact of composition variables on sick leaves followed by the impact of context variables.

In the case of individual variables, the results of econometric estimation show that men have fewer absences for illness. There is a non-linear effect of age on the probability of being on sick leave[10]. Age, thus, has a negative effect on taking a leave for illness. The negative sign of age squared limits this progression while age cubed with a positive coefficient shows the increase of this probability. This would seem to confirm the notion that taking a sick leave is more frequent after a certain age and primarily as the subject approaches retirement. At these ages, individuals are in poorer health, and healthcare systems are a possible avenue of escape to "pre-retirement".

Absenteeism for illness is most frequent among young people (under age 18) entering the labor market. The probability of being on sick leave decreases with the age at which

10 The two points of inflexion are 35 and 55 years for all sick leaves, and 37 and 50 for short leaves

Table 4. Determinants of the probability to at least one sick leaves (marginal effects)

	Probability of being on sick leave	
Sex		
Male	-0.056	***
Female	ref	
Age of benefit recipient		
Age	0.240	***
Age squared	-0.056	***
Age cubed	0.004	***
Age when entering the labour market		
Younger than 18	ref	
19-22	-0.019	***
23-26	-0.062	***
Older than 27	-0.073	***
Work status: having been unemployed		
Unemployment in 2004	-0.103	***
Unemployment in 2003 and 2004	0.045	***
Work status: having been on sick leave		
Sick leave in 2004	0.181	***
Sick leave in 2003 and 2004	0.091	***
Receiving of old-age insurance for parents at home (OIPH)		
Top OIPH in 2004	-0.042	***
Top OIPH in 2003 and 2004	0.022	**
Type of health insurance		
Special Alsace-Moselle plan	0.038	***
Recipient of universal health coverage (UHC)	-0.148	***
Status with UHC changed in the course of the year	0.240	***
With chronic disease	0.176	***
Work time		
Full time	ref	
Part time, at home or other	-0.050	***
Salary		
Salary	-0.274	***
Salary squared	0.042	***
Salary cubed	-0.002	***
Characteristics of the firm		
Number of employees in the firm (×10)	0.020	***
Number of employees in the firm squared (×10^2)	-0.001	***
Sector		
Industry	ref	
Agriculture	-0.088	**
Construction	-0.061	***
Services	-0.047	***
Economic context		
Mean annual unemployment rate	0.003	***
Birth rate	0.032	***
Birth rate squared	-0.001	***
Physician supply		
Density of general practitioners per 100,000 inhabitants (×10^2)	0.055	***
Density of general practitioners per 100,000 inhabitants squared (×10^4)	-0.019	***
Percentage of chronic disease s(×10^2)	0.066	***
Percentage of sick leaves verified	-0.002	***
Context of the enterprise		
Indicator of relative salary	-0.005	***
Indicator of severity of accidents (×10^2)	0.853	***
Number of observations	262,998	
Number of observations (sick leave = 1)	60,675	
Wald c^2 (35)	31,436.49	
Prob > c^2	0	
Pseudo R2	0.05	
Obs. P	0.23	

Note: Significance threshold: * :10%; ** :5%; *** : 1%

the subject entered the labor market. Thus, compared to the under age18 group entering the labor market, individuals older than 27 who enter have a probability 7.3 points higher of taking a sick leave. Young people entering the labor market are characterised primarily by a lower level of human capital; thus, their jobs require lower skill levels and are characterised by poor working conditions. Conversely, the last (oldest) group entering the labor market is generally composed of people with extensive education who are employed in positions of responsibility and whose working conditions are excellent.

Periods of unemployment during a professional career affect behavior that determines absenteeism. Thus, the individual who was unemployed for all or part of 2003 was less inclined to take sick leaves. The probability for sick leaves in general decreased by 10 points. One explanation for this is the existence of a labor discipline effect. Benefit recipients who were in a situation of unemployment in 2004 and 2003 had a higher probability of being on sick leave. This variable identifies the long duration of unemployment or individuals with a particularly difficult career in the labor market and those with special health characteristics. Concerning prior sick leaves, the employee who had sick leaves the previous year will tend to take more sick leaves. The variable "old-age insurance for parents at home" (OIPH) is used as a proxy for the presence of children at home. It is generally supposed that sick leave is taken more for women because their children are at home. Being the recipient of OIPH in 2004 had a negative and significant effect on the probability of a sick leave. On the contrary, the probability of recipients with OIPH in 2004 and 2003 being on sick leave was 2.2 points higher.

Concerning employment characteristics, part-time employees and those working at home have a lower probability of taking sick leaves than those working full time. The empirical results confirm the Shapiro-Stiglitz (1984) theoretical predictions of efficiency wages according to which salary considerably reduces the probability of absenteeism. Salary has a negative effect on the probability of being absent, and this effect stabilises for very high salaries. These differences can be explained either by a factor of "obligation of presence" for the most highly qualified and for those with positions of responsibility or by an effect related to working conditions. Highly paid positions are, thus, subjected to fewer risks and, thus, to fewer sick leaves[11].

Concerning firm-related variables, the number of employees is positively correlated with the individual probability of being on sick leave. In large firms, perhaps for reasons of less strict control, fewer constraints, and less involvement, the absence of a given employee will tend to have less of a negative effect than in the case of small firms (Weiss, 1985). There may also be differences in production procedures. Compared to an industrial sector, all sectors have a negative and significant effect on the probability of sick leaves. The sectors of agriculture, construction and services have 8.8%, 6.1% and 4.7% fewer chances, respectively, of sick leaves compared to industry.

We will now focus our analysis on effects of context. As a result of its construction, the indicator of severity can be considered as a proxy for working conditions in the firm. Thus, the higher the indicator of severity, the higher the risks for the employee compared to other firms in the same sector of activity and in the same department. Our results show a positive relationship between the firm's indicator of severity and individual sick leaves. The other firm-related context factor is the indicator of relative salary.

11 This result is in contradiction to the efficiency wage theory (Ose, 2003; Shapiro and Stiglitz, 1984), according to which an employee with good working conditions will accept a lower salary than an employee with more difficult working conditions in order to compensate the difficulties incurred.

Introducing this variable enables us to test the results of the theory of efficiency wages (Shapiro and Stiglitz, 1984) where we find a negative correlation. Thus, a high indicator of relative salary is the reflection of a mean salary in the firm that is higher than that of comparable enterprises and is negatively related to individual sick leaves. Salary, thus, has a dual effect: an individual effect and a relative effect.

Finally, concerning department variables, we introduced multilevel variables. These variables were also used to determine if there are absolute and saturation effects. For socio-demographic variables, our results show a significant relationship between the unemployment rate and absenteeism for illness (Bliksvaer and Helliesen, 1997). The unemployment rate of a department also has a positive and significant effect on sick leaves. Departments with a high unemployment rate also have a higher probability of sick leaves.

Concerning the variables of medical supply and health insurance, the density of general practitioners has a significant concave effect on taking sick leaves. A department from low to medium density of physicians increases the individual probability of being on sick leave. There is a saturation effect starting at 147 physicians per 100,000 inhabitants. Beyond this threshold, the probability begins to decrease. The percentage of verification of short sick leaves by National Health Insurance negatively and significantly influences taking sick leaves; the probability of sick leave decreases when the frequency of verifications in the department increases. This may be proof of its effectiveness in decreasing the probability of "shirkers" (malingerers) (Ross, 1973; Lazear, 1979). The percentage of chronic diseases in the department has significant effects on the sick leaves. The probability of sick leaves increases once the percentage of chronic diseases in the department increases. The birth rate of a department has the expected effect on taking sick leaves: it is significant and concave.

Our model point out the expected effects: composition and context variables, indeed, have an impact on taking sick leaves. Nevertheless, this first part of our analysis is not sufficient as it does not measure the supply of information from each group of variables. Therefore, to obtain this information, we conducted an analysis of difference and of variance between departments.

5. Geographic disparities: effects of composition and context

As we explained, an indicator was created: a relative indicator (I_{rel}) that is a reflection of changes of variance between departments, that is, the mean square difference of probabilities of being on sick leaves for all departments.

First, we provide (see table 5) the explanatory power of all of our variables in order to understand differences between departments. Concerning the relative indicator, all our variables explain 65.5% of the mean square error of the reference model.

Second, we provide the difference between the effect of composition and the effect of context. There appear to be no significant differences between the two effects, as either can explain the disparities between departments. Concerning the relative indicator, the proportions of the mean square error explained by the effect of composition are 45.4% and 47.5% for the effect of context of the probability of being on sick leave.

Third, we provide the decomposition of the both effects: effects of context and effects of composition. For the effect of composition, we consolidated the variables into three sub-groups: "individual" (age when entering the labor market, work status of the benefit recipient in 2004 and 2003, previous situation on the labor market), "insurance-related" (covered by the special Alsace-Moselle plan, CMU-C, status change concerning CMU-C, chronic disease) and "firm" (salary, firm size and sector of activity). For the effect of context, we consolidated the variables into three sub-groups: "socio-economic" (unemployment rate, birth rate), "insurance and supply" (density of general practitioners, percentage of chronic diseases and verification of sick leaves) and "enterprise" (indicator of relative salary and department, risk ratio per sector of activity and per department). All groups of variables are significant for explaining the relative indicator. All groups of variables, with varying degrees of importance, explain the mean square error (relative indicator) of proportions of sick leaves. It is to be noted that two groups are those that best explain the relative indicator. Concerning effects of composition, variables of the "individual" group explain 29.4% (I_{rel}^{k}) of the relative indicator for the probability of a sick leave. It is, thus, individual variables that better explain the effect of

Table 5: Analysis of difference and variance between departments

	Probability of being on sick leave	Confidence interval
RELATIVE INDICATOR		
Reference	**0.00**	
• Individual	29.45	(26.1; 32.8)
Age when entering the labour market	*23.00*	*(20.3; 25.7)*
Work time	*2.66*	*(1.8; 3.5)*
Prior work status	*7.66*	*(5.1; 10.2)*
• Insurance-related	7.65	(4.1; 11.2)
• Firm	20.81	(17.2; 24.4)
Effect of composition	**45.44**	**(40.4; 50.5)**
• Socio-economic	9.70	(6.7; 12.7)
• Insurance and supply	42.43	(34.0; 50.9)
Density of general practitioners	*28.80*	*(25.0; 32.6)*
Percentage of chronic diseases	*0.94*	*(-2.4; 4.3)*
Percentage of sick leaves verified	*31.62*	*(20.4; 42.9)*
• Enterprise	1.72	(1.2; 2.4)
Effect of context	**47.55**	**(38.5; 56.6)**
Total effect	**65.56**	**(57.9; 73.2)**

Note: the mean of effects is based on 400 simulations using the initial database. confidence intervals were calculated from the mean of the simulation ± 1.96*standard deviation of the simulation.

Reference: Age (square and cube), sex,

1- Individual: age when entering the labour market, work status of benefit recipient in 2004 and 2003, prior situation on the labour market, work time.
2- Insurance-related: benefit recipient of the special Alsace-Moselle plan, UHC, having changes UHC status, chronic disease
3- Firm: salary (squared and cubed), firm size, sector of activity,
4- Effect of composition: individual + insurance-related + firm (1+2+3)
5- Socio-economic: unemployment rate, birth rate (and its square).
6- Insurance and supply: density of general practitioners, percentage of chronic diseases, verification of sick leaves
7- Enterprise: indicator of relative salary and Department, degree of seriousness of occupational accidents per sector of activity and per Department.
8- Effect of context: Socio-economic + healthcare supply + enterprise (4+5+6)
9- Total effect: effect of composition + effect of context (4+8)

composition, confirming observations made during the analysis of descriptive statistics. For effects of context, "insurance and supply" apparently play a dominant role for the relative indicators.

Fourth, we provide the decomposition of the two groups of variables that best explain disparities between departments, that is, the "individual" effect of composition and the "insurance and supply" effect of context (see table 5). The three most determinant variables are the percentage of sick leaves verified (I_{rel} = 31.6%), the density of general practitioners (I_{rel} = 28.8%) and the age when entering the labor market (I_{rel} = 23.0%). Prior work status also explains disparities between departments (I_{rel} = 7.6%), but to a lesser extent. These two composition variables partly reflect the "past" (or original) situation of individuals with respect to the labor market. They could demonstrate the phenomena of hysteresis in the relationship between the structure of the labor market and the proportion of sick leaves.

Just as in the analysis of other types of healthcare expenditures or inequalities of healthcare, geographic disparities of sick leaves are the consequence of differences in the healthcare supply and the number of verifications conducted by National Health Insurance more than differences of composition, even if the situation of the labor market seems to have a certain degree of importance.

6. Conclusion

The purpose of this work was to understand disparities in sick leaves among the various French Departments. While cyclical macroeconomic changes have been studied often, the same cannot be said of geographic differences. Using the Hygie database constructed by merging several administrative files of private sector employees in France in 2005, and after discussing the various determinants of sick leaves and their importance for understanding geographic disparities, we conducted a 3-step empirical analysis: (1) a descriptive analysis to detect differences among Departments, (2) a multivariate analysis to highlight explanatory factors of individual probability of being on sick leave and (3) an analysis of determinants of differences among Departments using a specific indicator.

Our models have allowed us to demonstrate that a considerable number of the disparities among departments can be explained. The effects of composition and the effects of context account for approximately two-thirds of the relative indicator (variation in the mean squared error). Among the groups of variables we created, "insurance and supply" and "individual" variables best explain disparities among departments. More precisely, the percentage of verified sick leaves that can be regarded as a control for moral hazard and the density of general practitioners that require thought being given to induced demand, as well as the prior situation on the labor market appear to explain the differences among departments.

In contrast to other composition or context variables that are either affected by a proven temporal change in inertia (e.g., birth rate, the industrial sector) or variables for which health policy has few effects (e.g., policy of remunerating enterprises, unemployment rates, percentages of verified sick leaves and the density of general practitioners) are levers of health policies. Our research suggests that they could be used as public policy instruments aimed at reducing geographic disparities. It is, nevertheless, possible

to ask if this reduction is desirable, as disparity does not automatically mean inequality or even inequity.

This study was conducted on 2005 data. However, to verify our results, we can soon build on the panel data base Hygie from 2005 to 2008. This panel will allow us not only to check our positive effect of unemployment on the probability of sickness absence, but also to study these disparities interdepartmental considering two specific phenomena. Namely the analysis of causality links between determining variables and sick leaves and a more detailed "employer/employee" analysis than that provided by the introduction of efficiency wages and indices of severity.

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Sick Leaves: Understanding Disparities Between French Departments

Arrêts maladie : comprendre les disparités départementales

Mohamed Ali Ben Halima (Irdes), Thierry Debrand (Irdes), Camille Regaert (Irdes)

The purpose of this publication is to better understand disparities between the proportions of sick leaves granted among various departments in France. The Hygie database was used for this study. It was created by merging a number of administrative files of employees in the private sector in France in 2005. This database allows for the determination of «employer/employee» relations, the impact of the characteristics of firms on the health of their employees and the interactions between health and work.

After briefly reviewing the various determinants for the effect of composition and the effect of context, as well as sick leaves and their importance for understanding geographic differences, we present a three-phase empirical analysis: a descriptive analysis to detect differences between departments, a multivariate analysis to highlight explanatory factors of probability of being on sick leave and, finally, an analysis of determinants of differences between departments.

Our different models explain a significant portion of the disparities between departments. The effects of composition and effects of context account for approximately two-thirds of the mean squared error. The variables describing the medical supply (density of general practitioners), monitoring by National Health Insurance and patient age when the professional career began best explain the disparities between departments concerning sick leave. In contrast to other compositions or contexts included in our model, the percentage of sick leaves verified and the density of general practitioners are important factors with respect to health policies. Our research shows that they could be used as public policy instruments aimed at reducing geographic disparities.

* * *

L'objectif de cet article est de comprendre les disparités interdépartementales en termes d'arrêts maladie. Nous utilisons la base de données Hygie, construite à partir de la fusion de différents fichiers administratifs de salariés du secteur privé en France en 2005, qui permet de prendre en considération : les relations « employeurs/employés », l'impact des caractéristiques des entreprises sur la santé de leurs employés mais aussi les interactions entre la santé et le travail.

Après avoir rappelé les différents déterminants, entre effet de composition et effet de contexte, des arrêts maladie et leur importance pour comprendre les différences géographiques, nous menons une analyse empirique en trois temps : une analyse descriptive pour mettre en évidence les différences interdépartementales, une analyse multivariée pour mettre en avant les facteurs explicatifs de la probabilité d'être en arrêt maladie et enfin une analyse des déterminants des différences entre les départements.

Nos différentes modélisations explicitent une grande partie des disparités interdépartementales. Les effets de composition et les effets de contexte constituent approximativement la moitié de l'écart absolu et les deux tiers de l'erreur quadratique moyenne. Ce sont les variables décrivant l'offre médicale (densité d'omnipraticiens), les contrôles de l'Assurance maladie et l'âge d'entrée sur le marché du travail qui permettent le plus d'expliquer les disparités interdépartementales en matière d'arrêts maladie.

Contrairement à d'autres variables de composition ou de contexte qui ont soit une inertie d'évolution temporelle certaine (par exemple : le taux de natalité, le secteur industriel,…), soit des variables pour lesquelles la politique publique de santé a peu d'effets (par exemple : politique de rémunération des entreprises, taux de chômage), le pourcentage d'arrêts de travail contrôlés et la densité d'omnipraticiens sont déjà des leviers importants des politiques de santé. Notre recherche montre qu'ils pourraient être utilisés comme des instruments d'une politique publique visant à la réduction des disparités géographiques.

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