The Effects of Working Hours on Health Status and Health Behaviors

María Inés Berniell*
CEMFI - UIMP

March, 2012

Abstract

This study measures the effect of the amount of working hours on workers' health status and health behaviors. To deal with the endogeneity of the number of hours worked I use a quasi-experiment: the change in the legal maximum workweek hours in France enacted in 1998. The estimated effects, while moderate, are all consistent with the idea that less working hours improves health behaviors. In particular, this paper shows that a reduction of working time is associated with a drop in the probability of smoking, in alcohol consumption, and in physical inactivity. I do not find a direct effect of working time on health status measures (self-assessed health status and an index of vital risk), probably because I only capture short-run effects. However, since health behaviors directly affect future health outcomes, we should expect a long run effect of the number of hours worked on individual's health, through these changes on health behaviors.

JEL Classification: C21, I12, J08, J22, J28, J81.

*I am especially grateful to Guillermo Caruana and Manuel Bagüés for their encouragement and advise. I would also like to thank Manuel Arellano, Claudio Michelacci, Laura Crespo, Lian Allub, Lucila Berniell, Dolores de la Mata, Paul Dourgnon, Romain Fantin and attendants at CEMFI Master Thesis Workshop Sessions for helpful comments and discussions. Finally, I thank IRDES for providing me with the ESPS data. Any calculations, analyses and interpretation based on the supplied data are my sole responsibility.

''...mutual emulation and desire of greater gain
frequently prompted them [workers]
to over-work themselves, and
to hurt their health by excessive labour''.
An Inquiry into the Nature and Causes of the Wealth of Nations.
Adam Smith, 1776.

1 Introduction

There is evidence that work affects health. A quick look at the data from the fourth European Working Conditions Survey (EWCS) reveals that around 30% of workers in the European Union think that their health is at risk because of their work, and that the larger the number of hours worked the greater is the share of employees who agree with it (Figure 2).

Many studies try to estimate the impact of work on health, however the estimated sign of this effect is ambiguous. On the one hand, some studies support the idea that work is good for health, showing for instance that non-working individuals are often found to have poorer health than the working population (Langeland, 2009). On the other hand, some studies emphasize the negative effect of work on individual's health (Sparks, Cooper, Fried, and Shirom, 1997), and recent literature -starting with Ruhm (2000)- suggests that aggregate health indicators improve when unemployment increases.

The existence of this ambiguity in the estimated effect can be related to the fact that there are some weaknesses in previous studies that can bias the results. First, research in the health economics literature has not been able to find a causal effect of work on health, since in most cases there is an endogeneity problem because of reverse causality -working hours affects health but also health affects working hours- or third omitted factors that might influence health and working hours at the same time.[1] For instance, in those studies supporting the idea that individuals working more hours are healthier than those working less, the results may be driven by healthier people being able to work longer hours and those with ill health having to work less hours, rather than more working time leading to better health (see Section 2.1 for more detail). Second, in the previous literature the effect of more hours worked has not been isolated from the income effect usually associated to the change in time devoted to work.[2] Third, in some studies the effect of work on health along the intensive margin (work

[1]Two possible exceptions are the work of Xu and Kaestner (2010) about health and business cycles and the paper of Ruhm (2005) about health changes during macroeconomic downturns.

[2]Income is a fundamental variable in health–related aspects. For instance, low income individuals tend to consume food with low nutritional value because it is cheaper than healthy meals. Also sports require spending

more hours) has not been disentangled from the effect of work on health along the extensive margin (participation into the labor force), and both effects could go in opposite directions.

The purpose of this project is to study the causal effect of working hours on worker's health status and health lifestyle behaviors. I will address the three issues mentioned above, in order to be able to find an estimate that reflects a causal relation.

The identification strategy will be based on using a quasi-experiment: the change in the legal maximum workweek hours in France enacted in 1998 (Aubry Law). This law reduced the maximum number of hours worked from 39 to 35 per week with almost no decline in workers' income. The law was first implemented in firms with more than 20 employees and two years later in smaller firms. By using this natural experiment, I will be able to answer the question of whether an exogenous reduction in the number of working hours led to changes in health status and/or in health behaviors for individuals who were working more than 35 hours. Notice that I will focus on the number of hours worked, and I will only deal with working individuals, since the interest here is to assess the effects of working hours on health looking at the intensive rather than at the extensive margin of working time.

The mechanisms driving the impact of work on health are manifold. For instance, work can give an individual a sense of purpose and satisfaction, which is an important determinant of mental health. On the other hand, the number of hours worked can also affect mental and physical individual's health by producing stress, fatigue, muscular pain, etc. Also, unhealthy lifestyle behaviors can increase when non-working time decreases. Hence, people working more hours might be more likely to smoke, do less physical activity, have poor eating habits, and poor medical examination (Maruyama, Kohno, and Morimoto, 1995), which altogether affect the level of health stock. I will study the effect of working hours on self-assessed health status, vital health risk index, doctor visits and behavioral risk factors as smoking, alcohol consumption, body mass index (BMI) and physical activity. Behaviors such as stopping smoking, moderating of alcohol intake, reducing weight and doing physical activity can cut down on the risks of developing serious illnesses such as cancer, heart disease, and type 2 diabetes.

The study of the relationship between working hours, health status and health lifestyle behaviors is important for several reasons. First, it will contribute to the understanding of the actual opportunity cost of working more hours. Second, results provided by this study may help in the debate about policies promoting healthy lifestyles behaviors outside and inside workplaces. Finally, this study will also contribute to a more complete evaluation of the effects of the Aubry Law on workers' well-being.[3]

extra money, which implies that income and physical activity are also correlated.

[3]There are some studies analyzing the impact of this policy on other aspects of individuals' welfare, but no one

The paper is structured as follows. In Section 2 I first present a review of the literature related to working hours and health. Then I review the literature that uses legal changes in the maximum hours of work week to study the impact of working hours on different issues. In Section 3 I describe the data used in the estimations. Section 4 presents the empirical strategy. In Section 5 I present the results, and finally Section 6 concludes.

2 Literature Review

2.1 Health and Work

Sparks, Cooper, Fried, and Shirom (1997), White and Beswick (2003), and Siegrist and Rodel (2006) are three comprehensive surveys that review the relation between working hours and health. Sparks, Cooper, Fried, and Shirom (1997) reviews the existing literature on working hours both qualitatively and quantitatively, using meta-analysis to examine the relationship between the length of the working week and health symptoms. Results indicated small, but significant positive mean correlations between overall health symptoms, physiological and psychological health symptoms, and hours of work.[4] It is worthy to note that none of the studies included in the meta-analysis found a causal effect of working time on health, because the endogeneity problem of the number of hours worked has not been solved. White and Beswick (2003) summarizes the literature along with the econometric limitations of previous works on the relationship between working hours and fatigue, health and safety and work-life balance outcomes. They conclude that all studies suggest a positive association between working long hours and fatigue, working time and cardiovascular disorder, and a negative relation of hours worked and physical health. They also conclude that there is strong evidence that people perceive that working long hours leads to poor work-life balance. White and Beswick (2003) emphasize that the main problems in this research concern the inference of causation and suggest the advantage of implementing a quasi-experiment approach to be able to deal with endogeneity.[5] Van Der Hulst and Geurts (2001) also suggest the utilization of quasi-experiments studies in order to shed light on the direction of causation with respect to the

includes the effect of this law on workers' health (Estevão and Sá, 2008; Estevao, Sa, and Street, 2006; Askenazy, 2008).

[4]Also in the qualitative analysis were found 12 studies that support these findings of a positive relationship between hours of work and ill-health.

[5]Regarding this point they say that *"the possibility of mediating variables in long working hours literature analyzed suggests that single causation cannot be established. The likelihood is that multiple causation exists. Longitudinal or quasi-experimental studies are necessary to further investigate the existence and direction of causation and to check whether associations hold over time."*

relationships found in their study about working hours and psychological health. To the best of my knowledge, my work is the first study that uses a quasi-experiment to study the causal effect of working hours on health status and health behaviors. Finally, Siegrist and Rodel (2006) did a review based on 46 studies, published between 1989 and 2006, about the associations between psychosocial stress at work and health risk behaviors. The review supports the hypothesis of a consistent association between work stress and health risk behavior.[6]

Recent literature -starting with Ruhm (2000)- suggests that aggregate health indicators improve when unemployment increases. By using United States data for the years 1972-1991 Ruhm (2000) shows that a one percentage point rise in unemployment led to a 0.5-0.6% reduction in overall mortality. Similar results were found in a study about 23 OECD countries over the period 1960-1997 (Gerdtham and Ruhm, 2006). Ruhm (2003) establishes that also other measures of health improve when the unemployment rate rises. Furthermore, and more interestingly for the purpose of the present study, Ruhm (2005) found that a reduction in number of hours worked has a positive impact on health among the United States population. Specifically, working one hour less per week is associated with a 0.011 percentage point reduction in smoking, a 0.017 percentage point decline in severe obesity, a 0.036 percentage point decrease in physical inactivity, and a 0.044 percentage point decrease in multiple health risks. In this study Ruhm used group average rather than individual values for the variable hours in order to deal with the endogeneity problem. This last work of Ruhm and the study of Xu and Kaestner (2010) about health and business cycles are to the best of my knowledge the only studies in health economics literature that seriously tried to deal with the endogeneity problem and attempted to find a causal effect of work on health.[7]

Despite several studies found a negative relation between working hours and health, others found that work itself is not necessarily bad for individuals' health. Moreover, numerous studies have shown that those who are in employment are healthier and psychologically better adjusted than the unemployed, as in McPherson and Hall (1983).[8]

[6]The relatively strongest relationships have been found with regard to heavy alcohol consumption among men, overweight, and the co-manifestation of several risks.

[7]Xu and Kaestner (2010) uses an instrumental variables approach. She instrumented the number of hours worked using as instruments the regional unemployment rates, regional distribution of employment by industry, and the interaction between these two variables.

[8]Other studies document the progressive deterioration in health and well-being which tends to follow job loss and subsequent failure to find work (Jackson and Warr, 2009; Mathers and Schofield, 1998; Morrell, Taylor, and Kerr, 1998).

2.2 Changes in working time legislation as quasi-experiments

There are several studies that use working time laws as natural experiments. Evaluations of the impact of the law reducing working time in France in 1998 focused primarily on the question of job creation (Estevao, Sa, and Street, 2006; Bunel, 2002; Chemin and Wasmer, 2009b), whereas little attention was paid to other objectives.[9] Some exceptions are the works that studied the effect of this law on family balance (Fagnani and Letablier, 2004), social interaction (Saffer and Lamiraud, 2008; Estrade, Méda, and Orain, 2001), and some aspects of workers' well-being (Estevao, Sa, and Street, 2006). There are also studies that analyze the employment effects of other laws that modify legal working time. For instance, Crépon and Kramarz (2002) used the French law implemented in 1982, Raposo and Van Ours (2008) analyzed the case of Portugal in 1996 and Sánchez (2010) worked with the Chilean law of 2005.[10]

3 Data

I use data from the National Survey of Health and Social Protection (ESPS: "Enqute sur la sant et la protection sociale"), which is representative of the French population. It collects information on individuals' health status, access to health care services, health insurance and economic and social status.

In each wave the complete survey sample includes more than 8,000 households and 22,000 individuals. Until 1997 it was realized annually, and it became biannual in 1998. The ESPS is a panel survey where each individual is questioned every four years. In this study I use two different waves, one for the pre-treatment period (1998) and other for the post-treatment period (2002).

Using these two waves it was possible to merge information for 9240 individuals. Since the purpose of my study is to assess the impact of hours worked on health related variables, I restrict the analysis to the population of employed individuals aged 18 to 61 in 1998. I excluded from the sample individuals whose occupational category was *"cadres d'entrepise"*, because this group includes the upper-level managers for whom the Aubry law was implemented in a particular way.[11] Then, and keeping only those individuals for whom the information related

[9] Brunhes, Clerc, Méda, and Perret (2001).

[10] Similar studies were done exploiting changes in working time legislation in Canada, Brazil, Germany and Sweden.

[11] The category *"cadres d'entrepise"* includes company employees with important responsibilities in the management of enterprises. For more detail see *Nomenclature des Professions et Catgories Socioprofessionnelles (PCS)*, category number 36; INSEE.

to the implementation of the Aubry law in the firm where the individual work was correctly answered, I end up with a sample of 1887 individuals in each wave.

3.1 Description of variables

I use three types of variables: (1) health related variables, (2) socio-economic and demographics variables, and (3) a variable related to the 35-workweek hours law. The health related variables are the outcome variables of my estimations. In this set I have information about self-assessed health status, vital risk, smoking, body mass index (BMI), physical exercise and alcohol consumption. The socio-economic and demographics variables include data on worker's skills, education, income, sex, age, region of residence, marital status, family size, health insurance and number of hours worked. Finally, I also use a question about the implementation of the 35-workweek hours law in the firm where the employee works. A detailed description of each variable is presented in Appendix, Section 7.1.

In Section 7.2 of the Appendix, Tables 9 and 10 exhibit the summary statistics for socio-demographic variables and health-related variables respectively. Table 9 shows that 43% of individuals in the sample used are women and around 80% are living in couple. In 1998 the average age was 38 and 27% of these workers were high skilled. This year the average working hours was 38.6, but because of the legal reduction of working time this mean was 36.4 hours in 2002. See Appendix Table 10 for the statistics of health–related outcomes.

4 Empirical Strategy

4.1 Institutional framework: The 35-workweek hours law

To estimate the effect of the number of hours worked on individuals' health, I will work with a quasi-experiment: the French workweek hours law enacted in June 1998. This law, known as the Aubry Law[12], required a reduction -from 39 to 35 hours- in the legal length of working hours for full time workers.

The objectives of the law. The main objective of the Aubry law was to improve the employment situation through work sharing. It was enacted at a time when unemployment rate in France was very high (close to 12%). The idea of improving social well-being through reducing working week was not a priority in this case. [13] This means that in this study there

[12]The reduction of the workweek was implemented through two laws: Aubry I and Aubry II. These laws were named Aubry laws because Martine Aubry was the Labor Minister at that time.

[13]One of the arguments commonly used to justify reductions in working hours is that it may improve workers'

is no possible endogeneity of the intervention policy.

Timing of implementation. The law was first announced in June 1998, and the timing of the implementation was different depending on the size of the firm. The first deadline for the implementation of the law was for large firms (companies with more than 20 employees), on February 2000. The law gave 2 more years (January 2002) to reduce the workweek in firms with 20 or less employees. It was also more flexible with small firms by reducing the overtime premium and increasing their annual limit on overtime work (Askenazy, 2008).

Type of employment affected by the law. At the beginning the Aubry law only concerned private employers. However, it was finally partially implemented in the public sector. In fact, in most central administrations including ministries, the 35 hours were fully applied. An special treatment was given to managers, who had more flexibility in the negotiation of hours. In particular, directors were fully exempt from the 35-hour workweek.

Effects on salaries. Employees were expected to bear only a small part of the cost of the working-time reduction, continuing to earn roughly the same monthly income. However, explicit legislation keeping workers' monthly income unchanged was introduced only for individuals earning the hourly minimum wage (Estevão and Sá, 2008). Estimates of basic pay show that the monthly wage bill in companies applying the law grew by only one percentage point less than in similar companies (Passeron (2002) and Askenazy (2008)). In order to give incentives for the implementation of the law, the government provided subsidies to those enterprises who implemented the 35-workweek law by reducing social security contribution.[14]

Actual implementation of the law. The parameters pushing the adoption of the Aubry's law weakened considerably since 2002, after the socialist government lost the general elections. So, because of the transition period for the small firms and because of at least one fourth of the public workforce (teachers, researchers etc.) have experienced no reduction in working time, the Aubry law was never fully applied in France (Askenazy, 2008). Therefore, the implementation of the law has been essentially carried out by companies with more than 20 employees. By the end of June 2002, 46% of companies with more than 20 employees had applied the 35-hour week, compared to only 12.1% of companies with 20 employees or less. In

welfare by increasing non-work time. This was the main goal of previous working-time regulations implemented in France, but it was not in the Aubry's law.

[14]Askenazy (2008) considers that on average, the 35-hour week has been a financially-neutral proposition for most companies. However, he highlighted that it is more difficult to assess the net cost of the law for the public finances. The Ministries of Labor and Finance presented an estimation of the impact of the 35-hour week. For instance, it reported that in 2002 the net cost of the 35-hour week fall between 200 million and 1.5 billion euros, equivalent to a tiny 0.1% of GDP, which was shared out between central government and the social-security funds. However, Askenazy (2008) believes that this method underestimates the overall cost for the State.

total, 49% of employees benefit from a 35-hour working week, whereas only 14.5% of the total number of companies have actually implemented it (Srandon (2003) and Boisard (2004)).

4.2 Estimation Method: Differences-in-Differences and 2SLS Instrumental Variables

In the paper I use two different estimation methods, depending on the availability of the outcome variables I am interested in. When I observe the outcome variable for two periods (pre and post-treatment periods), I use a Differences-in-Differences estimation approach. All the variables of interest are observed in both periods, except the ones related to physical activity and alcohol consumption, that were collected only in the post-treatment period (2002). For these two variables, I use an instrumental variables strategy (more details in Subsection 4.2.4).

4.2.1 Definition of Pre and Post-treatment Periods

Because the law was first enacted in June 1998, this year is defined as the pre-treatment period. On the other hand January 2002 was the deadline for the implementation of the law for the last group of firms, the smaller ones. Therefore, in this analysis the year 2002 will be considered as the post-treatment period.

4.2.2 Definition of Treatment and Control Groups

As it was explained before, the Aubry law was never fully applied and its implementation was essentially carried out by large firms.[15] Therefore, depending on whether the individuals' firms adopted or not the law we can separate them into two groups: *treatment* and *control*. The *treatment* group includes individuals who were working more than 35 hours per week in 1998 and were working in institutions that implemented the 35-workweek law. On the other hand, those individuals already working 35 hours or less before the law, either in institutions that implemented the 35-workweek law or not, belong to the *control* group.[16] In this group there are also individuals working in institutions that did not implemented the 35-workweek law (see Table 1).

[15] Mainly because of: (i) the different timing in the implementation of the law depending on the size of the firm, (ii) the weakness of the enforcements since 2002, and (iii) the fact that the law was more flexible with small firms.

[16] It is worth noticing that in order to ensure more homogeneity between individuals I only use employees whose workweek length was between 30 and 48 hours in both years (48 hours is the legal limit of weekly overtime in France). By this way we also can be more confident that the behavior of the control group, after controlling for individuals observable characteristics, can be taken as the counterfactual for the behavior of the treated group in the absence of this exogenous reduction in the number of hours worked.

In order to identify whether an individual is in the control or in the treated group I use two questions of the ESPS survey: one to identify if the individual works in an institution that applied the law and other related to the number of hours worked before the law. A convenient feature of the ESPS survey is that in 2002, and only for that year, it included a question related to the 35 hours law. More precisely, each worker answer whether or not the firm where she works implemented the 35-workweek hours law. [17]

Table 1: Classification of Treatment and Control Groups

		Workweek length in 1998	
		35 hours or less	More than 35 hours
Work in institution	Yes	Control	**Treatment**
that implemented the law	No	Control	

I use these two groups (control and treatment) in order to identify the effect of the change in working hours on individuals' health and health behaviors, by using a differences-in-differences approach.

4.2.3 Differences-in-Differences Specification

The basic idea of the DID estimation is that the behavior of individuals in the control group gives information about how individuals in the treatment would have behaved if they had not been "treated" by the law. Thus, the effect of interest can be captured by the difference between the outcome of the treatment group after the law and before the law, and the corresponding difference for the control group. Because I am using a panel data, I can also control for individual fixed effects.

The regression specification is

$$Y_{i,t} = \beta_0 + \beta_1 * \tau + \beta_2(treatment * \tau) + \beta_3 * X_{i,t} + \eta_i + \epsilon_{i,t}, \ \ t\text{=}1998,\ 2002$$

where: $Y_{i,t}$ is the health outcome variable for individual i at time t (see Section 3 for more detail); the variable *treatment* takes the value 1 if the individual is in the treatment group and 0 if it is in the control group; the variable τ takes the value 0 if the year is 1998 and 1 if the year is 2002; $X_{i,t}$ is a vector of control variables, and η_i denotes the individual fixed effects. The parameter of interest is β_2.

[17] As far as I know, nobody has used this question of the ESPS survey to analyze impacts of the Aubry law.

4.2.4 2SLS Instrumental Variables

As I explain in subsection 4.2, the ESPS survey did not record information about physical activity and alcohol consumption until 2002. Thus, for these health behaviors I only have data for the post-treatment period and I can not use the DID approach. In order to estimate the effect of working time on these two health behaviors I use a 2SLS instrumental variables approach.

In order to identify whether an individual is in the control or in the treated group I use two questions of the ESPS survey: one to identify if the individual works in an institution that applied the law and other related to the number of hours worked before the law. A convenient feature of the ESPS survey is that in 2002, and only for that year, it included a question related to the 35 hours law. More precisely, each worker answer whether or not the firm where she works implemented the 35-workweek hours law. [18]

For each individual I instrument the number of hours worked using: (1) a dummy variable that is equal to 1 if the 35-workweek hours law was implemented in the firm where the individual works, and 0 otherwise; (2) the average number of hours worked in 2002 by individuals in her occupational category. Results for the first stage of the 2SLS estimation are shown in Appendix, Table 11. These results show that the instruments used are relevant in that they exhibit strong correlation with the instrumented variable.

5 Results

5.1 Validity of Control and Treatment Groups

Before I present the results of interest, I briefly describe the characteristics of treatment and control groups. In this section I show the outcomes of some checks I have done in order to insure the validity of both groups.

In the selected sample there are 535 individuals in the control group and 1,352 in the treatment group. Because each person is observed in both periods (pre and post-treatment years), in the whole sample there are 3,774 observations at the individual level.[19]

To assess the existence of differences in observable characteristics among individuals in the

[18] As far as I know, nobody has used this question of the ESPS survey to analyze impacts of the Aubry law.

[19] Because of the existence of some missing values in the variables used, the number of observations in the regressions results is smaller than 3,774. The variable with the greater number of missing values is the income variable. As a robustness check I have run regressions where imputed the missing values of the income variable by the amount observed for the same individual in the other wave, if any. The results remain robust to these checks.

treatment and those in the control group, I have done a test for mean differences between both groups. Table 2 shows the sample means of the control and the treated group before the law was implemented. As we can see, before the law came into effect (1998) control and treatment groups had similar observed characteristics. This is a good signal for the validity of the assumption that in the absence of the law the temporal effect would be the same for both groups.

The last column of this table show the results of the test for mean differences between both groups. There are differences only on two variables, sex and number of hours worked. Both differences are explained for the same reason: in the treatment group we only have employees working more than 35 hours per week in 1998, but in the control group we also have those individuals working between 30 and 35 hours. Therefore, it is not surprisingly that the mean of the workweek length would be lower in the control group. And also, because on average women work less hours than men we also should expect a larger proportion of women in the control group. It is worthy to notice that these two differences are not a problem because my estimations control for sex differences. For the rest of the variables, the test of mean differences are not rejected, which means that before the law was implemented the differences between the observable characteristics of individuals in both groups were not significantly different from zero.

Table 2: Test for the difference between means: Treated and Control Comparison for 1998.

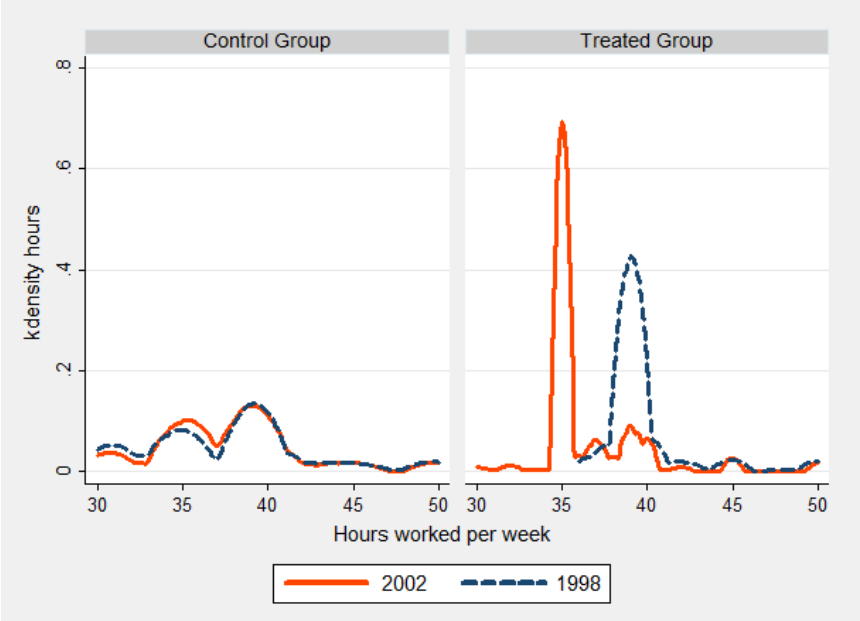
	Control	Treated	Mean Difference
	(1)	(2)	(3)
Female	0.529	0.388	0.141398***
	(0.500)	(0.487)	(0.0250723)
Age	37.76	38.24	-0.4789374
	(8.983)	(8.715)	(0.4490627)
Education	2.471	2.509	-0.0374544
	(0.964)	(0.943)	(0.049065)
In couple	0.837	0.817	0.0200755
	(0.369)	(0.387)	(0.0194992)
Family Size	3.422	3.391	0.0318974
	(1.256)	(1.238)	(0.0635089)
Health status, self-reported	8.486	8.485	0.0011409
	(1.223)	(1.332)	(0.074408)
Life Risk Index	1.509	1.451	0.0584088
	(0.991)	(1.033)	(0.0575242)
Smoking (yes-no)	0.327	0.315	0.0118651
	(0.47)	(0.465)	(0.0263067)
BMI	24.04	24.15	-0.110128
	(3.935)	(3.487)	(0.2054478)
Hours worked	36.85	39.35	-2.497905***
	(4.082)	(1.687)	(0.132811)

Stars show statistical significance of differences in proportion of the referred variable, between the control group and the treatment group. * Significant at 10%; **significant at 5%; *** significant at 1%.

Note: In columns 1 and 2 cells contain means and parentheses contain standard deviations. In column 3 cells contains mean difference between control and treatment groups, and parentheses contain standard errors.

I also check that the individuals in the treated group were effectively treated by the policy and that the law did not affect the number of hours worked by individuals in the control group.[20] Figure 1 shows the distribution of the workweek length in the pre-treatment year (1998) and in the post-treatment year (2002) for both groups (control and treatment). As we can see, for the control group the distribution of hours almost did not change between years, meanwhile in the treatment group the distribution of hours was clearly displaced to the left.

Figure 1: Distribution of number of hours worked, 1998 and 2002. (Whole sample)



The same effect is observed in the regression results shown in Table 3. In column 1 of this table the DID parameter (interaction between the time variable and the treatment variable) shows that on average individuals in the treatment group worked 3.5 hours less because of the law. The effect was greater for female, with a reduction of 3.8 hours (-3.1 for male), and for low skilled workers (-3.9 vs. -3.5 for high skilled).

[20] In addition I checked that there was not effect of the law on worker's income. I check it by running a DID regression where the dependent variable is income. The DID parameter estimated shows that the effect of the workweek reduction on income is not statistically different from zero. For more detail see Appendix, Section 7.4.

Table 3: Differences-in-Differences Regression Estimates. Outcome variable: Hours worked per week

	Hours, all	Hours, women	Hours, men	Hours, low skill	Hours, high skill
	(1)	(2)	(3)	(4)	(5)
Treated*Time	-3.479	-3.810	-3.062	-3.869	-3.535
	(.198)***	(.289)***	(.259)***	(.491)***	(.230)***
e(N)	2978	1302	1676	903	2075

* Significant at the 10%; **significant at the 5%; *** significant at 1%.

Regression includes as control variables: age, age squared, dummy for gender, level of education, income, dummy for skills, marital status, family size, region dichotomous variables, and a dummy variable for extra-health insurance. Parentheses show the standard errors clustered at individual level.

5.2 Effect of working hours on health

As I explain in Section 4, in order to analyze the effect of working hours on health status and health behaviors I use two methodological approaches. For those variables I have information in both waves (pre and post-treatment periods) I use differences-in-differences (DID). For those variables I only have information in the post-treatment period (sport and alcohol consumption), I use an instrumental variables approach (2SLS). When DID estimation is used, the parameter of interest is the corresponding to the *"interaction between the treatment variable and the time variable"*. In the case of IV estimations we are interested on the parameter of the instrumented variable *"hours"*.

I also show the results of a simple OLS regression that uses working hours as control variable, with the intention of showing the bias of the estimated effect of working time on health related variables when we directly include the number of hours worked as regressor. To see the magnitude and the sign of this bias, I compare the simple OLS estimation results with those estimated by DID and 2SLS. Thus, in each one of the following tables two regressions for the same dependent variable are shown. The first column shows the results of the OLS regression that includes hours worked as regressor, and the second one presents the estimation of the DID specification or the IV strategy, depending on the case.[21]

[21]In this section I only present the difference-in-difference results using OLS estimations. However I have also

The tables I present in this Section only show the parameters of interest.

5.2.1 Effect on Health Behaviors

Smoking consumption

Smoking is highly correlated to individual's health. In fact, it is responsible for high rates of disease and death. It is a risk factor for lung cancer, head, neck and throat cancers, heart disease, stroke, chronic respiratory disease and other conditions. Therefore, it is of relevance to estimate the impact that the number of hours worked could have on this unhealthy behavior.

Table 4: OLS and DID Regression Estimates. Outcome variable: Smoking status

	OLS	DID
	(1)	(2)
Hours	.004	
	(.003)	
Trated*Time		-.043
		(.023)*
e(N)	2615	2615

* Significant at the 10%; **significant at the 5%; *** significant at 1%.

Regression includes as control variables: age, age squared, dummy for gender, level of education, income, dummy for skills, marital status, family size, region dichotomous variables, and a dummy variable for extra-health insurance. Parentheses show the standard errors clustered at individual level.

Table 4 reports the results of the estimated effect of working hours on smoking probability. In the regressions the RHS variable is a dummy variable that takes value one if the individual reported that she smokes and it takes value zero if she does not.

By only observing the results of a simple OLS estimation that includes working hours as regressor we would conclude that working time does not affect the probability of smoking. However, the DID estimation shows that actually the number of hours worked has a positive impact on the smoking probability. As we can see in the second column of Table 4, the estimated value of the DID parameter is negative

run probit regressions for smoking probability, and ordinal probit regressions for categorical variables (self-assessed health status and index of vital risk). Despite degrees of significance are lost in some cases, in general the results are robust to these changes and none variation in the sign of the estimated effect is observed.

and significantly different from zero. Remember that the law reduced the number of hours worked, therefore a negative parameter in the DID specification means a positive correlation between the outcome variable and the number of hours worked. The point estimate in the DID regression is -0.043, which means that after the workweek reduction (3.5 hours on average) the probability of smoking decreases by 4,3%.

Body Mass Index (BMI)

For adults, obesity is a risk factor for many chronic diseases including hypertension, Type 2 diabetes, gallbladder disease, coronary artery disease, osteoarthritis, and certain types of cancer.

Table 5: OLS and DID Regression Estimates. Outcome variable: BMI

	OLS, whole sample	DID, whole sample	OLS, restricted sample	DID, restricted
	(1)	(2)	(3)	(4)
Hours	.014		.015	
	(.016)		(.017)	
Trated*Time		-.081		-.233
		(.116)		(.131)*
e(N)	2592	2592	1304	1304

* Significant at the 10%; **significant at the 5%; *** significant at 1%.

Regression includes as control variables: age, age squared, dummy for gender, level of education, income, dummy for skills, marital status, family size, region dichotomous variables, and a dummy variable for extra-health insurance. Parentheses show the standard errors clustered at individual level.

Columns 2 and 4 of Table 5 shows the results of the DID estimation when the outcome variable is BMI.[22] As in the case of smoking probability, the OLS estimation is again biased towards zero. The estimated effect of the reduction of working time on BMI is negative, but it is only significantly different from zero for the group of individuals with a BMI under the median value, which is 24 (this is the "restricted sample" on columns 3 and 4 of Table 5). For this particular group, and for treated individuals, this exogenous reduction in the number of hours worked leads to an average

[22]The average BMI of the treated individuals in the sample is 24.3 and the median is 24. An individual is overweight if he has a BMI greater than 25.

reduction on BMI of almost 0.23 kg/m^2. This value means, for instance, a reduction of 3/4 kg. for an individual of height 1.7 meters.

Alcohol consumption

Excess alcohol consumption over both the short and long term can negatively influence health. Table 6 shows the estimation results of the effect of working hours on alcohol consumption. Because in the ESPS survey this information is recorded only since 2002, I can not use DID in order to deal with the endogeneity of the number of hours worked. Therefore, for year 2002 I instrument the working hours variable, as it is explained in Section 4.2.4.

Table 6: OLS and IV Regression Estimates. Outcome variable: Alcohol consumption

	Times per period; (1-6)		More than 6 galsses; (1-4)	
	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)
Hours	.012	.076	.013	.080
	(.015)	(.041)*	(.009)	(.026)***
e(N)	1203	1203	1021	1021

* Significant at the 10%; **significant at the 5%; *** significant at 1%.

Regression includes as control variables: age, age squared, dummy for gender, level of education, income, dummy for skills, marital status, family size, region dichotomous variables, and a dummy variable for extra-health insurance. Parentheses show the standard errors clustered at individual level.

In the first two columns of Table 6 I present the results of the OLS and IV regressions, when the dependent variable is the number of times an individual consumes alcohol per period of time. This variable is ranged between 1 and 6 (1 if never; 2 if once a month or less; 3 if 2-4 times per month; 4 if 2-3 times a week; 5 if 4-6 times a week and 6 if she consumes alcohol every day). In the regressions results showed in the last two columns of this table the dependent variable reports how often the individual drinks six glasses or more during a single occasion. This variable is ranged between 0 and 4 (1 if never; 2 if less than once per month; 3 if monthly; 4 if once a week; 5 every day or almost).

As we can see in Table 6, the DID estimates of the effect of working hours on alcohol consumption is positive and significantly different from zero. This is true for the number of times the individual consumes alcohol as well as for how often the worker consumes six or more glasses during a single occasion.

If we compare the OLS results and the IV estimation, we can observe that the OLS estimator is biased towards zero. For instance, the OLS estimation presented in column 3 is 0.013 and the IV estimation of the effect of working hours on the same dependent variable is almost 6 times greater (0.08, column 4).

Physical activity

Research studies report a positive relationship between physical activity and health such that the most physically active are at the lowest risk of poor health. Physical inactivity is a modifiable risk factor for a wide range of chronic diseases including cardiovascular disease, diabetes mellitus, cancer and depression. The research about this issue shows that compared to people who are physically active, those who report being physically inactive are also more likely to report their mental health as fair or poor. Therefore, any impact of working time on the probability of doing sports will have a direct effect on individuals' health.

Table 7: OLS and IV Regression Estimates. Outcome variable: Physical activity (sports)

	OLS	IV
	(1)	(2)
Hours	-.008	-.022
	(.005)*	(.013)*
e(N)	1209	1209

* Significant at the 10%; **significant at the 5%; *** significant at 1%.

Regression includes as control variables: age, age squared, dummy for gender, level of education, income, dummy for skills, marital status, family size, region dichotomous variables, and a dummy variable for extra-health insurance. Parentheses show the standard errors clustered at individual level.

Information related to physical activity is also recorded since 2002, then the effect of working time on the probability of doing sports is estimated using IV. The dependent

variable of the regressions results showed in Table 7 is a dummy variable that takes value one if the individual reports that she regularly does sports at least once a week. The first column presents the results of the OLS estimation and the second one the IV estimation.

The 2SLS estimation results show that on average each hour worked reduces the probability of doing sports by 2.2%. As in the case of alcohol consumption, for the IV estimation the effect is bigger (in absolute value) than the one estimated by the simple OLS regression, which means that there is a positive bias in the OLS estimation that reduce the estimated effect of working hours on the probability of doing sports.

5.2.2 Health Status and Index of Vital Risk

I analyse the effect of working hours on health by using two different measures of health status, a subjective measure and an objective measure. The first one is the self–assessed health status variable and the other is the index of vital risk (see Appendix, Section 3.1 for more detail).

As shown in Table 8, neither when the dependent variable is self-assessed health status nor when it is the index of vital risk, the estimated DID parameter is significantly different from zero. Therefore, it seems to be that in the short run there was not effect of the reduction of working time on individuals' health status. It should not be considered as a contradiction with what we have observed previously for behavioral factors. Remember that I am analyzing a short run effect, because individuals were treated for less than 4 years. Therefore, it is more likely to observe changes in behaviors than changes in health status. However, because it is expected that behaviors analyzed here have a direct impact on future health outcomes, in the long run we should also observe positive changes on health status after modifications in working time.

The are several potential mechanisms or explanations for the findings on the effect of working time on health behaviors. For instance, lack of free time is an understandable cause for reduced physical activities, and plausibly for unhealthy food habits as well. Stress and fatigue associated to a large amount of hours worked can be one of

Table 8: OLS and DID Regression Estimates. Outcome variable: self-assessed health status and index of vital risk

	Self-assessed Health Status		Index of Vital Risk	
	(OLS)	(DID)	(OLD)	(DID)
Hours	.010		-.012	
	(.011)		(.009)	
Treated*Time		-.015		-.039
		(.084)		(.064)
e(N)	2539	2539	2620	2620

* Significant at the 10%; **significant at the 5%; *** significant at 1%.

Regression includes as control variables: age, age squared, dummy for gender, level of education, income, dummy for skills, marital status, family size, region dichotomous variables, and a dummy variable for extra-health insurance. Parentheses show the standard errors clustered at individual level.

the explanations linking working time and smoking or alcohol consumption.

6 Conclusions

In this study I measure the causal effect of working hours on health status and health lifestyle behaviors. In order to do it, I use a quasi-experiment in order to deal with endogeneity of the number of hours worked, generated by the presence of omitted variables and reverse causality between the working hours and health related variables. The quasi-experiment I use consists in a reduction of the legal maximum workweek hours in France. This approach have not been used before in studies about the impact of work on health.

This study is different from others in several issues. For instance, in my analysis I only use individuals who were employed in both waves, therefore I only study the intensive margin effect of working time on health. In various previous studies the effect of work along the intensive margin (work more hours) have not been disentangled from the effect of work along the extensive margin (participation into the labor force), and this fact was also responsible of part of the ambiguity in previous estimations of the effect of work on health. I am also able to isolate the effect of working less hours

from the effect of income reductions on health, because a nice feature of the law I use is that it was implemented with almost no changes in employees' wages. Finally, this study is different from others because in general previous research have focused on the health effects of more extreme work hours, such as working over 50 hours a week, whereas here I analyse the effects on health of what is considered as an *standard* number of working hours.

Results show that working time reduction positively affects individuals' health behaviors. For instance, the exercise I do shows that for an average reduction of 3.5 hours in working time the probability of smoking decreases by 4.3%. In addition, alcohol consumption decreases when working time diminishes, and for each reduction of one hour of work the probability of doing sports increases by 2.2%. I do not find a direct effect of working time on health status, however it is well known that health behaviors directly affect health outcomes. For instance, exercising sensibly lower the risk of conditions like heart disease and diabetes, and unhealthy behaviors such as smoking and excessive drinking raise the risk of conditions like lung cancer and liver disease. Therefore, even if we did not find a short run effect of working time on health outcomes, we should expect a long run effect of the number of hours worked on individual's health, through changes on health behaviors.

Because in the short run it is not easy to change health behaviors, the estimated effects found in this work are not huge. However, the crucial point is that all estimation results support the same idea that less working hours improves health behaviors, even when individuals were working less than 48 hours per week.

This study attempts to contribute to the understanding of the actual opportunity cost of working more hours, in particular the cost related to individual's health. I also think that it may help in the debate about policies promoting healthy lifestyles behaviors outside and inside workplaces. The evidence showed here is of relevant use, because it established that working time does affect behavioral risk factors. Therefore it is possible to achieve some health benefits by modifying working time or at least by being aware of the effects of it on health behaviors and try to implement policies with the purpose of attenuate the negative effects of working time on individuals' health. For instance, promoting normal working hours may help prevent unhealthy

weight gain and thereby obesity, could increase physical activity, cut down alcohol consumption and reduce the probability of smoking. But also promoting sporting at workplaces or made available to employees a healthy diet could be useful as well. It is also useful to know that working time could be an important barrier to change health behaviors, then every policy promoting healthy lifestyles should take it into account. In addition, this study also contributes to a more complete evaluation of the effects of the Aubry Law on workers' well-being. There are some studies analyzing the impact of this policy on other aspects of individuals' welfare, but no one includes the effect of this law on workers' health. Finally, it could be the key point to start a research about the relationship between differences in working time across countries and differences of health outcomes across them. There is a huge difference in working time across countries, e.g. Americans work 400 hours more per year than Europeans. Therefore, if workweek's length affects health, differences on working time across countries would contribute to explain part of the variation on health status and health behaviors across them.

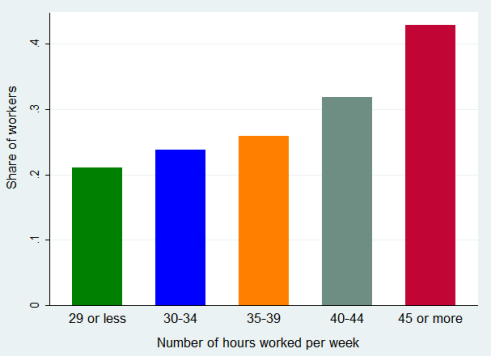
Further research should be done in order to explain the mechanism that lead to the results found in this study. Also some international comparison could be useful, because the effects of working time on individuals' health and health behaviors can be different across countries and/or can differ depending on the average number of hours worked. Therefore, it would be nice to do the same analysis for other countries. For instance, this exercise can be done for a developing country in order to compare the results with those I find in this study for a developed country. For this purpose it can be use the case of Chile or Brazil.[23] On the other hand, Canada can be used to compare the results found in two developed countries with different legal maximum number of hours worked.[24]

[23]The Chilenian law reduced in 2006 the number of hours worked, and in Brasil the reduction of working time was in 1988.

[24]Meanwhile the French law reduced the workweek from 39 hours to 35 hours, in 1997 Canada reduced it from 44 to 40 hours per week.

7 Appendix

Figure 2: Share of employees stating that their health is at risk because of their work



Source: Fourth European Working Conditions Survey

7.1 Description of variables used

1. **Health–related variables**

   (a) ***Self-assessed health status:*** Health status is assessed by asking the respondents to rate their own health on a scale ranging from 0 to 10, being 10 the optimal value.

   (b) ***Index of vital risk*:** This index is scaled from 0 to 5. The scores were given to the individuals by doctors according to their medical file. Practitioners attribute a level of severity based on expert opinion on the probability of death in the short or medium term. Value 0 indicates that there is no risk and value 5 means that individual has a poor prognosis with death within 5 years nearly certain.

   (c) **Behavioral risk factors**

   - *Smoking:* It is a dummy variable that takes value one if the individual reported that she smokes and zero if she does not.
   - *Body mass index (BMI)*: It is a continuous variable calculated from reported height and weight (kg/cm^2).
   - *Physical exercise:* It is a dummy variable. It takes the value one if the individual reported that she regularly do sports at least once a week.

- *Alcohol consumption:* In this study I included two variables related to alcohol consumption. One reports the number of times an individual consumes alcohol per period of time. This variable is ranged between 1 and 6 (1 if never; 2 if once a month or less; 3 if 2-4 times per month; 4 if 2-3 times a week; 5 if 4-6 times a week and 6 if she consumes alcohol every day). The other variable reports how often the individual drinks six glasses or more during a single occasion. This variable is ranged between 0 and 4 (1 if never; 2 if less than once per month; 3 if monthly; 4 if once a week; 5 every day or almost).

(d) ***Doctor Visits*:** Binary variables for ophthalmologist's visits or dentists visit. These variables were only responded for those individual who reported having eyes problems or teeth problems. [25]

2. **Socio-economic and demographics variables**

(a) ***Income per unit of consumption***: It is measured as household income (from all sources of income), divided by the OXFORD equivalence scale (1 for the first household member, .5 for each other person if he is younger than 14 and .7 if he is 14 years old or older). This variable is divided into 8 different values, where 0 is the lowest category of income and 7 the highest one.

(b) ***Education*:** Educational level is measured as (i) Without any education (ii) primary (age 11 in France), (iii) first level of secondary school (age 15), (iv) second level of secondary school (baccalaureate, age 18), (v) some post-secondary education.

(c) ***Low and high skilled workers*:** In the ESPS data workers' positions are coded according to the *Nomenclature des professions et catgories socioprofessionnelles* (PCS), which is the official French socioeconomic classification. The first digit corresponds to the four main skill levels that are distinguished in French collective agreements: (i) *cadres* (i.e., mostly upper-level managers, engineers, and professionals); (ii) *pro-fessions intermdiaires* (i.e., lower-level

[25] I only analyze doctor visits for eyes problems and teeth problems because for other type of illnesses I have sample size restriction.

managers and professionals, supervisors, and technicians); (iii) *ouvriers et employs qualifis* (i.e., skilled manual and nonmanual workers); and (iv) *ouvriers et employs non qualifis* (i.e., low-skill manual and nonmanual workers). Following Maurin and Thesmar (2004) I defined as high-skill workers to those individuals in group i and ii. It includes managers, professionals, engineers, technicians, and supervisors. The low-skill workers combines groups ii and iii [26].

(d) ***Sex*:** It is a binary variable. It takes the value one if the individual is woman and zero if he is men.

(e) ***Age*:** Age is entered as a continuous variable. To show possible nonlinear effects squared age is also included in all the regressions I estimated.

(f) ***Region*:** There are 8 different regions (Ile de France; Bassin Parisien; Nord; Est; Ouest; Sud-Ouest; Centre Est; Mditerrane).

(g) ***Marital status*:** It is a binary variable. It takes the value one if the individual is married or she lives in couple, and it is zero otherwise.

(h) ***Family size*:** Number of individuals living in the household.

(i) ***Extra Health Insurance*:** It is a binary variable. It takes the value one if the individual has 100% of health insurance coverage, and it is zero otherwise.

(j) ***Number of hours worked*:** It is continuous variable. I use a selected sample of individuals whose workweek length is between 30 and 50 hours.

3. **35-workweek hours law's question**

In 2002 the ESPS survey included, only for that year, a question related to the 35 hours law. More precisely, each worker answers whether or not the firm where she works implemented the 35-workweek hours law. It is a key question in order to differentiate the treatment and the control group in my study.

[26] As I explained before I excluded from the sample part of individuals in group i (the upper–level managers), because even if they would be working in a firm that implemented the Aubry's law, the restriction of hours was applied in a different way for these individuals

7.2 Summary statistics

Table 9: **Socio-demographic variables. Mean and standard deviation (in parentheses)**

Year	**Female**	**Age**	**Educ-** ation	**Income**	**Couple**	**Family size**	**Extra insurance**	**Worker's skill**	**Hours worked**
1998	0.43	38.10	2.50	4.96	0.82	3.40	0.04	0.27	38.64
	(0.49)	(8.79)	(0.95)	(1.62)	(0.38)	(1.24)	(0.20)	(0.45)	(2.83)
2002	0.43	42.23	2.52	5.47	0.85	3.27	0.06	0.32	36.36
	(0.49)	(8.79)	(0.96)	(1.54)	(0.36)	(1.22)	(0.23)	(0.47)	(2.79)
Total	0.43	40.17	2.51	5.21	0.83	3.34	0.05	0.30	37.50
	(0.49)	(9.03)	(0.95)	(1.60)	(0.37)	(1.23)	(0.22)	(0.46)	(3.03)

Table 10: **Health-related variables. Mean and standard deviation (in parentheses)**

Year	**Self-assessed health status**	**Index of vital risk**	**Smoking**	**Body Mass Index**	**Physical Exercise**	**Alcohol (times)**	**Alcohol (+ than 6)**
1998	8.49	1.47	0.32	24.12	.	.	.
	(1.30)	(1.02)	(0.47)	(3.62)	.	.	.
2002	8.26	1.46	0.31	24.63	0.35	3.30	0.60
	(1.35)	(1.04)	(0.46)	(3.84)	(0.48)	(1.51)	(0.82)
Total	8.38	1.46	0.31	24.37	0.35	3.30	0.60
	(1.33)	(1.03)	(0.46)	(3.74)	(0.48)	(1.51)	(0.82)

7.3 First Stage of the 2SLS IV estimation

Table 11:

	(1)
	NEW_IV
Aubry's Law was implemented in the firm	-2.449***
	(0.224)
Hours worked in 2002 for individuals in her same occupation	0.687***
	(0.225)
Age	0.000976
	(0.000945)
In couple	0.317
	(0.285)
Gender	-0.0127
	(0.361)
Gender*In couple	-1.072***
	(0.396)
Education	-0.0783
	(0.0883)
Income	0.105*
	(0.0603)
Family size	-0.0135
	(0.0790)
Extra health insurance	-0.412
	(0.309)
Constant	15.39*
	(8.395)
N	1209
R^2	0.165

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Parentheses show the standard errors clustered at individual level. * $p <$ 0.10, ** $p < 0.05$, *** $p < 0.01$.

7.4 DID regression. Income as dependent variable

Table 12:

	Income
Treatment	0.0742
	(0.0712)
Time	0.359***
	(0.0774)
Treated*Time	-0.0266
	(0.0884)
Age	0.0110
	(0.0253)
Age Squared	0.0000960
	(0.000310)
Couple	0.0129
	(0.110)
Female	-0.652***
	(0.139)
Female*Couple	1.114***
	(0.148)
Education	0.339***
	(0.0332)
Family Size	-0.593***
	(0.0245)
High Skilled Worker	0.426***
	(0.0593)
Regional Dummies	Yes

Parentheses show the standard errors clustered at individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

References

Allonier, C., P. Dourgnon, and T. Rochereau (2006): "Santé, soins et protection sociale en 2004," *IRDES report*, 1, 2379–90.

Arellano, M. (2005): "Empirical Evaluation of Public Policies: The Pursuit of Causality.," *mimeo*.

Askenazy, P. (2008): "A Primer on the 35-Hour in France, 1997-2007," *IZA DP No. 3402*.

Blundell, R., and M. Costa Dias (2007): "Alternative Approaches to Evaluation in Empirical Microeconomics ," .

Boisard, P. (2004): *Working time policy in France*. Centre d'études de l'emploi.

Boisard, P., D. Cartron, M. Gollac, and A. Valeyre (2003): *Time and work: duration of work*. Office for Official Publications of the European Communities.

Brunhes, B., D. Clerc, D. Méda, and B. Perret (2001): "35 Heures: l'heure du bilan," *Paris: Desclée de Brouwer*.

Bunel, M. (2002): "Added worker effect revisited through the French working time reduction experiment," .

Chemin, M., and E. Wasmer (2009a): "Regional Difference-in-Differences in France Using the German Annexation of Alsace-Moselle in 1870–1918," .

——— (2009b): "Using Alsace-Moselle Local Laws to Build a Difference-in-Differences Estimation Strategy of the Employment Effects of the 35-Hour Workweek Regulation in France," *Journal of Labor Economics*, 27(4), 487–524.

Crépon, B., and F. Kramarz (2002): "Employed 40 hours or not employed 39: Lessons from the 1982 mandatory reduction of the workweek," *Journal of Political Economy*, 110(6).

Estevão, M., and F. Sá (2008): "The 35-hour workweek in France: Straightjacket or welfare improvement?," *Economic Policy*, 23(55), 417–463.

Estevao, M., F. Sa, and T. Street (2006): "Are the French happy with the 35-hour workweek?," *IZA DP No. 2459*.

Estrade, M., D. Méda, and R. Orain (2001): "Les effets de la réduction du temps de travail sur les modes de vie: quen pensent les salariés un an après?," *Premières synthèses*, 21(1), 1–8.

Fagnani, J., and M. Letablier (2004): "Work and family life balance: the impact of the 35-hour laws in France," *Work, Employment & Society*, 18(3), 551.

Gerdtham, U., and C. Ruhm (2006): "Deaths rise in good economic times: evidence from the OECD," *Economics & Human Biology*, 4(3), 298–316.

Goux, D., E. Maurin, and B. Petrongolo (2010): "Worktime Regulations and Spousal Labour Supply," .

Hamermesh, D. (2002): "Timing, togetherness and time windfalls," *Journal of Population Economics*, 15(4), 601–623.

Helsinki, F. (2008): "Associations among working conditions and behavioral risk factors: The Helsinki Health Study with International Comparisons," .

Hill, C., and F. Stafford (1980): "Parental care of children: Time diary estimates of quantity, predictability, and variety," *Journal of Human Resources*, 15(2), 219–239.

Jackson, P., and P. Warr (2009): "Unemployment and psychological ill-health: The moderating role of duration and age," *Psychological Medicine*, 14(03), 605–614.

Johansson, E. (2004): "A note on the impact of hours worked on mortality in OECD countries," *The European Journal of Health Economics*, 5(4), 335–340.

Jusot, F., M. Khlat, T. Rochereau, and C. Serme (2008): "Job loss from poor health, smoking and obesity: a national prospective survey in France," *Journal of epidemiology and community health*, 62(4), 332.

Langeland, B. (2009): "Reported health differences between working and non-working people.," *National Institute of Occupational Health, Department of Occupational Health Surveillance*.

Lee, J., D. Kawaguchi, and D. Hamermesh (2011): "Aggregate Impacts of a Gift of Time," Discussion paper, National Bureau of Economic Research.

Mandin, C., and B. Palier (2002): "Welfare reform in France, 1985-2002," *Welfare Reform*.

Maruyama, S., K. Kohno, and K. Morimoto (1995): "A study of preventive medicine in relation to mental health among middle-management employees (Part 2).," *Japanese Journal of Hygiene*, 50(4), 849.

Mathers, C., and D. Schofield (1998): "The health consequences of unemployment: the evidence," *Medical journal of Australia*, 168, 178–185.

Maurin, E., and D. Thesmar (2004): "Changes in the Functional Structure of Firms and the Demand for Skill," *Journal of Labor Economics*, 22(3).

McPherson, A., and W. Hall (1983): "Psychiatric impairment, physical health and work values among unemployed and apprenticed young men," *Australasian Psychiatry*, 17(4), 335–340.

Morrell, S., R. Taylor, and C. Kerr (1998): "Unemployment and young people's health," *Medical Journal of Australia*, 168(5), 236–240.

Raposo, P., and J. Van Ours (2008): "How working time reduction affects employment and earnings," *IZA Discussion Papers*.

Ruhm, C. (2000): "Are Recessions Good for Your Health?," *Quarterly Journal of Economics*, 115(2), 617–650.

——— (2003): "Good times make you sick," *Journal of Health Economics*, 22(4), 637–658.

——— (2005): "Healthy living in hard times," *Journal of Health Economics*, 24(2), 341–363.

Saffer, H., and K. Lamiraud (2008): *The Effect of Hours of Work on Social Interaction*. National Bureau of Economic Research Cambridge, Mass., USA.

Sánchez, R. (2010): "Do reductions of standard hours affect employment transitions?: Evidence from Chile," *The Warwick Economics Research Paper Series (TWERPS)*.

Shields, M. (1999): "Long working hours and health," *Health Rep*, 11(2), 33–48.

Siegrist, J., and A. Rodel (2006): "Work stress and health risk behavior.," *Scandinavian journal of work, environment & health*, 32(6), 473.

Sparks, K., C. Cooper, Y. Fried, and A. Shirom (1997): "The effects of hours of work on health: A meta-analytic review," *Journal of Occupational and Organizational Psychology*, 70(4), 391–408.

Van Der Hulst, M., and S. Geurts (2001): "Associations between overtime and psychological health in high and low reward jobs," *Work & stress*, 15(3), 227–240.

White, J., and J. Beswick (2003): "Working long hours," .

Xu, X., and R. Kaestner (2010): "The Business Cycle and Health Behaviors," *NBER Working Paper*.