Essays on the Economics of Sleep Time and Work Stress

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Thesis submitted to the
Faculty of Graduate and Postdoctoral Studies
in partial fulfillment of the requirements
for the Doctorate in Philosophy degree in Economics

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Dedication

This thesis is dedicated to my mom, Akram Abolghassemi who sacrificed her life for me to be successful and to follow my dreams; to my father, Mohammad Hassan Sedigh, who taught me that you waste your life without love and caring for others; to my husband, Rashid Nikzad, who has supported me all these years in bad days and good days; to my two children, Nick and Sophie, who have given me the strength and power to finish this thesis with their unlimited love and kindness; to my sister, Mahnaz Sedigh, who always tries to be there for me and to help me find my way in the challenging moments of life; and to my brother, Ali Sedigh, who cares for me and always has a listening ear.

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Abstract

This thesis consists of three essays on the economics of sleep time and work stress.

The first essay, "the impact of economic factors on sleep: the role of insomnia", discusses the role played by insomnia on the link between economic variables and sleep time. Insomnia is a common phenomenon experienced by many Canadians. This paper uses the Canadian General Social Survey (GSS) 2005 to investigate the effect of economic factors on the sleep time of the labour force. It replicates previous work by Biddle and Hamermesh (1990) and then extends this work to look at the role played by insomnia on the link between economic variables and sleep time. The paper concludes that the presence of sleep problems can significantly change the impact of economic determinants such as wage and education on sleep time. This paper finds that a 10 percent increase in the wage rate decreases sleep time by almost 20 minutes per week for non-insomniacs while an increase in the wage rate does not have any impact on sleep time for insomniacs. In fact, the link between wage and sleep time appears to be broken for insomniacs as they do not want to, or cannot, sacrifice their sleep time in order to have more money in their pockets.

The second essay, "sleep time and wages: the role of chronic diseases and work environment", examines the role played by chronic diseases and work environment on the link between economic variables and sleep time. This paper, which expands on the work of the first essay, uses the Canadian Community Health Survey (CCHS) 2001 to investigate the roles of insomnia, chronic diseases and stressful work environments on the link between the wage rate and sleep time. Whereas Biddle and Hamermesh (1990) report that individuals sleep 14 minutes less per week as a result of a 10% increase in the wage rate, I find that this number increases to 30 minutes for individuals without sleep problems while it is zero for insomniacs. Moreover, the impact of wages on sleep time is even more pronounced – more than 60 minutes per week - once account is taken of health conditions and of the work environment. Interestingly, these health and environmental effects are in addition to their impact on insomnia: in other words, individuals with chronic health problems who are not insomniacs do not respond to an increase in the wage rate by reducing their sleep time. This means that the actual impact of wages on sleep time for those who do not suffer from these conditions is much more important than originally reported by Biddle and Hamermesh (1990).

The third essay, "are Québecers more stressed out at work than others? An investigation into the differences between Québec and the Rest of Canada in the level of work stress" discusses the level of stress experienced by workers in Canada. Work stress has a large socio-economic impact: it affects worker absenteeism, productivity, and family life. Psychological health problems including stress at workplace are an important issue in Canada. Using nine cycles spanning twelve years of the Canadian Community Health Survey (CCHS), I find that the level of work stress in Québec is much higher than in any other province. In Québec, 40% of the population report having quite a bit or extremely stressful jobs. In the other provinces, this number is much smaller, in the order of 30% in Ontario, Alberta, Manitoba and British Columbia, and even lower in the Atlantic Provinces. I find that Québec still has a higher level of reported work stress even after controlling for the main determinants of work stress: income, education, health, age, gender, marital status, children and work environment. Unionization rate and unemployment rate in the province do not seem to matter. However, I find that immigrants in Québec have less work stress than native-born Francophones. Also, Francophones in Québec and elsewhere have higher levels of work stress than Anglophones and Allophones. A body of literature has examined the subject of work stress, and while it has been noted by a few authors (Bordeleau and Traoré, 2007 and Lesage et al., 2010) that Québec is different; a thorough analysis of the causes of this phenomenon needs to be done. This paper estimates regression models that include a large number of factors such as age, gender, marital status, census metropolitan area (CMA), urban, immigrants, having young children, household type, living arrangement, mother tongue, language of conversation, race, education, income, working hours, part time job, health, physical activity, type of smoker, type of drinker, sense of belonging to community, provincial unionization rate and provincial unemployment rate to examine why there may be a consistent and persistent different between those who reside in Québec relative to the rest of Canada. I find that, even after controlling for those factors, work stress is still higher in Québec. This study suggests that differences in the legal systems and in cultures may be some of the reasons of the differences between Québec and the rest of Canada.

Acknowledgement

I would like to express my special appreciation and thanks to my supervisors Dr. Gilles Grenier and Dr. Rose Anne Devlin, you have been great mentors for me. I would like to thank you for helping me to walk to the research world and for walking with me step by step. You have inspired me, encouraged me and shown me the way of being a good thinker not only in research by also in life. I would also like to thank my committee members, Dr. Tammy Schirle, Dr. Catherine Deri Armstrong, Dr. Jennifer Stewart and Dr. Pierre Brochu for serving as my committee members. They have helped me to be a better researcher with their great comments. I would also like to thank all of my friends, Somaieh Nikpoor, Sophie Bernard, Catherine Milot, Jeffrey Peter, Rizwana Alamgir, Olayinka Williams, Hana Bataineh, Rukia Owusu, Ida Liu, Qi Zhang and Dylan Morgan, who supported me during my studies.

Introduction to the thesis

The productivity and well-being of workers are affected by many factors, including the amount of sleep that they are able to get and the amount of work stress under which they operate. Both sleep and work stress play important roles when it comes to worker well-being. This thesis consists of three essays that investigate the factors that affect sleep time and work stress of individuals in Canada.

The first chapter discusses the role played by insomnia on the link between economic variables and sleep time. Individuals vary in the amount of time that they devote to sleeping. Part of this variation is biological, but some of it is related to the choices made by individuals. Those choices are influenced, among other things, by economic incentives. In a seminal article, Biddle and Hamermesh (1990) investigate empirically the extent to which individuals adjust sleep time in response to economic stimuli. They highlight the fact that the wage rate, a commonly used measure of the opportunity cost of leisure, is also a measure of the opportunity cost of time spent sleeping. Failing to take account of the endogeneity of sleep time may result in an underestimation of the elasticity of the labour supply, biasing estimates of the responsiveness of labour to wage rate changes. Biddle and Hamermesh find that a 10 percent increase in the hourly wage rate decreases sleep time by 14 minutes per week in the US. Although the magnitude of the impact is not large, this empirical result has been noted by several researchers. Moreover, when one takes account of the impact of wages on sleep time across the population, it can amount to a significant change in time worked. Chapter 1 tries to understand better the link between socio-economic factors and sleep by exploring one very important determinant of time spent sleeping, namely insomnia. Between a quarter and a third of people in developed countries have sleep problems. The contributions of this chapter to the literature are twofold. First, this study adds to

the very small number of papers that empirically investigate how individual's sleep time responds to economic incentives. Using data from the Canadian General Social Survey (GSS) 2005, it replicates Biddle and Hamermesh's work to the extent possible in order to examine if the sleep of Canadians responds similarly to those of the US, and it does. I find that a ten percent increase in the hourly wage rate decreases sleep time by 20 minutes per week in Canada. The main contribution of this chapter, however, is that it examines what happens to the relationship between sleep time and economic factors when insomnia is taken into account, and hence when the link between wage and sleep time is disturbed. My main finding is that the link between the wage rate and sleep time is broken for those with sleep disorders.

Understanding that insomnia affects the relationship between the wage rate and hours worked, chapter 2 explores this relationship even further by asking whether the presence of chronic diseases as well as the work environment of the individual, would also affect the relationship between economic variables and sleep time. This chapter looks at whether chronic diseases affect the link between the wage rate and sleep time, irrespective of whether the individual is an insomniac, or whether their influence is solely through the presence of insomnia. Similarly, I ask the same question when it comes to work environment – namely, whether this too influences the link between wages and sleep time, once account is taken of insomnia. Using data from the Canadian Community Health Survey (CCHS) 2001, I find that these two factors can sever the link between the price of time and sleep for those who otherwise have no problems with sleeping, i.e., for the non-insomniac population. Strong non-insomniacs with certain chronic conditions such as arthritis, fibromyalgia and back problems no longer respond to an increase in the wage rate by sleeping less. Similarly, there is no relationship between the wage rate and sleep time for non-insomniacs with certain bad work environment conditions, such as high strain jobs.

The third chapter examines work stress across different jurisdictions in Canada. Work stress is something that most workers have to deal with at one point or another. According to Bernèche (2010), more than 29 percent of Canadians report that they have a high level of work stress. The same thing is observed around the world. In a study of 15 European Union member states, Kompier et al. (2000) reveals that 28 percent of people in Europe suffer from high work stress. Work stress not only affects individuals but it also has a negative impact on society. It causes low productivity and absenteeism, and increases health care costs (Park (2007)). This chapter investigates the factors that affect work stress, specifically, the work stress level reported across Canadian provinces. One interesting and puzzling fact is that work stress is higher in Québec than in the other provinces. While studies such as Bordeleau and Traoré (2007) and Lesage et al. (2010) have noticed that the level of work stress is significantly higher in Québec than in other provinces, they have not looked thoroughly at the causes of this phenomenon. The contributions of this chapter to the literature are twofold. First, this study adds to the papers that empirically investigate work stress and it looks at the impact of new factors such as language and culture. Second, the paper looks at the difference between Québec and other Canadian provinces in the level of reported work stress, and tries to explain why this difference persists. Using various cycles of the Canadian Community Health Survey (CCHS), this study finds persistence in the observation that people in Québec experience significantly more work stress relative to those elsewhere. In this chapter, I control for demographic factors, economic factors, health factors, work environment, social support, and macroeconomic factors to see if they can explain the high level of work stress in Canada and, specifically, if they can shed light on the differences between Québec and other provinces. It is found that irrespective of a host of influences, work stress is always higher in Québec.

Sleep and stress have important economic consequences. Insomniacs and people with some chronic diseases or certain work environments do not want to, or cannot, trade-off sleep time for more money. This distortion in the labour market is in addition to other costs of these problems such as work absenteeism and low productivity. Understanding better the high level of work stress among workers in Canada, especially in Québec, has the potential to help policy makers design ways in which to combat absenteeism and low productivity in the work place.

Chapter One

The Impact of Economic Factors on Sleep: The Role of Insomnia

1.1. Introduction

Individuals vary in the amount of time they devote to sleeping. Some average as little as four hours per night while others sleep more than ten hours. Part of this variation is biological, but some of it is related to the choices made by individuals, choices influenced, among other things, by economic incentives. If your promotion is contingent on getting a report done in a timely fashion, then sleep is often sacrificed. To earn more money, work may take the place of leisure and sleep. As obvious as these statements are, much of the research done on labour supply fails to take account of the fact that the decision faced by many individuals is not just between hours of work and hours of leisure, with sleep time being exogenous, rather sleep time may also be adjusted in response to economic influences.

In a seminal article, Biddle and Hamermesh (1990) (hereafter, BH) were the first to investigate empirically the extent to which individuals adjust sleep time in response to economic stimuli. BH demonstrated that the socio-economic factors that influence work time, like the wage rate, non-labour income and education, also influence sleep time. In particular, they highlighted the fact that the wage rate, a commonly used measure of the opportunity cost of leisure, is also a

measure of the opportunity cost of time spent sleeping. Failing to take account of the endogeneity of sleep time may result in an underestimation of the elasticity of the labour supply, biasing estimates of the responsiveness of labour to wage rate changes.

The importance of BH's work centres on their explicit assumption that individuals have the ability to choose the amount of time devoted to sleep. They then go on to measure the extent to which sleep time responds to economic incentives. However, while sleep time may be under the control of most individuals, it is unlikely to be so for all individuals. Some people struggle with getting to sleep and remaining asleep, and hence are unlikely to be in the position of choosing sleep time in response to economic incentives. Do economic incentives motivate individuals who have sleep disorders? If so, what does this mean for the findings of BH?

In this paper, I attempt to understand better the link between socio-economic factors and sleep by exploring one very important determinant of time spent sleeping, namely insomnia. Insomnia, defined as having "difficulty initiating and/or maintaining sleep or a non-restorative sleep for at least one month" is a strikingly pervasive condition.[1] It is estimated that 24%[2] of Canadians (Sutton et al., 2001), 33% of American adults (Morin et al., 2006), more than 36% of the population aged 16 to 74 years in England, Scotland, and Wales (Stewart et al., 2006) and 22.3% of Japanese workers (Doi et al., 2003) have insomnia. Overall, between a quarter and a third of people in developed countries have sleep problems. Insomnia decreases productivity at work and is one of the reasons for work absenteeism. It is also related to accidents, alcohol consumption and depression (Daley et al., 2009a).

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[1] Diagnostic and Statistical Manual of Mental Disorders (DSM) [http://web4health.info/en/answers/sleep-insomnia-what.htm]. "The *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*) is the standard classification of mental disorders used by mental health professionals in the United States." [http://www.psych.org/mainmenu/research/dsmiv.aspx].

[2] Sutton et al. (2001)'s sample is people over 15 years old. They also find that the prevalence of insomnia is 20% for people between 15 and 24 years and more than 33% for those over 75 years old. People in my sample are between 23 and 65 years old. Since, I do not have people between 15 and 23 years old in my sample, the prevalence of insomnia is higher in my sample.

Some researchers have tried to estimate the economic costs associated with insomnia. For instance, according to Daley et al. (2009a), the annual direct costs in the province of Québec of insomnia were about $6.6 billion Canadian dollar including the costs for consultation, medication, transportation and alcohol consumption in 2002. In Walsh and Engelhardt (1999), the approximate estimate of direct costs in the US for insomnia was $13.9 billion in 1995. While one could perhaps quibble with these figures, the point is that sleep problems can have important economic costs and consequences. In this chapter, I focus on another possible consequence of insomnia that has never before been considered, namely, that insomnia may distort economic incentives in the labour market.

The contributions of this chapter to the literature are twofold. First, this study adds to the very small number of papers that empirically investigate how individual's sleep time responds to economic incentives. It replicates BH's work to the extent possible in order to examine if the sleep of Canadians responds similarly to those of the US. Typically, the elasticity of supply of labour across Canada and the US are different: for instance, Dostie and Kromann (2012) mention that the labour supply elasticities in Canada are smaller than in the US. This could be because of differences in the rate of unionization, differences in the labour market rules or differences in the social safety nets. Given that the labour-market conditions are quite different in Canada as compared to the US, it is worthwhile examining the extent to which the time spent sleeping by Canadians respond to economic incentives to see how this compares to the estimates provided by BH in the US context.

The main contribution of this chapter, however, is that it examines what happens to the relationship between sleep time and economic factors when insomnia is taken into account, and hence when the link between wage and sleep time is disturbed. Indeed, when I consider the

subset of respondents reporting insomnia, it is observed that the wage rate does not have a significant effect on sleep time: people who experience insomnia do not appear to sacrifice sleep time in response to higher wages, hence altering their sleep-wage elasticity. A change in the sleep-wage elasticity affects directly the work time-wage elasticity. Accurate estimates of labour supply elasticities are essential in order to understand how individuals respond to, for instance, economic booms and downturns, as well as to a variety of public policies.

The remainder to this chapter proceeds as follows. The next section reviews the economic literature on sleeping and insomnia, followed by a discussion of the methodology used in the analysis. The fourth section provides information about the database employed, and the fifth section includes the results and the econometric analysis. Section six concludes the chapter.

1.2. Literature review

In this section, I discuss the studies on the economic determinants of sleep time, and review some key empirical studies in this area. The literature on the determinants of insomnia and on the role of insomnia in sleep studies is then presented.

1.2.1. Determinants of sleep time

Becker (1965) presents sleep as one of the main activities to which people allocate their time in order to maximize utility. He presents wage as the opportunity cost of time, which includes sleep time as well as other activities such as time spent eating or seeing a play. Moreover, the observation highlighted by Becker that sleep is "required for efficiency" (Becker, 1965 p.498), provides the motivation to BH to investigate the impact of sleep on the productivity of workers. They enter sleep time in the utility function and the budget constraint of a neoclassical microeconomic model of labour supply. They assume that sleep time directly affects utility and it affects the budget constraint through the wage equation: people who have sufficient

amount of sleep are more productive than people who suffer from a lack of sleep, and, as a result, they receive a higher remuneration. BH suggest that sleep time is endogenous and use the 1975-76 US General Social Study to examine empirically this question. Their model predicts that a higher wage rate should have a negative impact on sleeping, which they find, concluding that if we do not consider the effect of sleep in models of labour supply, we cannot get the correct wage and income elasticities.

Szalontai (2006) estimates a model similar to BH with a South African time-use data set for 2001 and confirms their results.[3] Another study in the spirit of BH's model is Brochu et al. (2012) who use data from Statistics Canada's GSS of 1992, 1998, and 2005. They include the unemployment rate as a proxy for the opportunity cost of time in the sleep model and suggest that during periods of economic growth, sleep time decreases. They do not use wage in their analysis; instead, they use economic conditions (unemployment rates) as a proxy for the opportunity cost of time. They observe that when the opportunity cost of sleeping is high (i.e., when unemployment is low), people sleep less because they want to benefit from higher incomes and better economic conditions. They do robustness check using only those whom their main source of personal income is wage and salary and they also find that an increase in personal income has a statistically (not economically) significant negative impact on men's sleep time, but the impact is not significant on women's sleep time.

Hurst (2008) also analyzes the sleep time of Canadians based on the GSS 2005 and finds results that are similar to those of the previous studies; however, his results are based on descriptive statistics, not econometric analysis. He compares the average sleep time across different groups. He finds that Canadians with higher income sleep less than their counterparts with lower incomes.

[3] The wage rate in Szalontai (2006) is the logarithm of the individual's self-reported income divided by 4.3 times 40.

1.2.2. Insomnia and sleep time

Insomnia is a common health problem that reduces the control that people have on their sleep time. There are several reasons why treating insomnia is not trouble-free. In their study on barriers to treatment seeking, Stinson et al. (2006 p. 1643) state:

> On the basis of the previous research largely conducted in North American, it was hypothesized that the barriers [to treatment seeking] would include (1) perception of insomnia as benign, trivial, or a problem one should be able to cope with alone, (2) lack of awareness of available treatment options, (3) perception of available treatment options as ineffective, (4) perception of available treatment options as unattractive, and (5) personal constraints on treatment seeking. Although not yet examined in the insomnia literature, (6) stigma surrounding psychological difficulties may well also be a barrier to treatment seeking.

The most common barrier is the "perception of insomnia as benign, trivial, or something one should be able to cope with alone" (Stinson et al., 2006 p. 1643). If people do not ask for treatment, there will be no way to solve their insomnia.

Another reason why treating insomnia is not easy is that general practitioners and pharmacists, who are the main source of advice, do not have enough information about the treatment of sleep problems. Stinson et al. (2006) point out that a medical student in the United Kingdom may spend just five minutes learning about sleep during his or her entire studies. Moreover, of the two types of treatments for insomnia, pharmacological and psychological, Vincent and Lionberg (2001) find that most practitioners choose pharmacological treatments, while patients prefer psychological treatments. They observe that pharmacological treatments can have undesirable consequences, such as daytime drowsiness, poor tolerance and dependence. However, Morin et al. (2006) present evidence that psychological and behavioral treatments which are thought to be more effective than pharmacological treatments, have their own problems. Psychological and behavioral treatments take a long time to cure insomnia and this is one of the likely reasons that they are not used by practitioners. In general, based on the 37

studies summarized in their article, Morin et al. (2006) conclude that neither psychological and behavioral therapies nor pharmacological treatments can solve insomnia completely.

Even when treatment is applied, insomnia may not be cured because it may be related to other health problems or even economic factors. In terms of socio-economic factors, insomnia is correlated with factors such as age, gender, marital status, education, income, working time, and unemployment. Table A1.1 summarizes the results of several insomnia studies. These results suggest that unemployment has a significant negative impact on insomnia (Xiang et al., 2008; Paine et al., 2004; Ohayon and Zulley, 2001) and people who have low income (Gu et al., 2010; Tjepkema, 2005) or low education level (Xiang et al., 2008; Yen et al., 2008; Tjepkema, 2005) suffer more from sleep problems than their counterparts with high incomes or high education. In addition, working long hours (Virtanen et al., 2009) is associated with insomnia. On the whole, the literature suggests that insomnia is a common health problem. It seems reasonable, therefore, that this problem be considered in studies about sleep.

The correlation between sleep and insomnia is recently investigated in Hurst (2008) and Brochu et al. (2012). Hurst (2008) and Brochu et al. (2012) confirm that people who have sleep problems sleep significantly less than those who do not. For example, Brochu et al. (2012) estimate that men and women who have sleep problems sleep on average respectively 1.4 and 2.4 fewer hours in a week than those who do not have such problems. However, no study looks at the impact of insomnia on the link between economic factors and sleep, which is the main contribution of this present work.

1.3. Methodology

The first step of this study is to replicate BH's models using Canadian data to compare the impact of economic factors on sleep time. In the second step, I extend their model to

investigate if insomnia affects their results. I divide my sample into two groups, insomniacs and non-insomniacs, to compare the impact of economic factors on sleep time between these two groups.

1.3.1. Replication of Biddle and Hamermesh

BH present two specifications of their sleeping models which are reflected in equations (1) and (2).

$$S^i = \alpha_0 + \alpha_1 WT^i + \alpha_2 EDU^i + \alpha_3 H^i + \alpha_4 X^i + {\epsilon_1}^i \quad (1)$$

$$S^i = \beta_0 + \beta_1 \ln W^i + \beta_2 H^i + \beta_3 X^i + \beta_4 \ln M^i + {\epsilon_2}^i \quad (2)^4$$

S^i is sleeping minutes per week by individual i . WT^i is the working time per week in minutes and EDU^i represents the education level of individual i. H^i denotes a dummy variable for health condition and X^i is a vector of socio-economic factors such as age, marital status, gender, presence of children less than 5 years old, and religion. $\ln W^i$ is the logarithm of the wage rate per hour and $\ln M^i$ is the logarithm of other income or non-labour income of individual i. Finally, ${\epsilon_j}^i$ is the error term (j = 1 or 2). In BH's article, equation (1) is meant to capture basic correlations between socio-economic variables and sleep time.

Hours of work is found to have negative impact on sleep time in BH. BH and Szalontai (2006) find that education has a negative impact on sleep time. They argue that this is a price effect of education through the wage. Moreover, the effect of age on sleep time varies by gender and across studies. Based on BH, the relationship between age and sleep for men in the US is an inverse U-shaped, where the peak is at 46 years old. The relationship between age and sleep for women, by contrast, is U-shaped, where the minimum is at 36. They also find an insignificant positive impact of age when they enter age linearly in their model.

[4] We are also looking at non-market waking time with a similar model. In that model, the dependent variable is non-market waking time.

Men and women have different sleeping patterns, but studies differ as to who sleeps more. Morgan (1987), Williams (2001), Szalontai (2006), Hale (2007) and Hurst (2008) find that women sleep more than men; but Szalai (1972) and BH find that men sleep more than women. Furthermore, Szalontai (2006) and Hurst (2008) find that married people sleep less; however, BH observe a positive impact of marriage on sleep time. Another variable that may affect sleep time is health; BH assume that sick people sleep more, but they cannot see any significant impact of illness on sleep time. Szalontai (2006) agrees that sick people sleep more considering that "sick people might have over reported their sleep time including both resting in bed and actual sleep under the same category" (Szalontai, 2006 p. 866). Brochu et al. (2012) also find that healthier people sleep less.

Children have a significant impact on their parents' sleep time. BH, Szalontai (2006), Craig (2006), and Brochu et al. (2012) find that parents who have young children sleep less than people with older or no children. Hurst (2008) reports that Canadians who have at least two children sleep twenty five minutes less per night than Canadians who do not have any children. Craig (2006) finds that sending children to daycare does not improve the sleep time of the parents because they prefer to sleep less and be with their children when they are present at home.

Equation (2), on the other hand, is based on a theoretical model that they develop in order to see the impact of the wage rate and other income on sleep time. I estimate both equations similarly to BH. In addition, in equation (2), wage is endogenous. Similar to BH, union status, occupation, industry codes, regions (provinces), and a dummy variable for metropolitan areas are used as the instruments for wage.

1.3.2. Dividing the sample into insomniacs and non-insomniacs

To test whether insomnia affects the impact of socio-economic variables such as wage and education, equation (3) is estimated separately for those with and without insomnia in order to compare the results with equation (1). The correlation between socio-economic variables and sleep time among insomniacs and non-insomniacs is estimated with these two regressions.

$$S^i{}_j = \alpha_{j\,0} + \alpha_{j1} WT^i{}_j + \alpha_{j2} EDU^i{}_j + \alpha_{j3} H^i{}_j + \alpha_{j4} X^i{}_j + \epsilon_{j1}{}^i \qquad j = P \text{ or } NP \qquad (3)$$

In order to compare with equation (2), equation (4) below is estimated for the insomniac and non-insomniac portions of the population to compare the impact of wage between these two groups.

$$S^i{}_j = \beta_{j0} + \beta_{j1} \ln W^i{}_j + \beta_{j2} H^i{}_j + \beta_{j3} X^i{}_j + \beta_{j4} \ln M^i{}_j + \epsilon_{j2}{}^i \qquad j = P \text{ or } NP \qquad (4)$$

Subscript P represents an insomniac individual and subscript NP represents a non-insomniac individual based on a question in survey, to be discussed later. Wage is probably an endogenous variable and I use instrument variables[5] for it as previously described. I check to see if the estimated coefficients for the wage rate variable are significantly different between insomniacs and non-insomniacs. In a further step, I also use Heckman's method to estimate equation (4)[6] to consider the possibility that there is a self-selection bias. Insomniacs and non-insomniacs may not be randomly distributed; certain characteristics may increase the probability of being insomniacs. For example, people with stress or chronic health conditions have more of a chance of having insomnia relative to others. In this case, it is possible that I am capturing the impact of stress or chronic conditions in the effect of insomnia and overestimate the impact of insomnia.

[5] Instruments for wage in my models: education, union status, and industry dummy variables (NAICS codes).
[6] I use Heckman's model for equation (4) only since it is the main model in this study.

Suppose that P^{*i}, is a dummy variable denoting the presence of insomnia, and that it is a function of the vector Z^i as follows:

$$P^{*i} = Z^i\gamma + \epsilon_0{}^i \quad (5)$$

P^i is 1 if $\epsilon_0{}^i > -Z^i\gamma$ and 0 if $\epsilon_0{}^i \leq -Z^i\gamma$. The variables included in Z that affect insomnia include marital status, age, gender, presence of children less than 5 years old, work time, education levels, shift work, and level of stress. Among the above, work time, education levels, shift work, and level of stress are not included in the sleeping model; [7] therefore, the model is not only identified by functional form but is identified through these additional variables. I thus run two Heckman models as follows:

$$S^i{}_j = \beta^H{}_{j0} + \beta^H{}_{j1} \ln W^i{}_j + \beta^H{}_{j2} H^i{}_j + \beta^H{}_{j3} X^i{}_j + \beta^H{}_{j4} \ln M^i{}_j + \beta^H{}_{j5}\, IMR + \epsilon_{j4}{}^i \; j = P \; or \; NP \quad (6)$$

The inverse Mills ratios (IMR) is $\frac{\phi(Z^i\gamma/\sigma_0)}{\Phi(Z^i\gamma/\sigma_0)}$ for insomniacs and is $\frac{-\phi(Z^i\gamma/\sigma_0)}{1-\Phi(Z^i\gamma/\sigma_0)}$ for non-insomniacs, and are constructed based on estimates from equation (5). σ_0 is the standard error of $\epsilon_0{}^i$. $\phi(.)$ is the normal standard density and $\Phi(.)$ is the cumulative distribution function. If the estimated $\beta^H{}_{j5}$ is significant in equation (6), then there is a selection bias and hence including the IMRs will give us consistent estimates.

1.4. Data

This study uses the Canadian GSS - Time Use 2005. This survey asked respondents to complete a diary listing all their activities over a 24-hour designated day beginning at 4:00 am.[8]

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[7] These instruments are not strong instruments since the literature says that they could have impact on sleep time. However, shift work and stress strongly explain insomnia and their impacts on sleep are very weak. Due to lack of better instruments for insomnia in the sleep model, I use work time, education levels, shift work, and level of stress as instruments for insomnia in the sleep model.
Moreover, I have also tried my sleep models including shift work and stress as explanatory variables, and I have got similar results for the impact of wage on sleep time.

[8] The **designated day** is the day that the interview is done. The designated day is 04:00am to next 04:00am. (Statistics Canada, 2005).

This section explains the variables included in the analysis and compares them with BH's variables.

1.4.1. Dependent variables

One of BH's dependent variables is time spent sleeping and napping (resting) per week. They use US time use survey 1975-1976 which reports sleep time in minutes. The benefit of using time use data is that individuals report their sleep time in minutes which thus generates more variation in the data on sleep time than is available in surveys that ask about usual hours of sleep. Lauderdale et al. (2008) and Robinson and Michelson (2010) report that surveys that ask about a single night of sleep time are better for analyzing sleep than are surveys with self-reported usual hours of sleeping. According to Lauderdale et al. (2008), the correlation between wrist-monitored sleep time with self-reported usual sleep time is 0.45, whereas, the correlation between wrist-monitored sleep time with single night reported sleep time is 0.60. This result suggests that single night sleep time reflects better the real sleep time than self-reported usual sleep time.

To create the sleep variable, I use two GSS 2005 variables. The first one is night sleep/essential sleep and the second one is naps/lying down. Night sleep/essential sleep is constructed using the following variables: start of sleep episode in the first night (*S1*), sleep duration (in minutes) in the first night (*D1*), sleep duration (in minutes) in the second night (*D2*), and wakeup time in the second night (*E2*).

Figure 1.1 depicts how the night sleep/essential sleep variable is created. The horizontal line is the time line which begins with the start of sleep episode in the first night and ends at wakeup time in the second night. By knowing that one person fell asleep at *S1* and slept for *D1*

minutes during the first night, we can find out when he or she woke up. However, just that part of the sleep which happened after 4:00 am, *x*, is kept in the 24-hours diary.

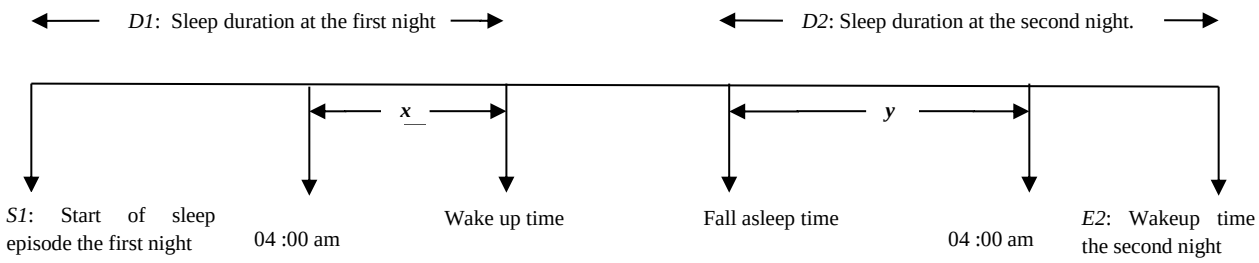

Figure 1.1. Sleep time calculation for the day of interview

Then for the second night, we know when respondents woke up, *E2*, and we know how much they slept, *D2*. Therefore, we can have the time that they fell asleep at the second night. Then we can find out how much they slept till 4:00 am, which is our variable *y*. The survey adds *x* and *y* together and calculates night sleep/essential sleep. As BH's dependent variable is time spent sleeping and napping (resting) per week and I want to replicate their model, I multiply the daily sleep time by 7 to get the weekly sleep time. The second dependent variable in BH is waking non-market time. This variable is defined as the time that we have in a day excluding sleep time and working time.

1.4.2. Explanatory variables

To be able to compare my results with those of BH, similar explanatory variables are used, namely: work time, marital status, age, education, gender, health status, presence of young children, religion, wage, and other income. Table A1.2 contains the definitions of all the variables used in BH and in this study. Unfortunately, some differences exist between the two datasets. I do not have "years married" and I could only include "marital status". Unlike BH, I do not have a variable for "race"; however, I include richer information on religion. It is not also possible for this study to obtain the years of schooling. However, dummy variables are available for education levels of individuals. Four dummy variables are used for education levels denoting

some secondary or less, a high school diploma (the reference category), a diploma/certificate from community college or some university/community college and a doctorate/masters/bachelor's degree.

The variable for the presence of children under three years old could not be created; instead I use a binary variable for the presence of children less than five years old. Moreover, I increased the number of categories for the BH's measure of religion. BH have one dummy variable for Protestant. In my model, I have four dummy variables for religion: one for Roman Catholics, one for United Church and Protestant, one for other religions, and one for people without a religion (the reference category).

The variable of interest, wage, is created from the annual personal income and the number of hours usually worked at all jobs in a week. I divide the personal income by 51.6[9] times the number of hours usually worked at all jobs in a week to get the hourly wage. My wage variable is different from BH because they have monthly earnings instead of annual personal income. Earnings are but one component of personal income which also includes income from investments, retirement income, and the like. BH also create the variable "other income" by subtracting individual earnings and his/her spouse's earnings from total household income. Since I do not have spousal earnings in my data, the "other income" variable in my study is created by subtracting personal income from total household income. Given that I have household income in 12 categories in the GSS 2005, I take the mid-point of each group as the annual household income for that group. For the last group whose reported household income is higher than $100,000, following Brochu et al. (2012) and Phipps et al. (2001), I use $150,000 ($100,000 times 1.5) as the household income of the last group.

[9] 12 (number of months) *4.3 (number of weeks in a month)

Once BH's model is replicated, I then add several variables not used by them to the sleep time regression. Insomnia is a binary variable which is zero for those who do not report having sleep problems and one for those who report having sleep problems. Some studies reviewed in table A1.1 use more complex measures of insomnia. Examples include the Pittsburgh Sleep Quality Index (PSQI) (Zisberg et al., 2010; Barclay et al., 2010; Mystakidou et al., 2007), Jenkins Scale (Virtanen et al., 2009), 8-item Athens Insomnia Scale (AIS-8) (Yen et al., 2008), and the Sleep Quality Index (SQI) (Chung and Cheung, 2008). Some other studies use simple questions about sleep quality such as: "How do you rate your sleep quality recently?" (Gu et al., 2010) or "How often do you have trouble going to sleep or staying asleep?" (Kling et al., 2010; Tjepkema, 2005). Kling et al. (2010) argue that a simple question such as "how often do you have trouble going to sleep or staying asleep?" can be used as a measure of insomnia for two reasons. First, it is an accepted measure for insomnia and Statistics Canada uses this question to estimate the level of insomnia in Canada. Second, there is no accepted specific definition for insomnia. Based on Ohayon et al. (2002) in Kling et al. (2010), the response to a question such as the above one is the most common measure of insomnia in epidemiological studies.

Other than these two reasons, I can provide another justification for the use of the responses to a simple question to measure insomnia. As we see in table A1.1, a variety of sleep problem measures are used in insomnia studies; however, the impact of various covariates on insomnia is more or less the same, whether a complex measure of insomnia or a simple question is used. Since a simple question is asked about sleeping problem in the GSS 2005: "Do you regularly have trouble going to sleep or staying sleep?", this question is used to measure insomnia. I will use this measure to divide my sample into two groups: people with insomnia (insomniacs) and people without insomnia (non-insomniacs). Other variables used in this study

include: spouse employment, stress level, shift work, dummy variables for provinces, the month of interview and the day of interview. These variables are defined in table A1.2.

Starting with 19,597 observations in the GSS 2005, I make the following sample restrictions. First, BH look only at people between 23 and 65 years of age because they are interested in the working people. I do likewise and restrict my sample to this group. I keep only people between 23 to 65 years old in my sample to be consistent with BH. Second, as sleeping patterns on weekdays and weekend could be different, I restrict my sample to those who reported their activities on a weekday.[10] In addition, I take students out of my sample because students may use their sleep time for studying and not for working. Moreover, since BH restrict their sample to workers, I drop those individuals whose number of hours usually worked at all jobs in a week is missing or zero. I also drop those with missing observations. After these restrictions, I am left with 6,915 observations (2,086 insomniacs and 4,824 non-insomniacs).

1.4.3. Descriptive statistics

To have a better understanding of the data, table 1.1 shows the mean values of the variables in my sample.[11] On average, in 2005, people slept 3,278 minutes per week, which is equal to 7 hours and 48 minutes per night. The average age in the sample is 42 years old, for both men and women. Furthermore, the average amount of time at work per week is 42 hours (the sample includes only people between 23 and 65 years old) and, on average, men work 8 hours per week more than women. Almost 6% of the individuals have at least one child under 5 years of age. Twenty-nine percent of the sample suffers from insomnia, and only 11 percent report their health condition as poor or fair. Table 1.2 shows the descriptive analysis separately for

[10] The results will not change even if we add people who work during weekends (the results are available upon request).

[11] All the regressions and descriptive analysis are weighted using the person weight variable: WGHT_PER. In the sample, each person represents herself/himself and at the same time some other of people.

insomniacs and non-insomniacs. The main difference between these two groups relates to health factors. Insomniacs are less healthy than non-insomniacs. Stress indicators are also included in table 1.2. On average, non-insomniacs have less stress than insomniacs.

1.5. Empirical Results

This section presents the results from replicating BH's sleeping models. Then insomnia is taken into account. I find that BH's assumption about the negative impact of wage on sleep time holds only for non-insomniacs.

1.5.1. Replication of Biddle and Hamermesh

I begin by estimating the first sleeping model, equation (1), for Canadians using the GSS 2005. Table 1.3 reports my results and the results of BH. Like BH, the impact of work time is found to be negative and significant at the one percent level, meaning that people who work more spend less time sleeping. An hour increase in work time per day decreases the sleep time by six minutes per day in Canada compared to twelve minutes per day in the US. Higher education has a negative impact on sleep time consistent with the notion that it increases the price of sleep time, namely the wage rate. On average, my study shows that healthy people sleep 30 minutes per week less than their unhealthy counterparts. People with young children at home sleep on average one hour and thirty minutes less than others, ceteris paribus. Having young children at home decreases the parents' available time for sleeping, but it is stronger for men in this study than in BH's. The difference might be explained by more participation of men in child care compared to 30 years ago.

Following BH, work time and education are removed from the first model and equation (2) is estimated with wage and other income being added to the other control variables. As BH consider wage as an endogenous variable and use an instrumental variables procedure to deal

with this problem, I do likewise. Education, union status, large CMA (metropolitan area), regions (provinces), and industry dummy variables (NAICS[12] codes) are the instruments for the wage rate used by BH (my study in parenthesis when the instruments differ from those of BH). In table 1.4, the estimated impact of wage and other income on sleep time and waking non-market time are presented. I have a smaller sample size in equation (2) because wage, some instruments and other income are missing for some individuals and these people are not included in the estimation of the sleep model of equation (2).

An increase in the wage rate has a negative and significant impact on sleep time. On average, a ten percent increase in the hourly wage rate decreases sleep time by 19.09[13] minutes in a week. This result for wage is consistent with the one of BH who find that a ten percent increase in hourly wages decreases the sleep time by 14.1 minutes in a week. An increase in the wage rate does not have any significant impact on waking non-market time, which is similar to BH. Other income or non-labour income has a positive but insignificant impact on sleep time.

Since instrument variables were used for the wage rate, it is important to report some tests on the quality of the instruments. To be a good instrument for wage, two conditions should be satisfied. The first is that the instruments should be correlated with the wage rate; while, the second condition is that the instruments should not be correlated with the error term of the sleeping model. To check the first condition, F-statistics for the joint significance of the coefficients on additional instruments are checked. Since the F-statistics are significant at one percent level in table A1.3, the first condition is satisfied. To check the second condition, I use Wooldridge's robust score test of over identifying restrictions (Wooldridge, 1995), which is

[12] The North American Industry Classification System (NAICS) is a standard way of classifying business establishments.

[13] In a linear-log regression, the coefficient of an explanatory variable in logarithm is divided by 100 when the result is interpreted.

identical to Sargan's test statistic. The null hypothesis is that the instruments are not correlated with the error term and the instruments are exogenous. The result of this test suggests that my instrument variables are not valid since the Wooldridge's robust score is significant at five percent level and the null hypothesis is rejected. Unfortunately, it is not possible to compare these tests with BH's because these tests are not presented in their study.

I find that two of the instrumental variables, CMA and provinces, should in fact be included as explanatory variables in the sleeping model. Union status and type of the industry of individuals' work do not have significant impact of sleep time but these two variables are explanatory variables of wage rate in the labour literature. Therefore, the sleep model is estimated again with the dummy variables for CMA and provinces as explanatory variables and with union status and industry dummy variables (NAICS codes) being used as the instruments for the wage rate. The new models are presented in table 1.5. The endogeneity tests show that wage is endogenous since the robust score chi2 test and robust regression F test are significant and I can reject the null hypothesis (the exogeneity of wage variable). This time, the instruments are not correlated with the error term in women's regression since I cannot reject the null hypothesis of Wooldridge's robust score test.

The results of table 1.5 suggest that a ten percent increase in the wage rate on average decreases the sleep time by 17.56 minutes per week compared to 14.1 minutes per week in BH. The impact is 20.83 minutes for men and 15.65 minutes for women in this study compared to 18.16 minutes per week for men and 6.43 minutes per week for women in BH. The sleep-wage elasticity (evaluated at the mean) is -0.05 compared to -0.042 in BH. According to BH, the elasticity confirms the hypothesis that sleep is affected by the socio-economic factors. Moreover,

while the elasticity is small, it is larger than the work time-wage elasticity of +0.04 in this study which is larger than that of BH (at +0.004) and is comparable to other studies of labour supply.[14]

1.5.2. Dividing the sample into insomniacs and non-insomniacs

I now turn to an examination of whether the impacts of our explanatory variables on sleep time are different between insomniacs and non-insomniacs. Table 1.6 shows the results of the sleeping model of equation (3) for insomniacs and non-insomniacs separately, assuming that insomnia is exogenous. Interestingly, one can observe that socio-economic factors, especially education, have a significant impact only for non-insomniacs.[15] I also run the sleeping model of equation (4) for insomniacs and non-insomniacs separately to see the impact of wage on sleep time for these two groups. Columns 2 and 3 of table 1.7 suggest that an increase in the wage rate does not have an impact on insomniacs; [16] however, a ten percent increase in the wage rate significantly decreases the sleep time by 18.95 minutes per week for non-insomniacs.

Non insomniac men decrease their sleep time by 20.31 minutes per week for a ten percent increase in the wage rate. Insomniac men do not change their sleep time for an increase in the wage rate. Non insomniac women decrease their sleep time by 16.31 minutes per week for a ten percent increase in the wage rate. Insomniac women do not change their sleep time for an increase in the wage rate.

A Heckman approach is used to account for the fact that people might not be randomly distributed into insomniac and non-insomniac groups and that the models may suffer from

[14] Based on 22 US studies, men's elasticity of labour supply is between -0.29 and 0.21 (with a median at -0.09) and based on 44 22 US studies, women's elasticity of labour supply is between -0.89 and 15.24 (with a median at 0.77) [Jacobson, 2007 p. 122].

[15] Age, health condition and presence of young children have also an impact only on sleep time of non-insomniacs.

[16] Table A1.11 also presents the results where wage is assumed to be exogenous. This table confirms the results that the link between wage and sleep time is broken for insomniacs. However, OLS results are biased. According to BH, we are more productive and our wage rate is higher when we sleep more. Since, wage is endogenous in the sleep model and it is positively correlated with the error term, the results of OLS models underestimate the impact of wage on sleep time.

selection bias.[17] It is assumed that people are distributed between the insomniacs' and non-insomniacs' groups based on some socio-economic or health characteristics. Table 1.2 shows that there are some differences between the insomniacs' and non-insomniacs' characteristics. First, the insomnia model of equation (5) is estimated and the results are shown in table 1.8.[18] Insomnia is a function of health and socio-economic factors such as work time, wage, marital status, age, gender, education, health situation, having young children, religion, other income, shift work, and stress. Work time has a small negative impact on insomnia. The probability of having insomnia is five percent less for married (common-laws) individuals relative to others. Marriage seems to decrease insomnia, as found elsewhere in the literature. Men have less insomnia than women and educated people suffer less from sleep problems similar to Xiang et al. (2008) and Tjepkema (2005).

Gu et al. (2010), Xiang et al. (2008) and Tjepkema (2005) report that unhealthy people have more insomnia, which is consistent with the results of my study that suggests that being healthy decreases the probability of having insomnia by 16 percent. Women with young children have less insomnia, and any type of religion decreases the probability of insomnia. Since I do not have a variable to control for race, religion could capture some part of the impact of race. Importantly, having some type of non-regular shift work increases the probability of having insomnia by 26 percent and having stress in one's life can increase the probability of having insomnia by almost 50 percent. Tjepkema (2005) also reports a negative impact of shift work and stress on sleep time in Canada. According to him, people who do shift work increase the risk of developing insomnia by 1.3 times compared to people who do not work on shifts; in addition,

[17] The Heckman approach is applied only on the sleeping model including the wage rate and other income because the focus of this study is on this equation.
[18] The sample size changed a little because there is some missing information about work time, education, stress and shift work for some observations.

people who have stress face a 1.4 to 2.3 times higher risk of developing insomnia than people who do not have stress in their lives.

Once the selection equation is estimated, the inverse Mills ratio is calculated and is included in all regressions of the second sleeping model to consider for the possibility of selection bias. The inverse Mills ratio is only significant for non-insomniac women's regression. Columns four and five of table 1.7 include the results of the Heckman models for insomniacs and non-insomniacs (the full regressions' results are provided in table A1.9). The results suggest that a ten percent increase in the wage rate significantly decreases women's sleep time by 20.73 minutes per week which is significant at the one percent level. The inverse Mills ratios are not significant in other regressions, suggesting that there is no selection bias in those other models. There is no relationship between wage and sleep time for insomniacs while a ten percent increase in the wage rate decreases sleep time by almost twenty minutes per week for non-insomniacs. In fact, the link between wage and sleep time appears to be broken for insomniacs and they do not want to, or cannot, sacrifice their sleep time for having more money in their pockets.[19]

1.5.3. Replication of BH model with the GSS 2010

The GSS 2010 became available at the end of this study and I used it to estimate again BH's model. Interestingly, the impact of wage on sleep time is not significant for women using this 2010 data set, and this impact is significant only at the ten percent level for men. Table 1.9 shows the results of regressions for GSS 2010. The impact of the wage rate on sleep time is also smaller in magnitude compared to the results from the GSS 2005. One possibility is that people react less to an increase in the opportunity cost of time, the wage rate, during economic downturns (as was the case in 2010) compared to during growth periods (as was the case in 2005

[19] Insomniacs may also use sleeping pills to help them to sleep and hence this too may explain why the link between wages and sleep time is broken.

and the case of BH in 1975-1976). This explanation is consistent with the findings of Brochu et al. (2012) which suggest that people sleep less during growth periods than during recessionary ones.

1.6. Conclusions

This paper uses the Canadian GSS 2005 to investigate the effect of economic factors on sleep time. The results are similar to BH's in signs and in magnitudes. Like in the US, sleep time in Canada is found to be endogenous, and, as a consequence, estimates of the elasticity of supply need to take account of this additional impact coming from the wage rate. According to BH (1990 p.941): "[labour supply elasticities] can no longer be viewed as the negative of elasticities of demand for leisure." Using the results of this study, it is found that the sleep-wage elasticity, leisure time-wage elasticity, and labour supply elasticity (work time-wage) are -0.05, +0.01 and +0.04, respectively, clearly indicating the extent to which that viewing the supply elasticity as the inverse of the leisure-time elasticity would understate the responsiveness of the labour supply to changes in the wage rate.

The paper also finds that the link between wage and sleep time, as found in BH, is broken for insomniacs. A ten percent increase in the wage rate decreases sleep time by almost twenty minutes per week for non-insomniacs while a comparable increase in the wage rate has no impact on the sleep time for insomniacs. Insomniacs do not want to, or cannot, trade-off sleep time for more money. This distortion in the labour market could be added to other costs of insomnia such as work absenteeism and low productivity.

Further work could fruitfully be undertaken to check the impact of other health problems on the relationship between the opportunity cost of time, the wage rate, and sleep time. Empirical work could be improved by more and better data. For instance, our understanding of insomnia

may be improved by including a variety of factors known to affect insomnia, including depression levels, chronic diseases, the use of sleep medications and activity limitations. Unfortunately, this information is not available in time use surveys.

In spite of its limitations, however, this study is the first to compare the impact of wage on sleep time among insomniacs and non-insomniacs and reveals that insomnia breaks the link between wage and sleep time. In chapter 2, I intend to explore further this link by comparing the impact of wage on sleep time among those who have chronic diseases or bad work conditions and those who do not with the use of non-time-use survey data.

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Table 1.1. Summary Statistics: Mean and standard deviations of variables - GSS 2005

	All (n=6,915)	Men (n=3,360)	Women (n=3,555)
Sleeping minutes per week	3,277.55 (757.03)	3,248.62 (767.91)	3,312.40 (742.35)
Age	41.79 (10.52)	41.95 (10.60)	41.59 (10.41)
Some secondary/elementary/no Schooling	0.09	0.10	0.07
Diploma or certificate from community college & Some university or community college	0.45	0.43	0.47
Doctorate/masters/bachelor's degree	0.29	0.29	0.29
Minutes worked per week	2,526.99 (833.61)	2,739.36 (813.71)	2,271.15 (784.10)
Having children less than 5	0.05	0.06	0.04
Insomnia	0.29	0.24	0.34
Excellent, very good, or good health	0.89	0.90	0.87

These numbers are weighted.

Table 1.2. Summary Statistics: Mean and standard deviations of variables for insomniacs and non-insomniacs - GSS 2005

	All (n=2,086) insomniacs	Men (n=852) insomniacs	Women (n=1,234) insomniacs	All (n=4,824) non insomniacs	Men (n=2,506) non insomniacs	Women (n=2,318) non insomniacs
Sleeping minutes per week	3,258.33 (783.29)	3,247.69 (751.26)	3,267.25 (809.39)	3,285.06 (743.20)	3,249.22 (773.46)	3,335.30 (695.65)
Age	41.60 (10.58)	41.15 (10.71)	41.97 (10.46)	41.86 (10.49)	42.20 (10.56)	41.37 (10.38)
Some secondary/elementary/no Schooling	0.09	0.09	0.09	0.08	0.10	0.06
Diploma or certificate from community college & Some university or community college	0.50	0.49	0.51	0.43	0.42	0.45
Doctorate/masters/bachelor's degree	0.24	0.22	0.25	0.31	0.31	0.32
Minutes worked per week	2,488.00 (895.24)	2,746.48 (834.64)	2,271.45 (887.15)	2,543.13 (806.79)	2,737.31 (807.26)	2,270.88 (723.30)
Having children less than 5	0.04	0.06	0.02	0.06	0.06	0.06
Excellent, very good, or good health	0.81	0.82	0.80	0.92	0.92	0.92
Binary variable for “not very stressful”	0.13	0.13	0.12	0.24	0.25	0.22
Binary variable for “a bit stressful”	0.41	0.41	0.41	0.46	0.45	0.49
Binary variable for “quite a bit stressful”	0.35	0.34	0.36	0.18	0.17	0.19
Binary variable for “extremely stressful”	0.06	0.05	0.06	0.02	0.02	0.02

These numbers are weighted.

Table 1.3. Results from the replication of BH for Canada (Equation 1)

	BH -USA Time use survey 1975			Current study (2011)-Canada Time use survey-2005		
Dependent variable: Sleep time per week	All	Men	Women	All	Men	Women
Work time per week	-0.199***	-0.219***	-0.169***	-0.10***	-0.10***	-0.10***
	(0.02)	(0.03)	(0.03)	(0.01)	(0.02)	(0.02)
Married/common law	16.04	-43.15	92.5	22.55	22.15	26.99
	(57.27)	(82.71)	(82.2)	(25.81)	(38.61)	(35.18)
Years of married	-2.59	2.43	-7.62**	---	---	---
	(2.31)	(3.13)	(3.49)			
Age	1.86	24.52	-24.81	-25.05***	-22.42*	-28.08**
	(12.8)	(16.2)	(21.17)	(8.90)	(11.79)	(13.41)
Age square	0.02	-0.26	0.35	0.25**	0.21	0.29*
	(0. 15)	(0.19)	(0.25)	(0.10)	(0.13)	(0.15)
Male	99.42*	---	---	-22.59	---	---
	(39.07)			(23.12)		
Years of schooling	-14.3*	-18.28*	-9.09			
	(6.71)	(8.55)	(10.83)	---	---	---
Some secondary/elementary/no Schooling (reference: high school degree)	---	---	---	15.75 (51.71)	56.18 (69.03)	-45.40 (76.58)
Diploma or certificate from community college & Some university or community college	---	---	---	-83.42** (37.34)	-102.61** (50.91)	-58.78 (55.02)
Doctorate/masters/bachelor's degree	---	---	---	-97.21**	-97.47*	-92.09
				(39.78)	(53.56)	(59.31)
Excellent, very good, or good health	-94.16	-123.79	-59.66	-30.59	-112.76**	50.80
	(59.16)	(80.75)	(89.05)	(34.44)	(52.08)	(43.93)
Children less than 3 (5 for this study)	-35.42	39.03	-153.00	-97.50**	-136.56***	-40.87
	(56.44)	(67.72)	(102.60)	(40.20)	(50.53)	(66.85)
Protestant	86.15**	90.87*	93.97*			
	(37.45)	(47.99)	(60.04)			
Roman Catholic (reference: no religion)				-86.74***	-133.76***	-23.55
	---	---	---	(32.68)	(43.37)	(50.01)
United Church and Protestant				-79.06**	-82.97*	-62.58
				(33.04)	(43.37)	(51.16)
Other religion	---	---	---	-88.98	-112.18	-53.91
				(55.15)	(79.80)	(71.51)
Black	-69.17	-110.45	-43.95			
	(80.62)	(114.41)	(115.63)			
Constant	---	---	---	4,274.30***	4,309.78***	4,202.93***
				(207.30)	(264.64)	(327.25)
Observations				6,915	3,360	3,555
R-squared	0.141	0.176	0.108	0.02	0.03	0.02

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Table 1.4. Results from the replication of Biddle and Hamermesh's models-Wage and income effect – endogenous wage - GSS 2005

	BH		This study	
Dependent variable	wage	other income	wage	other income
	All respondents		All respondents	
Sleep time per week	-141.44*	-1.78	-190.94***	10.33
	(77.35)	(4.80)	(50.04)	(6.74)
Observations	-	-	4,596	4,596
Waking non market time per week	132.18	-1.71	-75.40	32.77***
	(129.37)	(8.09)	(87.80)	(12.09)
Observations	-	-	4,596	4,596
	Men		Men	
Sleep time per week	-181.68	-2.88	-199.01***	6.32
	(120.88)	(5.77)	(63.75)	(8.34)
Observations	-	-	2,159	2,159
Waking non market time per week	233.34	-6.69	22.78	44.79***
	(193.67)	(9.30)	(120.45)	(16.22)
Observations	-	-	2,159	2,159
	Women		Women	
Sleep time per week	-64.30	1.55	-185.99**	11.13
	(93.44)	(8.43)	(77.10)	(12.41)
Observations	-	-	2,437	2,437
Waking non market time per week	-262.42	14.44	-105.33	1.83
	(166.99)	(14.80)	(117.07)	(18.20)
Observations	-	-	2,437	2,437

Full regression results can be found in the tables A1.3 and A1.4 in Appendix.
Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1
Instruments for wage in my models: education, union status, and industry dummy variables (NAICS codes). Also controlled for marital status, age, gender, health conditions, presence of children, religion, provinces, CMA, other income (non-labour income) and months of interview.

Table 1.5. Results from the replication of Biddle and Hamermesh's models-Wage and income effect on sleep time using new instrument variables for wage - GSS 2005

Dependent variable: Sleep time per week	All	Men	Women
Ln (wage)	-175.68***	-208.31***	-156.56*
	(56.93)	(69.14)	(88.97)
Married/common law	3.61	7.31	14.21
	(34.61)	(50.68)	(55.30)
Age	-11.93	-8.05	-18.60
	(11.19)	(15.64)	(15.80)
Age square	0.12	0.06	0.22
	(0.13)	(0.18)	(0.18)
Male	-4.47	---	---
	(28.54)		
Excellent, very good, or good health	11.74	-83.39	102.45*
	(42.06)	(58.54)	(57.41)
Children less than 3 (5 for this study)	-117.05**	-221.57***	42.17
	(47.55)	(61.68)	(73.13)
Roman Catholic	-39.93	-24.45	-61.68
	(42.13)	(53.25)	(69.87)
United Church and Protestant	-28.53	19.98	-75.40
	(41.44)	(50.74)	(68.33)
Other religion	-15.08	-61.07	42.49
	(77.80)	(115.49)	(97.37)
Ln (other income)	11.90*	7.37	13.07
	(6.69)	(8.25)	(12.32)
CMA	-53.13	-63.52	-27.65
	(33.20)	(46.75)	(45.42)
Province fixed effect	Yes	Yes	Yes
Months of interview fixed effect	Yes	Yes	Yes
Constant	4,015.55***	4,067.09***	4,059.17***
	(260.21)	(328.70)	(401.31)
Observations	4,596	2,159	2,437
R-squared	0.01	0.04	0.01
Weak identification test			
First stage robust- F statistic	37.26***	22.80***	17.86***
Overidentifying restrictions test			
Wooldridge's robust score test	36.34*	40.84**	34.04
Tests of endogeneity			
Robust score chi2	7.77***	3.91**	5.05**
Robust regression F	4.81**	3.07*	2.46

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1
Instruments for wage in my models: education, union status, and industry dummy variables (NAICS codes).

Table 1.6. Impact of economic factors on sleep time of insomniacs and non-insomniacs - GSS 2005

Dependent variable: Sleep time per week	All insomniacs	Men insomniacs	Women insomniacs	All non insomniacs	Men non insomniacs	Women non insomniacs
Work time per week	-0.11***	-0.10***	-0.11***	-0.10***	-0.10***	-0.08***
	(0.02)	(0.04)	(0.03)	(0.02)	(0.03)	(0.02)
Married/common law	62.65	87.65	45.78	1.87	-0.24	10.71
	(46.37)	(73.08)	(61.07)	(30.59)	(44.97)	(40.70)
Age	-29.08	-23.58	-35.73	-21.05**	-21.70	-20.82
	(17.69)	(24.08)	(25.79)	(9.74)	(13.38)	(13.97)
Age square	0.28	0.22	0.36	0.21*	0.21	0.21
	(0.20)	(0.27)	(0.29)	(0.11)	(0.15)	(0.16)
Male	17.00	---	---	-41.03	---	---
	(46.35)			(26.62)		
Some secondary/elementary/no schooling	40.48	70.51	4.63	9.82	51.59	-69.44
	(94.69)	(118.89)	(144.94)	(62.89)	(83.85)	(92.01)
Diploma or certificate from community college & Some university or community college	-2.73	-29.83	28.55	-112.16***	-122.89**	-91.71*
	(78.25)	(93.12)	(128.57)	(41.76)	(61.30)	(52.26)
Doctorate/masters/bachelor's degree	13.53	-47.19	86.48	-133.79***	-117.13*	-159.97***
	(83.23)	(98.09)	(137.62)	(44.28)	(64.32)	(55.15)
Excellent, very good, or good health	20.87	-93.80	89.97	-98.47**	-150.13**	-20.30
	(52.29)	(83.34)	(67.36)	(48.14)	(69.48)	(61.93)
Children less than 3 (5 for this study)	-59.04	21.37	-181.79	-123.09***	-192.48***	-2.66
	(81.15)	(101.81)	(129.81)	(45.71)	(57.02)	(76.71)
Roman Catholic	-139.71**	-247.89***	-42.52	-46.01	-60.30	-39.32
	(68.48)	(89.63)	(107.47)	(38.81)	(53.31)	(54.78)
United Church and Protestant	-89.89	-71.20	-84.40	-53.45	-68.80	-24.11
	(62.66)	(75.19)	(100.65)	(39.68)	(55.16)	(54.97)
Other religion	-100.30	-71.26	-123.26	-91.96	-118.40	-47.60
	(102.72)	(147.97)	(145.08)	(66.38)	(96.65)	(79.35)
Constant	4,366.76***	4,261.64***	4,478.44***	4,213.92***	4,199.83***	4,131.96***
	4,366.76***	4,261.64***	4,478.44***	4,213.92***	4,199.83***	4,131.96***
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Months of interview fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,086	852	1,234	4,824	2,506	2,318
R-squared	0.04	0.06	0.07	0.03	0.04	0.03

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Table 1.7. Wage effect for insomniacs and non-insomniacs (endogenous wage) GSS 2005

Dependent variable:	All sample	Insomniacs	Non insomniacs	Insomniacs	Non insomniacs
	2SLS	2SLS	2SLS	Heckman (2SLS)	Heckman (2SLS)
			All respondents		
Sleep time per week	-175.68***	-82.53	-189.52***	-110.26	-200.24***
	(56.93)	(113.02)	(58.94)	(117.13)	(60.30)
Observations	4,596	1,442	3,149	1,439	3,143
Waking non market time per week	63.74	178.23	19.99	199.61	34.01
	(96.06)	(169.16)	(114.77)	(174.92)	(118.50)
Observations	4,596	1,442	3,149	1,439	3,143
			Men		
Sleep time per week	-208.31***	-137.48	-203.16**	-120.24	-187.93**
	(69.14)	(130.18)	(81.87)	(130.25)	(82.54)
Observations	2,159	574	1,583	573	1,577
Waking non market time per week	131.57	51.37	157.47	52.25	156.64
	(132.33)	(238.62)	(149.44)	(236.88)	(152.25)
Observations	2,159	574	1,583	573	1,577
			Women		
Sleep time per week	-156.56*	-7.58	-163.18**	-95.09	-207.31***
	(88.97)	(178.36)	(77.99)	(197.68)	(77.27)
Observations	2,437	868	1,566	866	1,566
Waking non market time per week	61.77	202.23	-31.22	269.74	13.09
	(127.10)	(230.78)	(150.25)	(247.86)	(154.73)
Observations	2,437	868	1,566	866	1,566

Full regression results are presented in tables A1.5, A1.6, A1.7, A1.8, A1.9 and A1.10 in Appendix.
Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1
Instruments for wage in my models: education, union status, and industry dummy variables (NAICS codes).
Also controlled for marital status, age, gender, health conditions, presence of children, religion, provinces, CMA, other income (non-labour income) and months of interview.

Table 1.8. Impact of economic factors on insomnia (marginal effects) (first stage regression)- GSS 2005

Dependent variable: Insomnia (a binary variable)	All	Men	Women
Work time	-0.00***	-0.00**	-0.00**
	(0.00)	(0.00)	(0.00)
Ln (wage)	-0.01	0.02	-0.03*
	(0.01)	(0.02)	(0.02)
Married/common law	-0.05***	-0.06**	-0.04
	(0.02)	(0.02)	(0.03)
Age	-0.00	-0.00	-0.00
	(0.01)	(0.01)	(0.01)
Age square	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)
Male	-0.09***	---	---
	(0.02)		
Some secondary/elementary/no	-0.01	-0.03	0.09
Schooling (reference: high school degree)	(0.03)	(0.03)	(0.06)
Diploma or certificate from community	-0.00	-0.00	0.02
college & Some university or community college	(0.02)	(0.03)	(0.04)
Doctorate/masters/bachelor's degree	-0.08***	-0.10***	-0.04
	(0.02)	(0.03)	(0.04)
Excellent, very good, or good health	-0.16***	-0.14***	-0.18***
	(0.03)	(0.04)	(0.04)
Children less than 3 (5 for this study)	-0.06*	0.01	-0.15***
	(0.03)	(0.04)	(0.04)
Roman Catholic	-0.04**	-0.07***	0.01
	(0.02)	(0.03)	(0.04)
United Church and Protestant	-0.04*	-0.08***	0.03
	(0.02)	(0.03)	(0.03)
Other religion	-0.06*	-0.08**	-0.01
	(0.03)	(0.04)	(0.06)
Ln (other income)	0.00	-0.00	0.00
	(0.00)	(0.00)	(0.01)
A regular evening shift			
Reference: a regular daytime schedule or shift	0.04	0.08	0.01
	(0.05)	(0.07)	(0.06)
A regular night shift	0.14**	0.13*	0.15
	(0.06)	(0.07)	(0.10)
A rotating shift	0.15***	0.20***	0.06
	(0.03)	(0.04)	(0.04)
A split shift	-0.06	-0.10	-0.01
	(0.07)	(0.07)	(0.11)
A compressed work week	-0.00	0.02	0.02
	(0.09)	(0.11)	(0.14)
On call or casual	0.16**	0.26***	0.07
	(0.07)	(0.10)	(0.10)
An irregular schedule	0.11***	0.13***	0.09*
	(0.03)	(0.04)	(0.05)
Other type of shift	0.08	0.07	0.20
	(0.09)	(0.10)	(0.14)
Not very stressful			
Reference: not at all stressful	0.04	0.02	0.11

	(0.04)	(0.05)	(0.07)
A bit stressful	0.17***	0.15***	0.24***
	(0.04)	(0.04)	(0.06)
A quite a bit stressful	0.37***	0.35***	0.44***
	(0.04)	(0.05)	(0.06)
Extremely stressful	0.44***	0.40***	0.51***
	(0.05)	(0.08)	(0.06)
Province fixed effect	Yes	Yes	Yes
Month of interview fixed effect	Yes	Yes	Yes
Observations	5,524	2,744	2,780
R-squared	0.10	0.10	0.10

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Table 1.9. Results from the replication of Biddle and Hamermesh's models-Wage and income effect on sleep time using new instrument variables for wage- GSS 2010

Dependent variable: Sleep time per week	All	Men	Women
Ln (wage)	-114.70*	-170.09*	-51.80
	(64.40)	(100.61)	(82.28)
Married/common law	42.89	68.31	7.19
	(46.67)	(68.90)	(61.56)
Age	-22.34*	-8.91	-34.03*
	(13.06)	(19.20)	(17.62)
Age square	0.22	0.08	0.35*
	(0.15)	(0.21)	(0.20)
Male	-129.37***	---	---
	(34.73)		
Excellent, very good, or good health	-10.21	-37.13	8.27
	(49.70)	(73.30)	(66.36)
Children less than 3 (5 for this study)	-47.85	-123.01*	43.34
	(49.58)	(73.22)	(64.91)
Roman Catholic	3.03	15.34	-28.61
	(45.80)	(64.58)	(65.37)
United Church and Protestant	-14.20	4.82	-46.37
	(45.75)	(68.64)	(61.67)
Other religion	33.64	51.64	9.71
	(69.84)	(98.78)	(94.48)
Ln (other income)	-0.79	-3.93	4.70
	(9.68)	(14.08)	(11.87)
CMA	-21.89	3.85	-52.67
	(39.55)	(60.47)	(48.96)
Province fixed effect	Yes	Yes	Yes
Months of interview fixed effect	Yes	Yes	Yes
Constant	4,240.03***	4,073.62***	4,256.39***
	(311.71)	(503.47)	(376.59)
Observations	3,319	1,500	1,819
R-squared	0.03	0.02	0.04
Weak identification test			
First stage robust- F statistic	19.05***	7.74***	14.28***
Overidentifying restrictions test			
Wooldridge's robust score test	59.78***	39.38**	52.29***
Tests of endogeneity			
Robust score chi2	2.71*	2.84*	0.18
Robust regression F	1.82	1.87	0.12

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1
Instruments for wage in my models: education, union status, and industry dummy variables (NAICS codes).

Appendix 1

Table A1.1. Summary of studies on the impact of various factors on different measures of sleep problem

			Measures of sleep problem (see definitions at the bottom of the table)							
Covariates and Studies		**Country**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
Work time	Ribet and Derriennic (1999)	France						+		
	Sekine et al. (2006)	Japan	+							
Income	Gu et al. (2010)	China								-
	Jean-Louis et al. (2001)	USA				-NS				
	Tjepkema (2005)	Canada								-
Education	Gu et al. (2010)	China								+ NS
	Xiang et al. (2008)	China							-	
	Yen et al. (2008)	Taiwan		-						
	Jean-Louis et al. (2001)	USA				+ NS				
	Doi et al. (2003)	Japan	+ NS							
	Tjepkema (2005)	Canada								-
Age	Gu et al. (2010)	China								-
	Paine et al. (2004)	New Zealand					+			+
	Xiang et al. (2008)	China							+	
	Yen et al. (2008)	Taiwan		+						
	Ribet and Derriennic (1999)	France						+		
	Ohayon and Zulley (2001)	Germany			+					
	Jean-Louis et al. (2001)	USA				+ NS				
	Doi et al. (2003)	Japan	+							
	Tjepkema (2005)	Canada								+
Marital status (Married/ common law vs unmarried)	Gu et al. (2010)	China								+ NS
	Xiang et al. (2008)	China							+	
	Sekine et al. (2006)	Japan	-							
	Jean-Louis et al. (2001)	USA				+ NS				
	Doi et al. (2003)	Japan	-							
Gender (Men	Gu et al. (2010)	China								-

vs Women)	Xiang et al. (2008)	China							-	
	Yen et al. (2008)	Taiwan		+						
	Ribet and Derriennic (1999)	France						-		
	Ohayon and Zulley (2001)	Germany			-					
	Sekine et al. (2006)	Japan	+							
	Jean-Louis et al. (2001)	USA				- **NS**				
	Doi et al. (2003)	Japan	+							
Poor health	Gu et al. (2010)	China								+
	Xiang et al. (2008)	China							+	
Chronic diseases	Gu et al. (2010)	China								+
	Ohayon and Zulley (2001)	Germany			+					
	Jean-Louis et al. (2001)	USA				+				
	Doi et al. (2003)	Japan	+							
	Tjepkema (2005)	Canada								+
Drinking Alcohol	Gu et al. (2010)	China								-
	Jean-Louis et al. (2001)	USA				+ **NS**				
	Doi et al. (2003)	Japan	+**NS**							
	Tjepkema (2005)	Canada								+
Smoking	Gu et al. (2010)	China								+
	Jean-Louis et al. (2001)	USA				+ **NS**				
	Doi et al. (2003)	Japan	+							
Stress or anxiety	Gu et al. (2010)	China								+
	Ohayon and Zulley (2001)	Germany			+					
	Jean-Louis et al. (2001)	USA				+				
	Doi et al. (2003)	Japan	+							
	Tjepkema (2005)	Canada								+
Depression	Yen et al. (2008)	Taiwan	+							
	Ohayon and Zulley (2001)	Germany			+					
Unemploy-ment	Paine et al. (2004)	New Zealand					+			+
	Xiang et al. (2008)	China							+	
	Ohayon and Zulley (2001)	Germany			+					

Night work	Paine et al. (2004)	New Zealand					+			+
Socioeconomic deprivation	Paine et al. (2004)	New Zealand					+			+
Shift work	Ribet and Derriennic (1999)	France						+		
	Sekine et al. (2006)	Japan	+							
	Ohayon and Zulley (2001)	Germany			+ NS					
	Tjepkema (2005)	Canada								+
Body Mass Index	Ohayon and Zulley (2001)	Germany			+					
	Jennings et al. (2007)	USA	+							
	Jean-Louis et al. (2001)	USA				- NS				
	Tjepkema (2005)	Canada								+
Exercise	Doi et al. (2003)	Japan	-							
	Tjepkema (2005)	Canada								-

Definitions of symbols:
"+" is positive significant.
"- " is negative significant.
"+ NS" is positive insignificant.
"- NS" is negative insignificant.

Measures of sleep problem (see Table A1.2 below for full definitions): M1 is Pittsburgh sleep quality index (PSQI); M2 is 8-item Athens insomnia scale (AIS-8); M3 is global dissatisfaction with sleep (GSD); M4 is severity index of sleep disturbance; M5 is combination of some sleep problem related questions; M6 is Sleep disorder (using five question); M7 is difficulties initiating sleep (DIS), difficulties maintaining sleep (DMS), and early morning awakening (EMA); M8 is a question about having trouble going to sleep or staying asleep.

Table A1.2. Variable definitions

		Current study	BH
Dependent variables			
Sleep time per week	S^i	Night sleep/essential sleep + naps/lying down per week (in minutes)	Time spent sleeping and napping (resting) per week (in minutes)
Waking non market time per day		1440 minutes (24 hours) minus sleep and naps minutes and work minutes at the main job or the second job on the day of interview	1440 minutes (24 hours) minus sleep and naps minutes and work minutes at the main job or the second job on the day of interview
Waking non market time per week		Waking non market time per day times 7	Waking non market time per day times 7
Independent variables			
Work time per week	WT^i	Self-reported time usually worked at all jobs in a week (in minutes)	Self-reported time usually worked at all jobs in a week (in minutes)
Married/common law		= 1 if married or common law, = 0 if widowed, separated, divorced, and single	= 1 if married, otherwise= 0
Years married		Not available in GSS 2005	Number of years of marriage
Age		Age	Age
Age square		Square of age	Square of age
Male		Male= 1, female= 0	Male= 1, female= 0
Education	EDU^i		Years of schooling
High school degree		= 1 if the highest education level is high school degree, otherwise= 0. (The reference group).	
Some secondary/elementary/no schooling		= 1 if the highest education level is some secondary/elementary/no schooling, otherwise= 0.	
Diploma or certificate from community college & some university or community college		= 1 if the highest education level is diploma or certificate from community college & some university or community college, otherwise= 0.	
Doctorate/masters/bachelor's degree		= 1 if the highest education level is doctorate/masters/bachelor's degree, otherwise= 0.	
Excellent, very good, or Good health	H^i	= 1 if health situation is excellent, very good, or good, = 0 if health situation is fair or poor.	

Children less than 3 (5 for this study)		= 1 if some children less than 5 years old are in the family, otherwise= 0.	= 1 if some children less than 3 years old are in the family, otherwise= 0.
Religion			
Protestant			= 1 if religion is protestant, otherwise= 0.
No religion		= 1 if the individual does not have any religion, otherwise= 0. (The reference group).	
Roman Catholic		= 1 if religion is protestant, otherwise= 0.	
United Church and Protestant		= 1 if religion is united church or protestant, otherwise= 0.	
Other religion		= 1 if religion is other religion, otherwise= 0.	
Black		Not available in GSS 2005	= 1 if race is black, otherwise= 0.
Log(wage)		Natural log of annual personal income divided by 51.6 (12 times 4.3) the number of hours usually worked at all jobs in a week to get the hourly wage	Natural log of monthly earning divided by 4.3 times the number of hours usually worked at all jobs in a week to get the hourly wage
Log(other income)	M^i	Natural log of household income excluding the individual personal income.	Natural log of the difference between the respondent's reported 1974 household income less a spouse's expected 1975 earnings and 12 times the respondent's monthly earnings.
Instrumental variables			
large SMSA		=1 if large CMA (metropolitan area), otherwise= 0.	=1 if large SMSA (metropolitan area), otherwise= 0.
Union status		=1 if the individual is a union member or covered by a union contract or collective agreement in the job, otherwise= 0.	=1 if the individual is a union member, otherwise= 0.
Region		Canada's provinces (see below)	The US's Regions
Occupation		Not available in GSS 2005	Occupation dummy variables

Industry dummy variables		North American Industrial Classification System of the respondent - Last 12 months	Industry dummy variables

New variables

Insomnia	I^i	= 1 if the individual has trouble going to sleep or staying asleep, = 0 if the individual does not have trouble going to sleep or staying asleep.
Spouse employed		= 1 if the individual is married and his/her spouse is employed, = 0 if the individual is not married or married but his/her spouse is not employed.
Spouse not employed		= 1 if the individual is married and his/her spouse is not employed, = 0 if the individual is not married or married but his/her spouse is employed.
Not married		= 1 if the individual is not married, = 0 if the individual is married.
Shift work		
A regular daytime schedule or shift		= 1 if the individual has a regular daytime schedule or shift, otherwise= 0. (The reference group).
A regular evening shift		= 1 if the individual has a regular evening shift, otherwise= 0
A regular night shift		= 1 if the individual has a regular night shift, otherwise= 0
A rotating shift		= 1 if the individual has a rotating shift, otherwise= 0
A split shift		= 1 if the individual has a split shift, otherwise= 0
A compressed work week compressed work week		= 1 if the individual has a split shift, otherwise= 0
On call or casual		= 1 if the individual is on call or casual, otherwise= 0
An irregular schedule		= 1 if the individual has an irregular schedule , otherwise= 0
Other type of shift		= 1 if the individual has other type of shift , otherwise= 0
Stress levels		

Not at all stressful	= 1 if the individual is not at all stressful, otherwise= 0. (The reference group)
Not very stressful	= 1 if the individual is not very stressful, otherwise= 0.
A bit stressful	= 1 if the individual is a bit stressful, otherwise= 0.
A quite a bit stressful	= 1 if the individual is a quit a bit stressful, otherwise= 0.
Extremely stressful	= 1 if the individual is extremely stressful, otherwise= 0.
Province	
British Columbia	British Columbia = 1, otherwise = 0. (The reference group)
Alberta	Alberta = 1, otherwise = 0
Saskatchewan	Saskatchewan = 1, otherwise = 0
Manitoba	Manitoba = 1, otherwise = 0
Ontario	Ontario = 1, otherwise = 0
Québec	Québec = 1, otherwise = 0
New Brunswick	New Brunswick = 1, otherwise = 0
Nova Scotia	Nova Scotia = 1, otherwise = 0
Prince Edward Island	Prince Edward Island = 1, otherwise = 0
Newfoundland and Labrador	Newfoundland and Labrador = 1, otherwise = 0
Month of interview	12 dummy variables for the months of January to December
Day of interview	5 dummy variables for Monday, Tuesday, Wednesday, Thursday and Friday.
Sleep deviation	Difference between the first night sleep duration from the second night sleep duration.
Menopause	= 1 if a woman is between 45 to 60 years old, otherwise= 0.

Work time in groups	
Work time less than 20 Hours per week	= 1 if work time is less than 20 Hours per week, otherwise= 0. (The reference group)
Work time between 20 to 30 hours per week	= 1 if work time is between 20 to 30 hours per week, otherwise= 0.
Work time between 30 to 40 hours per week	= 1 if work time is between 30 to 40 hours per week, otherwise= 0.
Work time between 40 to 50 hours per week	= 1 if work time is between 40 to 50 hours per week, otherwise= 0.
Work time more than 50 hours per week	= 1 if work time is more than 50 hours per week, otherwise= 0.
Sleep problem measures	
Pittsburgh Sleep Quality Index (PSQI)	The Pittsburgh Sleep Quality Index (PSQI) includes sleep duration, sleep disturbances, sleep latency, daytime dysfunction, sleep efficiency, sleep quality and medication use. (Zisberg et al., 2010 p. 510).
Jenkins Scale	The Jenkins Scale includes 4 questions on "having trouble falling asleep," "waking up several times per night," "having trouble staying asleep," "waking up after the usual amount of sleep feeling tired and worn out" (Virtanen et al., 2009 p. 738).
8-item Athens Insomnia Scale (AIS-8)	AIS-8 includes difficulty with sleep induction, awakening during the night, early morning awakening, total sleep time, and overall quality of sleep. (Yen et al., 2008 p. 1516).
Sleep Quality Index (SQI)	The Sleep Quality Index (SQI) includes difficulty falling asleep, waking up during the night, waking up too early in the morning, disturbed night sleep, and insomnia. (Chung and Cheung, 2008 p. 186).
Global dissatisfaction with sleep (GSD)	Global dissatisfaction with sleep (GSD) includes questions about sleep satisfaction (Ohayon et al., 2001 p. 781).

Sleep disorder (SD)	Sleep disorder (SD) includes taking tablets to help sleep, awaking for most of the night, sleeping badly at night, taking a long time to get to sleep, waking up early hours of the morning (Ribet and Derriennic, 1999 p. 493).
Difficulties initiating sleep (DIS), difficulties maintaining sleep (DMS), and early morning awakening (EMA)	They include the 3 basic forms of sleep disturbances lasting 2 weeks or longer in the past 12 months (Xiang et al., 2008 p. 1656).
Insomnia symptoms	Insomnia symptoms include difficulty falling asleep, waking too early in the morning, and waking refreshed. (Paine et al., 2004 p. 1164).
Severity index of sleep disturbance	"Five questions comprise the sleep disorder subscale: "Do you depend on medicine to sleep?"; "Do you have difficulty falling asleep?"; "Do you wake up often during the night?"; "Do you wake up early or wake feeling tired?"; and "Do you sleep during the day for more than two hours?"…. the dependent variable was a severity index of sleep disturbance based on combined scores for the five sleep questions" (Jean-Louis et al., 2001 p. 928).

Table A1.3. Results from the replication of Biddle and Hamermesh's models-Wage and income effect on sleep time-wage endogenous

Dependent variable: Sleep time per week	All	Men	Women
Ln (wage)	-190.94***	-199.01***	-185.99**
	(50.04)	(63.75)	(77.10)
Married/common law	10.42	4.02	27.57
	(34.81)	(50.70)	(55.81)
Age	-11.37	-7.21	-15.08
	(11.32)	(15.68)	(16.15)
Age square	0.12	0.05	0.19
	(0.13)	(0.18)	(0.19)
Male	-2.21	---	---
	(28.49)		
Excellent, very good, or good health	9.22	-86.82	105.84*
	(41.51)	(58.08)	(56.61)
Children less than 3 (5 for this study)	-115.45**	-216.51***	32.86
	(47.67)	(61.43)	(73.07)
Roman Catholic	-44.59	-49.85	-37.68
	(39.97)	(49.49)	(67.11)
United Church and Protestant	-44.68	8.08	-93.43
	(40.74)	(49.63)	(68.46)
Other religion	-16.14	-50.60	38.82
	(77.29)	(114.90)	(94.12)
Ln (other income)	10.33	6.32	11.13
	(6.74)	(8.34)	(12.41)
Constant	4,059.80***	4,140.79***	3,976.12***
	(255.22)	(312.18)	(411.19)
Observations	4,596	2,159	2,437
R-squared	0.00	0.02	.
Weak identification test			
First stage robust- F statistic	40.98***	28.35***	16.93***
Overidentifying restrictions test			
Wooldridge's robust score test	58.03**	56.11**	60.75***
Tests of endogeneity			
Robust score chi2	11.38***	4.30**	8.34***
Robust regression F	7.66***	3.50*	4.67**

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1
Instruments for wage in my models: education, union status, and industry dummy variables (NAICS codes).

Table A1.4. Results from the replication of Biddle and Hamermesh's models-Wage and income effect on waking non-market time

Dependent variable: Waking non market time	All	Men	Women
Ln (wage)	-75.40	22.78	-105.33
	(87.80)	(120.45)	(117.07)
Married/common law	-94.86	-358.44***	183.90**
	(62.74)	(90.35)	(89.33)
Age	-16.39	-7.62	-27.19
	(20.60)	(29.74)	(27.20)
Age square	0.32	0.23	0.44
	(0.24)	(0.35)	(0.32)
Male	-320.87***	---	---
	(56.06)		
Excellent, very good, or good health	48.01	61.46	48.67
	(81.16)	(125.45)	(101.20)
Children less than 3 (5 for this study)	257.91**	103.13	558.38***
	(114.85)	(152.57)	(165.46)
Roman Catholic	46.46	191.84*	-120.94
	(74.25)	(101.49)	(105.82)
United Church and Protestant	9.35	114.75	-103.70
	(78.78)	(108.40)	(113.28)
Other religion	42.43	130.90	-24.07
	(113.84)	(146.71)	(184.20)
Ln (other income)	32.77***	44.79***	1.83
	(12.09)	(16.22)	(18.20)
Constant	4,260.54***	3,464.87***	4,658.68***
	(435.22)	(622.52)	(594.74)
Observations	4,596	2,159	2,437
R-squared	0.02	0.02	0.01
Weak identification test			
First stage robust- F statistic	40.98***	28.35***	16.93***
Overidentifying restrictions test			
Wooldridge's robust score test	193.73***	103.31***	149.98***
Tests of endogeneity			
Robust score chi2	6.20**	3.40*	2.07
Robust regression F	4.62**	2.56	1.47

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1
Instruments for wage in my models: education, union status, and industry dummy variables (NAICS codes).

Table A1.5. Impact of wage on sleep time (endogenous wage)

Dependent variable: Sleep time per week	All	Men	Women
Ln (wage)	-175.68***	-208.31***	-156.56*
	(56.93)	(69.14)	(88.97)
Married/common law	3.61	7.31	14.21
	(34.61)	(50.68)	(55.30)
Age	-11.93	-8.05	-18.60
	(11.19)	(15.64)	(15.80)
Age square	0.12	0.06	0.22
	(0.13)	(0.18)	(0.18)
Male	-4.47	---	---
	(28.54)		
Excellent, very good, or good health	11.74	-83.39	102.45*
	(42.06)	(58.54)	(57.41)
Children less than 3 (5 for this study)	-117.05**	-221.57***	42.17
	(47.55)	(61.68)	(73.13)
Roman Catholic	-39.93	-24.45	-61.68
	(42.13)	(53.25)	(69.87)
United Church and Protestant	-28.53	19.98	-75.40
	(41.44)	(50.74)	(68.33)
Other religion	-15.08	-61.07	42.49
	(77.80)	(115.49)	(97.37)
Ln (other income)	11.90*	7.37	13.07
	(6.69)	(8.25)	(12.32)
CMA	-53.13	-63.52	-27.65
	(33.20)	(46.75)	(45.42)
Province fixed effect	Yes	Yes	Yes
Months of interview fixed effect	Yes	Yes	Yes
Constant	4,015.55***	4,067.09***	4,059.17***
	(260.21)	(328.70)	(401.31)
Observations	4,596	2,159	2,437
R-squared	0.01	0.04	0.01
Weak identification test			
First stage robust- F statistic	37.26***	22.80***	17.86***
Overidentifying restrictions test			
Wooldridge's robust score test	36.34*	40.84*	34.04
Tests of endogeneity			
Robust score chi2	7.77***	3.91**	5.05**
Robust regression F	4.81**	3.07*	2.46

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1
Instruments for wage in my models: education, union status, and industry dummy variables (NAICS codes).

Table A1.6. Impact of wage on waking non-market time (endogenous wage)

Dependent variable: Waking non market time	All	Men	Women
Ln (wage)	63.74	131.57	61.77
	(96.06)	(132.33)	(127.10)
Married/common law	-130.05**	-396.62***	148.49*
	(62.13)	(89.58)	(86.43)
Age	-22.17	-8.52	-36.26
	(20.53)	(29.58)	(26.68)
Age square	0.37	0.23	0.53*
	(0.24)	(0.35)	(0.31)
Male	-355.59***	---	---
	(56.64)		
Excellent, very good, or good health	26.71	64.61	-27.26
	(80.30)	(123.75)	(100.03)
Children less than 3 (5 for this study)	244.70**	109.59	559.68***
	(115.42)	(151.58)	(169.30)
Roman Catholic	13.01	172.68	-176.81*
	(78.41)	(109.82)	(105.90)
United Church and Protestant	-4.75	97.96	-132.03
	(78.00)	(108.14)	(109.91)
Other religion	67.74	161.22	-2.73
	(112.36)	(146.04)	(178.89)
Ln (other income)	37.08***	48.41***	7.86
	(11.98)	(15.95)	(17.91)
CMA	-90.82	8.69	-205.19**
	(74.42)	(106.12)	(97.40)
Province fixed effect	Yes	Yes	Yes
Months of interview fixed effect	Yes	Yes	Yes
Constant	4,267.52***	3,559.58***	4,558.61***
	(452.70)	(663.29)	(595.64)
Observations	4,596	2,159	2,437
R-squared	0.04	0.04	0.05
Weak identification test			
First stage robust- F statistic	37.26***	22.80***	17.86***
Overidentifying restrictions test			
Wooldridge's robust score test	167.00***	89.53***	116.25***
Tests of endogeneity			
Robust score chi2	0.61	0.79	0.00
Robust regression F	0.43	0.58	0.00

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1
Instruments for wage in my models: education, union status, and industry dummy variables (NAICS codes).

Table A1.7. Impact of wage on insomniacs and non-insomniacs' sleep time (endogenous wage)

Dependent variable: Sleep time per week	All insomniacs	Men insomniacs	Women insomniacs	All non insomniacs	Men non insomniacs	Women non insomniacs
Ln (wage)	-82.53	-137.48	-7.58	-189.52***	-203.16**	-163.18**
	(113.02)	(130.18)	(178.36)	(58.94)	(81.87)	(77.99)
Married/common law	-13.97	37.61	-20.39	3.89	-28.44	37.68
	(64.54)	(88.99)	(107.42)	(41.53)	(60.50)	(58.27)
Age	-16.44	-14.03	-23.65	-7.42	-2.12	-16.55
	(21.74)	(31.91)	(28.67)	(12.47)	(17.21)	(17.11)
Age square	0.15	0.10	0.25	0.07	0.00	0.20
	(0.25)	(0.36)	(0.33)	(0.14)	(0.20)	(0.20)
Male	19.08	---	---	-35.64	---	---
	(57.99)			(31.48)		
Excellent, very good, or good health	28.69	-96.76	127.49	-32.08	-85.80	20.81
	(69.20)	(99.99)	(92.46)	(51.95)	(72.89)	(64.87)
Children less than 3 (5 for this study)	-137.61*	-176.79	-94.16	-124.74**	-233.15***	59.95
	(83.55)	(130.52)	(128.00)	(56.22)	(72.15)	(85.99)
Roman Catholic	-200.72**	-298.97***	-110.40	33.77	69.82	-28.82
	(87.65)	(106.78)	(148.30)	(44.51)	(58.95)	(66.16)
United Church and Protestant	-111.39	-80.38	-116.24	16.66	65.27	-43.73
	(82.62)	(89.48)	(139.69)	(45.34)	(60.12)	(66.72)
Other religion	-138.81	-156.58	-40.30	19.18	-21.34	64.06
	(112.35)	(165.16)	(169.40)	(96.41)	(143.59)	(102.59)
Ln (other income)	24.28*	32.79*	12.77	6.25	-1.86	13.75
	(13.21)	(17.03)	(23.38)	(7.54)	(9.27)	(12.26)
CMA	-28.35	-71.60	25.60	-68.77*	-64.32	-62.13
	(58.13)	(83.89)	(78.14)	(39.66)	(56.07)	(51.00)
Constant	3,932.71***	4,035.89***	3,853.14***	3,996.26***	3,951.84***	4,062.69***
	(541.34)	(652.48)	(828.23)	(253.71)	(366.27)	(336.76)
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Months of interview fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,442	574	868	3,149	1,583	1,566
R-squared	0.04	0.08	0.06	0.03	0.05	0.03
Weak identification test						
First stage robust- F statistic	17.09***	9.00***	12.62***	20.86***	13.81***	10.88***
Overidentifying restrictions test						
Wooldridge's robust score test	33.21	32.77	37.93**	26.31	26.38	30.99
Tests of endogeneity						
Robust score chi2	1.94	1.56	0.23	4.08**	1.61	2.38
Robust regression F	1.12	1.34	0.10	3.01*	1.26	1.74

Robust standard errors are in the parentheses. *** p-value<0.01, ** p-value<0.05, * p-value<0.1
Instruments for wage in my models: education, union status, and industry dummy variables (NAICS codes).

Table A1.8. Impact of wage on insomniacs and non-insomniacs' waking non-market time (endogenous wage)

Dependent variable: Waking non market time	All insomniacs	Men insomniacs	Women insomniacs	All non insomniacs	Men non insomniacs	Women non insomniacs
Ln (wage)	178.23	51.37	202.23	19.99	157.47	-31.22
	(169.16)	(238.62)	(230.78)	(114.77)	(149.44)	(150.25)
Married/common law	-30.04	-439.32***	272.31*	-160.45**	-373.10***	123.16
	(109.31)	(163.05)	(149.71)	(76.24)	(105.94)	(108.30)
Age	-36.92	-19.50	-38.32	-20.81	-14.95	-34.36
	(37.84)	(55.65)	(50.92)	(24.29)	(34.75)	(30.12)
Age square	0.56	0.53	0.46	0.35	0.26	0.57
	(0.44)	(0.65)	(0.59)	(0.28)	(0.41)	(0.36)
Male	-473.89***	---	---	-293.25***	---	---
	(103.70)			(65.44)		
Excellent, very good, or good health	-112.60	-92.22	-114.75	153.18	118.10	171.85
	(115.34)	(183.75)	(142.19)	(112.34)	(163.82)	(138.26)
Children less than 3 (5 for this study)	227.12	251.77	254.08	256.27*	27.74	659.90***
	(207.53)	(300.50)	(244.08)	(134.28)	(172.86)	(203.28)
Roman Catholic	-8.72	257.79	-222.58	21.26	157.75	-151.05
	(143.43)	(206.97)	(191.97)	(92.37)	(126.61)	(125.06)
United Church and Protestant	-1.25	58.00	-30.20	-20.88	124.89	-219.04*
	(142.53)	(202.02)	(195.23)	(92.40)	(127.40)	(129.91)
Other religion	95.63	128.71	35.98	62.80	189.26	-18.22
	(226.74)	(275.62)	(359.23)	(130.53)	(171.07)	(203.60)
Ln (other income)	9.18	27.74	-5.18	48.57***	55.21***	11.79
	(22.30)	(31.18)	(32.16)	(14.14)	(18.55)	(21.31)
CMA	-183.18	67.67	-352.71**	-57.55	-5.63	-114.84
	(138.50)	(200.43)	(178.54)	(87.96)	(123.42)	(114.34)
Constant	4,313.05***	3,442.15***	4,518.86***	4,229.53***	3,716.34***	4,472.34***
	(823.85)	(1,188.92)	(1,096.22)	(529.26)	(765.84)	(683.97)
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Months of interview fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,442	574	868	3,149	1,583	1,566
R-squared	0.07	0.10	0.06	0.04	0.04	0.06
Weak identification test						
First stage robust- F statistic	17.09***	9.00***	12.62***	20.86***	13.81***	10.88***
Overidentifying restrictions test						
Wooldridge's robust score test	82.39***	45.24**	76.65***	116.35***	77.63***	82.17***
Tests of endogeneity						
Robust score chi2	0.11	2.87*	0.12	0.71	0.05	0.24
Robust regression F	0.07	2.23	0.07	0.52	0.03	0.17

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1
Instruments for wage in my models: education, union status, and industry dummy variables (NAICS codes).

Table A1.9. Heckman models for insomniacs and non-insomniacs' sleep time (endogenous wage)

Dependent variable: Sleep time per week	All insomniacs	Men insomniacs	Women insomniacs	All non insomniacs	Men non insomniacs	Women non insomniacs
Ln (wage)	-110.26	-120.24	-95.09	-200.24***	-187.93**	-207.31***
	(117.13)	(130.25)	(197.68)	(60.30)	(82.54)	(77.27)
Married/common law	-29.62	34.42	-57.67	0.59	-22.41	18.63
	(66.66)	(90.85)	(113.06)	(41.73)	(60.68)	(58.50)
Age	-13.30	-14.79	-16.23	-6.20	-2.37	-13.91
	(21.75)	(31.93)	(28.17)	(12.63)	(17.33)	(16.94)
Age square	0.11	0.10	0.17	0.06	0.01	0.18
	(0.25)	(0.36)	(0.32)	(0.15)	(0.20)	(0.20)
Male	-1.70	---	---	-46.55	---	---
	(59.84)			(33.43)		
Excellent, very good, or good health	-7.17	-92.87	20.75	-55.46	-54.48	-119.87
	(71.50)	(99.20)	(94.74)	(57.90)	(78.44)	(73.70)
Children less than 3 (5 for this study)	-153.82*	-173.51	-191.85	-132.20**	-228.69***	-23.00
	(85.89)	(130.72)	(141.92)	(56.28)	(71.87)	(86.45)
Roman Catholic	-210.12**	-298.88***	-112.36	29.05	82.42	-15.25
	(88.70)	(109.28)	(144.92)	(45.13)	(61.30)	(65.50)
United Church and Protestant	-120.34	-82.17	-112.51	15.23	75.98	-21.52
	(82.98)	(92.59)	(135.68)	(45.62)	(61.93)	(66.94)
Other religion	-151.04	-157.81	-52.58	8.16	-6.57	74.60
	(113.12)	(164.95)	(164.39)	(97.39)	(146.56)	(103.11)
Ln (other income)	24.91*	33.06*	15.69	6.07	-1.41	14.25
	(13.20)	(16.96)	(23.04)	(7.54)	(9.32)	(12.18)
CMA	-28.20	-75.57	23.63	-67.80*	-63.19	-71.71
	(57.76)	(84.05)	(77.12)	(39.72)	(56.05)	(51.24)
Inverse Mills Ratio (insomniacs)	120.91	-4.42	320.37*	---	---	---
	(97.93)	(113.44)	(167.38)			
Inverse Mills Ratio (non insomniacs)	---	---	---	81.61	-135.76	417.71***
				(86.56)	(115.36)	(108.46)
Constant	3,866.74***	4,018.85***	3,644.95***	4,072.66***	3,810.50***	4,443.86***
	(536.26)	(653.36)	(777.72)	(262.44)	(382.46)	(332.89)
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Months of interview fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,439	573	866	3,143	1,577	1,566
R-squared	0.03	0.09	0.06	0.03	0.05	0.04
Weak identification test						
First stage robust- F statistic	16.98***	9.23***	9.73***	20.95***	13.71***	10.40***
Overidentifying restrictions test						
Wooldridge's robust score	31.40	34.37	35.50*	27.44	26.98	32.81
Tests of endogeneity						
Robust score chi2	2.71*	1.13	1.20	4.47**	1.06	3.97**
Robust regression F	1.57	0.99	0.48	3.33*	0.82	3.04*

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1
Instruments for wage in my models: education, union status, and industry dummy variables (NAICS codes).

Table A1.10. Heckman models for insomniacs and non-insomniacs' waking non-market time (endogenous wage)

Dependent variable: Waking non market time	All insomniacs	Men insomniacs	Women insomniacs	All non insomniacs	Men non insomniacs	Women non insomniacs
Ln (wage)	199.61	52.25	269.74	34.01	156.64	13.09
	(174.92)	(236.88)	(247.86)	(118.50)	(152.25)	(154.73)
Married/common law	-23.78	-418.75**	291.38*	-158.14**	-374.53***	138.25
	(112.76)	(165.00)	(156.42)	(76.50)	(106.18)	(108.77)
Age	-38.15	-19.83	-42.04	-24.92	-19.63	-36.94
	(38.04)	(55.60)	(51.23)	(24.24)	(34.65)	(30.23)
Age square	0.58	0.55	0.50	0.40	0.32	0.59*
	(0.44)	(0.65)	(0.59)	(0.28)	(0.41)	(0.36)
Male	-472.02***	---	---	-280.62***	---	---
	(106.36)			(68.67)		
Excellent, very good, or good health	-89.77	-36.06	-59.02	178.59	124.67	289.65*
	(128.96)	(192.98)	(169.45)	(123.76)	(175.21)	(155.80)
Children less than 3 (5 for this study)	235.66	248.69	307.30	265.77**	31.10	730.56***
	(209.19)	(298.79)	(253.68)	(134.37)	(172.83)	(205.21)
Roman Catholic	0.67	274.43	-213.49	26.50	161.80	-162.33
	(143.68)	(204.03)	(191.26)	(92.82)	(128.76)	(124.98)
United Church and Protestant	-4.80	75.57	-42.96	-17.25	129.40	-237.61*
	(142.60)	(200.79)	(196.59)	(92.48)	(127.62)	(129.44)
Other religion	96.97	146.43	35.15	75.24	197.62	-26.27
	(227.83)	(275.22)	(358.70)	(131.01)	(172.47)	(200.35)
Ln (other income)	10.16	28.18	-5.11	49.27***	55.90***	11.46
	(22.37)	(31.18)	(32.43)	(14.14)	(18.62)	(21.27)
CMA	-181.62	73.12	-344.11*	-60.38	-8.83	-108.19
	(138.24)	(200.07)	(177.65)	(88.04)	(123.58)	(114.28)
Inverse Mills Ratio (insomniacs)	-57.89	-158.71	-160.77	---	---	---
	(179.51)	(215.75)	(258.36)			
Inverse Mills Ratio (non-insomniacs)	---	---	---	-91.23	-22.46	-354.54
				(174.44)	(241.05)	(232.96)
Constant	4,303.77***	3,520.28***	4,530.98***	4,188.50***	3,779.92***	4,141.18***
	(827.70)	(1,191.41)	(1,098.45)	(574.71)	(825.23)	(727.53)
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Months of interview fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,439	573	866	3,143	1,577	1,566
R-squared	0.07	0.10	0.06	0.04	0.04	0.06
Weak identification test						
First stage robust- F statistic	15.98***	9.23***	9.73***	20.95***	13.71***	10.40***
Overidentifying restrictions test						
Wooldridge's robust score	81.88***	45.49**	75.87***	114.24***	76.12***	81.88***
Tests of endogeneity						
Robust score chi2	0.04	2.93*	0.42	0.44	0.03	0.05
Robust regression F	0.02	2.29	0.24	0.33	0.02	0.04

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1
Instruments for wage in my models: education, union status, and industry dummy variables (NAICS codes).

Table A1.11. Wage effect for insomniacs and non-insomniacs (wage exogenous)

Dependent variable:	All sample	insomniacs	Non insomniacs	insomniacs	Non insomniacs
	OLS	OLS	OLS	Heckman	Heckman
			All respondents		
Sleep time per week	-29.96	46.01	-54.65**	40.87	-59.59**
	(20.97)	(39.30)	(25.55)	(39.58)	(25.27)
Observations	5,545	1,700	3,840	1,696	3,828
Waking non market time per week	127.40***	129.60*	175.11***	142.09*	175.50***
	(38.10)	(74.64)	(46.23)	(75.13)	(46.71)
Observations	5,545	1,700	3,840	1,696	3,828
			Men		
Sleep time per week	-37.92	72.49	-68.71	72.47	-70.12
	(34.93)	(53.78)	(43.07)	(54.26)	(43.16)
Observations	2,758	714	2,042	712	2,032
Waking non market time per week	224.08***	312.24***	246.99***	313.92***	240.29***
	(54.52)	(98.77)	(65.45)	(99.97)	(65.68)
Observations	2,758	714	2,042	712	2,032
			Women		
Sleep time per week	-23.45	39.90	-43.60*	20.49	-56.47**
	(24.97)	(54.33)	(25.65)	(55.87)	(24.89)
Observations	2,787	986	1,798	984	1,796
Waking non market time per week	51.15	21.73	115.13*	51.13	127.21*
	(53.34)	(98.48)	(65.50)	(99.68)	(65.46)
Observations	2,787	986	1,798	984	1,796

Full regression results are presented in Appendix, table A1.12, A1.13, A1.14, A1.15, A1.16 and A1.17.
Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1
Also controlled for marital status, age, gender, health conditions, presence of children, religion, provinces, CMA, other income (non-labour income) and months of interview.

Table A1.12. Impact of wage on sleep time (exogenous wage)

Dependent variable: Sleep time per week	All	Men	Women
Ln (wage)	-29.96	-37.92	-23.45
	(20.97)	(34.93)	(24.97)
Married/common law	4.54	-16.83	33.96
	(31.56)	(43.45)	(52.28)
Age	-23.87**	-20.89	-26.77*
	(10.18)	(13.30)	(15.23)
Age square	0.25**	0.21	0.30*
	(0.12)	(0.15)	(0.17)
Male	-45.17*	---	---
	(24.97)		
Excellent, very good, or good health	-11.94	-104.93*	87.98*
	(39.22)	(58.23)	(48.91)
Children less than 3 (5 for this study)	-91.86**	-143.76**	-7.78
	(45.15)	(56.86)	(75.05)
Roman Catholic	-64.36*	-85.61*	-35.31
	(35.76)	(46.34)	(57.54)
United Church and Protestant	-50.17	-17.92	-80.30
	(36.46)	(46.32)	(59.61)
Other religion	-15.74	-42.75	36.99
	(64.83)	(93.94)	(80.33)
Ln (other income)	9.67	6.62	10.27
	(6.06)	(7.55)	(10.95)
Constant	3,916.01***	3,971.38***	3,806.68***
	(223.40)	(288.20)	(340.44)
Observations	5,545	2,758	2,787
R-squared	0.01	0.01	0.01

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Table A1.13. Impact of wage on waking non-market time (exogenous wage)

Dependent variable: Waking non market time	All	Men	Women
Ln (wage)	127.40***	224.08***	51.15
	(38.10)	(54.52)	(53.34)
Married/common law	-143.58**	-412.12***	175.07**
	(57.76)	(81.02)	(84.74)
Age	-42.85**	-50.30*	-30.78
	(18.64)	(26.27)	(25.45)
Age square	0.63***	0.73**	0.50*
	(0.22)	(0.31)	(0.30)
Male	-482.42***	---	---
	(48.93)		
Excellent, very good, or good health	5.19	46.95	-17.79
	(75.23)	(111.52)	(98.29)
Children less than 3 (5 for this study)	232.18**	51.85	630.83***
	(103.10)	(131.69)	(156.64)
Roman Catholic	44.27	146.90	-95.82
	(67.32)	(90.69)	(98.83)
United Church and Protestant	16.50	77.31	-56.87
	(71.28)	(96.15)	(104.80)
Other religion	-17.25	22.53	-12.95
	(104.53)	(139.04)	(165.13)
Ln (other income)	42.04***	52.29***	8.62
	(10.84)	(14.25)	(16.97)
Constant	4,297.52***	3,716.65***	4,306.49***
	(392.27)	(549.94)	(538.13)
Observations	5,545	2,758	2,787
R-squared	0.04	0.03	0.02

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Table A1.14. Impact of wage on insomniacs and non-insomniacs' sleep time (exogenous wage)

Dependent variable: Sleep time per week	All insomniacs	Men insomniacs	Women insomniacs	All non insomniacs	Men non insomniacs	Women non insomniacs
Ln (wage)	46.01	72.49	39.90	-54.65**	-68.71	-43.60*
	(39.30)	(53.78)	(54.33)	(25.55)	(43.07)	(25.65)
Married/common law	-22.24	-50.79	9.70	5.54	-14.09	25.25
	(59.00)	(79.68)	(92.59)	(36.06)	(50.47)	(53.46)
Age	-25.55	-27.14	-27.11	-19.97*	-15.80	-26.28*
	(19.78)	(26.60)	(27.97)	(10.80)	(14.76)	(15.15)
Age square	0.26	0.26	0.28	0.21*	0.16	0.30*
	(0.22)	(0.30)	(0.32)	(0.13)	(0.17)	(0.18)
Male	-14.67	---	---	-67.57**	---	---
	(48.11)			(27.92)		
Excellent, very good, or good health	36.43	-99.26	134.23*	-73.56	-129.34	3.92
	(58.17)	(89.33)	(76.95)	(54.75)	(79.47)	(61.41)
Children less than 3 (5 for this study)	-62.77	60.90	-212.46	-131.02**	-235.39***	47.69
	(90.92)	(119.14)	(135.41)	(51.28)	(63.70)	(86.26)
Roman Catholic	-172.15**	-275.18***	-113.16	-5.47	6.00	-43.11
	(76.65)	(96.77)	(124.21)	(41.63)	(56.41)	(60.49)
United Church and Protestant	-100.07	-74.16	-130.57	5.30	28.08	-22.41
	(71.45)	(81.83)	(118.57)	(42.38)	(57.61)	(61.68)
Other religion	-63.62	-74.56	-36.15	1.64	-25.95	43.06
	(98.54)	(142.37)	(145.98)	(79.50)	(113.66)	(89.29)
Ln (other income)	23.81**	33.38**	12.13	6.09	-1.52	15.37
	(11.76)	(14.64)	(20.16)	(6.75)	(8.51)	(10.75)
CMA	-28.11	-116.82	45.51	-76.57**	-65.06	-89.18*
	(49.81)	(74.55)	(68.27)	(34.84)	(47.79)	(48.25)
Constant	3,760.38***	3,814.18***	3,758.55***	3,944.21***	3,801.75***	4,075.77***
	(474.93)	(604.58)	(677.39)	(239.96)	(342.81)	(311.00)
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Months of interview fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,700	714	986	3,840	2,042	1,798
R-squared	0.04	0.07	0.06	0.03	0.04	0.03

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Table A1.15. Impact of wage on insomniacs and non-insomniacs' waking non-market time (exogenous wage)

Dependent variable: Waking non market time	All insomniacs	Men insomniacs	Women insomniacs	All non insomniacs	Men non insomniacs	Women non insomniacs
Ln (wage)	129.60*	312.24***	21.73	175.11***	246.99***	115.13*
	(74.64)	(98.77)	(98.48)	(46.23)	(65.45)	(65.50)
Married/common law	-60.42	-464.52***	212.28	-201.72***	-414.95***	142.88
	(102.26)	(146.76)	(147.22)	(69.40)	(95.55)	(99.80)
Age	-38.30	-35.33	-17.77	-49.04**	-57.86*	-37.51
	(34.27)	(50.88)	(47.01)	(21.83)	(30.34)	(29.28)
Age square	0.59	0.65	0.28	0.69***	0.78**	0.61*
	(0.40)	(0.59)	(0.55)	(0.26)	(0.35)	(0.35)
Male	-584.10***	---	---	-435.81***	---	---
	(89.15)			(57.13)		
Excellent, very good, or good health	-98.44	-173.53	-25.59	107.63	179.26	18.52
	(109.12)	(172.12)	(140.98)	(106.98)	(149.64)	(143.73)
Children less than 3 (5 for this study)	191.97	33.91	641.48**	262.44**	69.43	683.26***
	(195.04)	(249.27)	(261.03)	(119.01)	(150.20)	(188.53)
Roman Catholic	-0.53	253.01	-264.89	-10.76	74.30	-146.99
	(133.38)	(191.48)	(187.11)	(84.78)	(113.46)	(119.92)
United Church and Protestant	20.43	102.76	-65.18	-19.89	68.19	-158.45
	(131.47)	(181.65)	(188.36)	(84.36)	(113.08)	(122.93)
Other religion	16.89	14.25	-47.15	5.08	41.51	47.17
	(197.40)	(265.04)	(309.45)	(122.20)	(161.65)	(189.12)
Ln (other income)	17.73	22.16	16.22	57.01***	68.24***	10.95
	(20.69)	(28.49)	(32.00)	(12.49)	(16.18)	(19.32)
CMA	-233.66*	-19.31	-430.25**	-63.43	33.87	-163.38
	(122.48)	(168.87)	(170.72)	(78.57)	(107.27)	(112.24)
Constant	4,425.72***	3,183.56***	4,421.21***	4,566.54***	4,318.67***	4,309.71***
	(766.81)	(1,124.98)	(1,055.47)	(491.46)	(683.88)	(652.72)
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Months of interview fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,700	714	986	3,840	2,042	1,798
R-squared	0.07	0.11	0.05	0.05	0.05	0.05

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Table A1.16. Heckman models for insomniacs and non-insomniacs' sleep time (exogenous wage)

Dependent variable: Sleep time per week	All insomniacs	Men insomniacs	Women insomniacs	All non insomniacs	Men non insomniacs	Women non insomniacs
Ln (wage)	40.87	72.47	20.49	-59.59**	-70.12	-56.47**
	(39.58)	(54.26)	(55.87)	(25.27)	(43.16)	(24.89)
Married/common law	-35.28	-54.38	-13.41	-3.87	-15.58	7.29
	(59.91)	(81.45)	(94.17)	(36.45)	(51.30)	(53.45)
Age	-24.16	-26.91	-25.57	-18.79*	-14.90	-25.38*
	(19.75)	(26.66)	(27.67)	(10.84)	(14.86)	(14.98)
Age square	0.24	0.26	0.27	0.20	0.15	0.30*
	(0.22)	(0.30)	(0.31)	(0.13)	(0.17)	(0.17)
Male	-38.17	---	---	-89.49***	---	---
	(50.83)			(30.41)		
Excellent, very good, or good health	-0.45	-105.31	34.48	-118.77*	-133.37	-127.13*
	(63.02)	(90.88)	(87.07)	(62.56)	(87.40)	(70.95)
Children less than 3 (5 for this study)	-78.93	61.35	-298.25**	-143.13***	-235.93***	-22.08
	(92.99)	(119.54)	(145.73)	(51.62)	(63.74)	(89.06)
Roman Catholic	-179.41**	-278.45***	-110.89	-13.63	4.67	-32.98
	(77.37)	(99.32)	(122.89)	(42.25)	(58.90)	(59.83)
United Church and Protestant	-108.95	-79.88	-127.04	1.54	28.80	-4.01
	(71.75)	(85.42)	(117.00)	(42.74)	(59.72)	(61.67)
Other religion	-78.02	-78.12	-53.37	-12.08	-31.40	49.71
	(98.96)	(143.68)	(143.00)	(80.30)	(115.28)	(89.97)
Ln (other income)	23.94**	33.30**	13.16	6.09	-1.53	16.17
	(11.72)	(14.61)	(19.90)	(6.75)	(8.56)	(10.63)
CMA	-31.29	-119.60	42.68	-79.32**	-65.05	-104.42**
	(49.91)	(76.74)	(67.55)	(35.08)	(48.15)	(48.77)
Inverse Mills Ratio (insomniacs)	113.03	26.14	271.90**	---	---	---
	(81.86)	(98.18)	(127.97)			
Inverse Mills Ratio (non insomniacs)	---	---	---	152.29**	14.51	374.62***
				(77.38)	(103.94)	(98.66)
Constant	3,679.01***	3,798.78***	3,545.99***	4,074.96***	3,801.99***	4,390.97***
	(473.38)	(610.37)	(657.60)	(246.22)	(355.26)	(308.33)
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Months of interview fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,696	712	984	3,828	2,032	1,796
R-squared	0.04	0.07	0.07	0.03	0.04	0.05

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Table A1.17. Heckman models for insomniacs and non-insomniacs' waking non-market time (exogenous wage)

Dependent variable: Waking non market time	All insomniacs	Men insomniacs	Women insomniacs	All non insomniacs	Men non insomniacs	Women non insomniacs
Ln (wage)	142.09*	313.92***	51.13	175.50***	240.29***	127.21*
	(75.13)	(99.97)	(99.68)	(46.71)	(65.68)	(65.46)
Married/common law	-44.59	-447.93***	230.98	-189.92***	-416.97***	167.72*
	(104.64)	(148.34)	(151.14)	(70.27)	(96.70)	(101.08)
Age	-38.86	-35.78	-17.69	-51.96**	-60.28**	-39.38
	(34.26)	(51.00)	(46.65)	(21.85)	(30.45)	(29.30)
Age square	0.61	0.66	0.28	0.73***	0.81**	0.63*
	(0.40)	(0.59)	(0.55)	(0.26)	(0.35)	(0.35)
Male	-550.11***	---	---	-406.85***	---	---
	(94.91)			(62.08)		
Excellent, very good, or good health	-20.72	-114.60	106.46	160.69	174.63	174.41
	(125.04)	(181.33)	(171.59)	(119.00)	(162.32)	(164.59)
Children less than 3 (5 for this study)	221.85	37.85	755.35***	277.66**	70.32	768.08***
	(197.36)	(249.50)	(271.52)	(119.29)	(150.10)	(190.60)
Roman Catholic	13.18	270.03	-267.97	-0.71	74.97	-162.54
	(133.88)	(190.93)	(186.89)	(85.50)	(116.01)	(119.74)
United Church and Protestant	23.03	126.07	-87.25	-16.01	67.68	-188.33
	(131.72)	(183.36)	(190.01)	(84.75)	(114.52)	(122.47)
Other religion	35.80	35.08	-37.58	19.91	40.16	44.45
	(198.66)	(266.64)	(310.15)	(122.86)	(162.17)	(187.61)
Ln (other income)	19.62	23.58	17.86	57.82***	68.73***	11.19
	(20.72)	(28.58)	(32.05)	(12.52)	(16.25)	(19.36)
CMA	-225.58*	-9.21	-418.93**	-61.63	32.06	-146.07
	(122.31)	(170.10)	(169.71)	(78.93)	(107.91)	(112.74)
Inverse Mills Ratio (insomniacs)	-206.57	-164.56	-344.02	---	---	---
	(163.78)	(195.90)	(241.54)			
Inverse Mills Ratio (non insomniacs)	---	---	---	-175.15	26.49	-447.74**
				(158.74)	(214.03)	(216.65)
Constant	4,511.54***	3,272.65***	4,602.69***	4,449.86***	4,391.95***	3,952.80***
	(767.98)	(1,128.86)	(1,056.08)	(524.26)	(728.86)	(685.27)
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Months of interview fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,696	712	984	3,828	2,032	1,796
R-squared	0.08	0.11	0.05	0.05	0.05	0.06

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Chapter Two

Sleep Time and Wages:
The Role of Chronic Diseases and Work Environment

2.1. Introduction

Biddle and Hamermesh (1990) in their seminal paper explain that sleep time, like working time and leisure time, is affected by economic factors, especially the wage rate (the price of time). They find that a ten percent increase in the hourly wage rate decreases sleep time by 14 minutes per week (2 minutes per day) in the US. My first chapter similarly finds that a ten percent increase in the hourly wage rate decreases sleep time by 19 minutes per week (2.7 minutes per day) in Canada. Although the magnitude of the impact is not large, this empirical result of Biddle and Hamermesh (1990) is highlighted as having some importance in many other studies such as Juster and Stafford (1991), Yamada et al. (1999), Altman (2001), Gronau and Hamermesh (2008) and Mullahy and Robert (2010).

Everybody needs sleep to be productive. People cannot work, concentrate, study, think or play when they are very tired. Lack of sleep can lead to more accidents (Howard et al., 2004 and Krueger and Friedman, 2009) or learning and memory problems (Krueger and Friedman, 2009); mistakes are more likely, and individuals can put themselves and their families in danger (Howard et al., 2004 and Nixon et al., 2008). The lack of adequate sleep is also associated with

lower life expectancy: Kojima et al. (2000), Gottlieb et al. (2002) and Kripke et al. (2002) find that sleeping fewer than 6.5 hours or 7 hours per night increases mortality risk. So, for people who sleep fewer than 6.5 hours (example: insomniacs[20] in this chapter), any small amount of extra sleep is important. In addition, for some people who are really tired, even one more minute of sleep can be very valuable. One knows of people who take a five minute nap at their workplace because they cannot continue working when they are too tired.

My first chapter shows that the link between the wage rate and sleep time suggested by Biddle and Hamermesh (1990) may be severed for those with sleep disorders. This means that estimates of the elasticity of work (or leisure) time with respect to wages may be underestimated if based on the population as a whole, rather than focusing on those without sleep problems. To understand the phenomenon further, one could further ask whether it is insomnia, per se, that breaks this link, or whether this is but one of perhaps a class of factors that changes the way in which individuals respond to the wage rate. Using data from the Canadian Community Health Survey (CCHS), this paper examines this question by investigating the role played by chronic diseases and bad work environments on the link between the wage rate and sleep time, controlling for the presence of insomnia.

A variety of chronic conditions have been linked with sleep problems (see, for instance, Katz and McHorney (2002), Foley et al. (2004), John et al. (2005), Tjepkema (2005) and Moore et al. (2011)). I am interested in whether these chronic diseases also affect the link between the wage rate and sleep time irrespective of whether the individual is an insomniac, or whether their influence is solely through the presence of insomnia. The environment in which the individual works may also affect the link between wages and sleep time – and once again, I am interested in knowing whether this effect is in addition to the presence of insomnia or not.

[20] Insomniacs have trouble staying asleep or falling sleep; therefore, they sleep less than non-insomniacs.

One reason why this question is of interest returns to the issue highlighted by Biddle and Hamermesh, namely the responsiveness of sleep time to economic incentives. Controlling for both insomnia and other conditions that may affect sleep time will allow determining a more accurate measure of the elasticity of sleep with respect to wages. Moreover, if factors that can be adjusted through public and other interventions, like, for instance, the work environment, can be identified, then the productivity of individuals can be affected by influencing their work-leisure-sleep decisions.

Overall, I find that insomnia is not the only condition which severs the link between wages and sleep time. I find that non-insomniacs with certain chronic conditions such arthritis, fibromyalgia and back problems no longer respond to an increase in the wage rate by sleeping less. Similarly, there is no relationship between the wage rate and sleep time for non-insomniacs with certain bad work environments such as high strain jobs.

The rest of this paper is organized as follows. The second section reviews the economic literature on sleeping, insomnia, chronic diseases and bad work environment. The third section presents the methodology used in the paper. The fourth section provides information about the database that is used and the fifth section includes the results and the econometric analysis. Section six concludes the chapter.

2.2. Literature review

Insomnia, defined as having "difficulty initiating and/or maintaining sleep or a non-restorative sleep for at least one month",[21] obviously affects sleep time. Hurst (2008) and Brochu et al. (2012) confirm that people who have sleep problems sleep significantly less than those who

[21] Diagnostic and Statistical Manual of Mental Disorders (DSM) [http://web4health.info/en/answers/sleep-insomnia-what.htm]. "The *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*) is the standard classification of mental disorders used by mental health professionals in the United States." [http://www.psych.org/mainmenu/research/dsmiv.aspx].

do not. For example, Brochu et al. (2012) estimate that men and women who report having sleep problems sleep on average 1.3 and 2.3 fewer hours, respectively, in a week than those who do not report having such problems. My first chapter finds that insomnia can significantly change the way some economic variables, such as wages and education, affect sleep, concluding that a ten percent increase in the wage rate decreases sleep time by almost twenty minutes per week for non-insomniacs, while it has no impact on sleep time for insomniacs. Indeed, the link between wage and sleep time appears to be broken for insomniacs. Not having control of their sleeping hours, insomniacs cannot or do not want to adjust themselves to changes in the wages as non-insomniacs can.

Chronic diseases affect sleep. Katz and McHorney (2002), in a study of three cities in the United States, find that 50 percent of people with chronic medical or psychiatric conditions such as ulcers, congestive heart failure and depressive disorders, suffer from insomnia: more precisely, 16 percent have severe insomnia and 34 percent have mild insomnia. Likewise, Rocha et al. (2002) find that people aged 60 and over from the city of Bambui in Brazil who have chronic conditions are 1.83 times more likely to have insomnia than those without those conditions. Specifically, they look at the impact of coronary heart disease and diabetes and find that people who suffer from these two conditions are respectively 1.74 and 1.52 times more likely to have insomnia.

Fass et al. (2000) find that bowel disorders may be correlated with insomnia and Foley et al. (2004) suggest that chronic diseases such as heart diseases, arthritis, diabetes, stroke and lung diseases are associated with insomnia among older individuals in the United States. Gangwisch et al. (2008) find that diabetes, hypertension and cancer affect sleep time, while Moore et al. (2011) focus on the adverse sleeping effects from asthma and attention deficit hyperactivity

disorder (ADHD). In short, the literature finds that a wide array of chronic diseases can affect the amount of people's sleep.

Finally, work environment plays an important role in mental and physical health. Wilkins and Beaudet (1998) find that job strain, job insecurity, physical demands at work, low co-worker support and low supervisor support have negative impacts on health, causing work injuries, migraines and psychological distress. Moreover, according to Park (2007), a bad work environment affects job performance. He uses the CCHS 2002 and the National Population Health Survey (NPHS) 1996, 1998, 2000, 2002 and 2004, to demonstrate that "high-strain jobs" (jobs with low decision latitude and high psychological demands)[22] cause long-term health problems and reduced work activities. Jobs with more physical activities or without security also cause reduced work activities due to health problems. He finds that high-strain jobs and jobs with physical exertion are even causes of reduced work activities two years after the initial problem. Park (2007) also observes that high physical exertion at work causes absenteeism.

Knudsen et al. (2007) show that work overload, role conflict, repetitive tasks and job autonomy all affect sleep. They suggest that repetitive tasks have a strong negative impact on difficulty initiating sleep and maintaining sleep and people without job autonomy significantly have less restorative sleep. According to Nomura et al. (2009), people with high job strain are twice more likely to experience insomnia than those without high job strain, and having control on one's job decreases the prevalence of insomnia.

[22] The literature suggests that jobs can be categorized into four groups based on psychological demands and decision latitude characteristics of jobs: active jobs (jobs with high decision latitude and high psychological demands), high-strain jobs (jobs with low decision latitude and high psychological demands), passive jobs (jobs with low decision latitude and low psychological demands) and low strain jobs (jobs with high decision latitude and low psychological demands) (Karasek,1979 and Park, 2007).

So far, no study has looked at the impact of chronic diseases and work conditions on the link between economic factors and sleep. This paper considers the role of those conditions on the relationship between the wage rate and the sleep time of workers in Canada.

2.3. Methodology

Using the General Social Survey (GSS) 2005 data set, my first chapter suggests that the wage rate has a significant negative impact on sleep time per day for people who do not suffer from insomnia, but that this impact is not observed for insomniacs. While the GSS data set was a good one to use for replicating Biddle and Hamermesh (1990)'s study since sleep time is reported in minutes, it lacks some of the information necessary for this present analysis. The CCHS reports sleep time in hours, which is less precise than the GSS, but the CCHS is a better data set for the study of the impact of chronic diseases and work environment on sleep.[23] In addition, the question about sleep problem in the CCHS is answered in more detail. In the CCHS 2001, people answered if they had most of the time, sometimes or never trouble going to sleep or staying asleep. In the GSS 2005, people only answered if they had trouble going to sleep or staying asleep.

I begin by replicating as much as possible the work of the first chapter using the CCHS data. I separate the sample into insomniacs and non-insomniacs to see if I obtain similar results to those in my first chapter. Then I conduct the analysis including variables representing chronic diseases and work environment. Several methodological issues are present, which I address.

[23] The National Population Health Survey (NPHS) also includes the same variables as the CCHS. It is also a longitudinal survey which could help to tract individuals over time. However, the NPHS only follows 17,000 people over time. Béland et al. (2000) explain that NPHS does not have enough observations for studying "special populations such as seniors, visible minorities, single mothers, users of home care, shift workers, individuals with specific chronic conditions, etc." (Béland et al., 2000 p. 1). Béland et al. (2000) also recommend using the CCHS instead of the NPHS to study special populations such as people with special diseases.

2.3.1. Dividing the sample into insomniacs and non-insomniacs

In order to consider how insomnia could affect the impact of wage on sleep time, equation (1) below is estimated separately for the insomniac and non-insomniac portions of the population:

$$S^i_{\text{j}} = \beta_{j0} + \beta_{j1} \ln W^i_{\text{j}} + \beta_{j2} H^i_{\text{j}} + \beta_{j3} X^i_{\text{j}} + \beta_{j4} \ln M^i_{\text{j}} + \epsilon_{j2}{}^i \quad \text{j = insomniac or non-insomniac} \quad (1)$$

where S^i is sleeping hours per day by individual i, $\ln W^i$ is the logarithm of the wage rate per hour, H^i denotes a vector of health conditions, chronic diseases and stress levels, X^i is a vector of socio-economic characteristics such as age, marital status, gender, presence of children less than 5 years old, and race, immigration, weeks searching for a job,[24] self-employed, shift work and work environment conditions, and $\ln M^i$ is the logarithm of other income or non-labour income of individual i.[25] Finally, $\epsilon_j{}^i$ is the error term.

The insomnia variable is defined in exactly the same way as Tjepkema (2005), who uses the CCHS 2002 to study the prevalence of sleeping disorders among Canadians. Insomniacs are defined as people who have *most of the time* sleep problems. In this study, I use two categories of non-insomniacs: weak non-insomniacs and strong non-insomniacs. Weak non-insomniacs are people who have *sometimes* sleep problems and strong non-insomniacs are people who *never* have sleep problems. Equation (1) is first estimated for insomniacs and non-insomniacs (weak

[24] People worked at a job in the last twelve months in my sample and also, they did not look for job in the last (past) four weeks. Almost 4000 people in my sample looked for job at least for one week. My wage variable is defined as annual personal income divided by week worked yearly times the number of hours usually worked at all jobs in a week. Therefore, I consider the exact numbers of weeks people worked to create the wage variable and looking for a job for a few weeks does not create any bias in my wage calculation.

[25] Education and wage are highly correlated. If I have both of them in the model, there will be a collinearity problem. I have done the auxiliary regression and the R-squared of the auxiliary regression is greater than R-squared of the main model. Therefore, I remove education from my main model. Biddle and Hamermesh (1990) also remove education from sleep model including the wage rate.

and strong non-insomniacs together). Later, to get a sharper contrast, I estimate the same equation for only the strong non-insomniacs (excluding weak non-insomniacs).

Equation (1) is based on a theoretical model that Biddle and Hamermesh (1990) developed in order to see the impact of the wage rate and other income on sleep time to which I have added a few more control variables that are likely to affect sleep time.[26] In addition, wage is considered endogenous because, according to Biddle and Hamermesh (1990), sleeping more can have a positive impact on productivity, and hence on the wage rate. Because of this reverse causality, I use an instrumental variable procedure for the wage rate. Because union status and the North American Industry Classification System[27] (NAICS) codes used by Biddle and Hamermesh (1990) and in my first chapter are not available in the CCHS, other instruments must be found. I use the unionization rate in a person's province in 2001 and average employment income at the Census division level[28] in 2001 as instruments. [29]

I follow two steps to map the average employment income at the Census division level to the CCHS 2001. In the first step, I use the Postal Code Conversion File (PCCF)[30] to map the

[26] Similar to my first chapter, I use wage, age, gender, marital status, health, having children, other income, CMA, provinces as explanatory variables. Also, Stress level, immigration status, weeks looked for a job, self-employed, shift work, chronic diseases and work environment variables are added to Biddle and Hamermesh (1990) model in this study.

[27] The North American Industry Classification System (NAICS) is a standard way of classifying business establishments.

[28] The Census division (CD) refers to provincially legislated areas. They are smaller than a province and bigger than a Census subdivision. (Source: http://www12.statcan.ca/census-recensement/2006/ref/dict/geo008-eng.cfm)

[29] In my study, the unionization rate and average employment income are considered as exogenous variables because people cannot control them and they do not affect sleep time. These two variables are likely related to the wage rate, making them good potential instruments. The unionization rate and average employment income are not available directly in CCHS, but average employment income information is available in the 2001 census public data: "Profile for Canada, Provinces, Territories, Census Divisions, 2001 Census" 2001 Census Statistics Canada 95F0495XCB2001001 and unionization rate at the province level information in 2001 is available in HRSDC calculations based on Statistics Canada. Labour force survey estimates (LFS), employees by union coverage, North American Industry Classification System (NAICS), sex and age group, annual (CANSIM Table 282-0078). Ottawa: Statistics Canada, 2012.

[30] The Postal Code Conversion File (PCCF) is created by the Statistics Canada and it maps the six-character postal code and the 2001 Census geographic areas.

Census 2001 division codes to the postal codes in CCHS 2001.[31] [32] In the second step, I map the average employment income at the Census division from the Census 2001 public data to each matched division in the CCHS 2001.

My instruments are thus different from those of Biddle and Hamermesh (1990) and those of my first chapter. In my first chapter, I used NAICS (industry codes) and union status as instruments for the wage rate. In this chapter, I do not have access to the same variables. I use unionization rate in individual's province instead of the union status of the individuals. In addition, I use average employment income at the Census division level as the second instrument for the wage rate. Ahituv and Lerman (2011) likewise use average earning at the county level as an instrument for wage. Consequently, I decide to use average employment income at the Census division level as an instrument for the wage rate.

I estimate equation (1) for insomniacs and non-insomniacs separately. However, one concern in this study is the existence of a self-selection bias: insomniacs and non-insomniacs may not be randomly distributed. In fact, insomnia can be induced by socio-economic and health factors. Another concern is that I have a very large sample of non-insomniacs (over 30,000 observations), compared to insomniacs (about 4,000 observations), with the consequence that the coefficients in the non-insomniacs model could become statistically significant (not necessarily economically significant) just because of the size of the sample.

In order to control for selection bias[33] and to have similar sample sizes for the insomniacs and non-insomniacs, a propensity score matching approach[34] is also employed to estimate

[31] The Census geographical variables in the CCHS 2001 are from the Census 1996. That is the reason that I use the PCCF to have the Census 2001 geographical areas for the CCHS 2001.
[32] Out of 131535 observations in the CCHS 2001, I could do this mapping for 129310 observations using the PCCF. There are not good records for 2225 postal codes or the postal codes are retired.
[33] To control for selection bias, a Heckman model, the same as the first chapter, was also estimated. However, the inverse mills ratios were not significant.

equation (1). Stuart (2010) explains that matching methods and regression models such as instrumental models or selection models can be appropriately combined and that they control for the existing selection bias better than when only one of these methods is used. Other studies such as Rubin (1973), Rubin and Thomas (2000) and Abadie and Imbens (2006), Ho et al. (2007) also confirm that matching and regression can complete each other in controlling for selection bias. In fact, using the two methods together is a kind of "double robustness" test (Stuart, 2010 p.15).

As explained by Becker and Ichino (2002), propensity score matching is a commonly used method to generate samples of the treated (insomniacs) and control (non-insomniacs) groups with similar characteristics in order to get unbiased treatment effects. Stuart (2010) explains that matching is a method to "equate (or "balance") the distribution of covariates in the treated and control groups" (Stuart, 2010 p. 2). In this method, the treated and control groups are matched based on some observed characteristics and it is assumed that "there are no unobserved differences between the treatment and control groups, conditional on the observed covariates" (Stuart, 2010 p. 6). This is called the "ignorability assumption" (Stuart, 2010 p. 3). According to Stuart (2010), matching steps include defining the distance measure to find the closest match for an individual in the control group, using the matching method with the chosen distance measure, checking the quality of matching and analyzing the impact of treatment of outcome using the matched sample.

There are different matching methods which are explained in the appendix. Stuart (2010) advises researchers to use the method that gives them the best balance. One approach is to choose the method that gives the minimum standardized difference of the means of the matched

[34] More precisely, the method that we use is called "Nearest-Neighbor Matching within caliper" or, more simply, "caliper matching". A technical explanation of this method is presented in the appendix.

treated and the matched control groups. [35] In addition, Stuart (2010) explains that 1:1 nearest neighbour matching (where 1:1 means that one individual from the treated group is matched with k individuals in the control group) without replacement is a good choice for its simplicity and good performance. In this study, I use 1:1 nearest neighbour matching. This method creates a good balance in my matching. Since, I am interested to have control on the size of matches' sample in this study, 1:1 nearest neighbour matching without replacement is chosen. Some might think that finding more than one matched individual in the control group for an individual in the treated group increases the power of matching. However, Stuart (2010) also explains that 1:1 nearest neighbour matching does not necessarily reduce the power of matching because smaller matched individuals can be more precise for comparison of treated and control groups and also 1:1 matching include less poor matches compared to k:1 matching.[36]

In the 1:1 nearest neighbour matching without replacement, the distance measure is the propensity score. According to Stuart (2010), these propensity scores essentially "…summarize all of the covariates into one scalar" (Stuart, 2010 p. 8). The propensity score is the conditional probability of being a treated individual given the observed covariates, and the logistic regression is the most common technique with which to estimate these scores. Stuart (2010) suggests imposing a caliper approach to avoid poor matches which determines how close a match is. Here I use a caliper of 0.25 standard deviations of the linear propensity score, as is suggested by the literature (e.g., Rosenbaum and Rubin (1985) and Stuart (2010)). Rosenbaum and Rubin (1985)

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[35] Standardized differences in means= $\frac{mean\ X\ (treated) - \ mean\ X(control)}{st.Dev\ X(treated)}$

where X is the vector of covariates used in the matching. The standardized difference in means should be calculated for each covariate, that is used in the matching, before and after matching. "The same standard deviation should be used in the standardization before and after matching" (Stuart, 2010 p. 14). Also, Stuarts (2010) explains that according to Rubin (2001), the absolute standardized difference in means should be less than 0.25 and the variance ratios should be between 0.5 and 2 after matching for a good balance. For binary covariates the same method can be used or only the proportions can be compared before and after matching.

[36] K:1 means that one individual from the treated group is matched with k individuals in the control group.

define close matches as those scores that fall within caliper of one-quarter (0.25) of the standard deviation of the propensity scores.

One important question is how to choose the covariates in the matching. Stuart (2010) explains that all variables that are related to treatment assignment and the outcome should be included in the matching procedure to achieve a good balance. It is also important to assess common area of support or the degree of overlap in the propensity score between the treated and control groups. According to Stuart (2010), matching assumes that the propensity score distribution of the treated and control groups have a lot of overlaps and these two groups have differences only in density. However, it might be possible to have very different control and treated groups which makes the matching very difficult. In this study, this is not a problem because "[n]earest neighbour matching with calipers automatically only uses individuals in (or close to) the area of common support" (Stuart, 2010 p. 13) and I also put a restriction in my model to use only individuals in the area of common support.

To do the matching, first, as described by Rosenbaum and Rubin (1983) in the appendix, I calculate the propensity score using a logistic model. The propensity score is the conditional probability of being, in this case, an insomniac given the characteristics of individuals. Suppose that I^{*i} is a variable denoting the presence of insomnia, and that it is a function of a vector Z^i as follows:

$$I^{*i} = Z^i\gamma + \epsilon_0{}^i \quad (2)$$

$I^i = 1$ if $\epsilon_0{}^i > -Z^i\gamma$ and 0 if $\epsilon_0{}^i < -Z^i\gamma$.

The variables in Z that affect insomnia are well established in the literature. In this study, they include marital status, age, gender, health, presence of children less than five years old, wage rate, other income, provinces, CMA, race (white or not), weeks looked for job, self-

employed, shift work, level of stress, chronic diseases and work environment conditions. In this case, the propensity score is the predicted probability of being insomniac given variables Z (Pr (I=1 | Z)) using a logit model. Next, for each observation in the insomniacs group, one observation in the non-insomniacs group is chosen such that the individual in the non-insomniacs group has a propensity score within one one-quarter of a standard deviation of the chosen insomniac's propensity score.[37] Finally, I compare the impact of the wage rate in (1) on sleep time between similar samples of insomniacs and matched non-insomniacs, where non-insomniacs are defined in turn as weak and strong non-insomniacs put together, and as strong non-insomniacs only.

2.3.2. Dividing the sample into two groups according to different conditions

As previously indicated, the literature suggests that conditions such as chronic diseases and bad work environments may cause insomnia. In order to identify the effects of these conditions on sleep time, independent of their impact on insomnia, I limit my sample to strong non-insomniacs and exclude weak non-insomniacs.[38] Equation (3) below is thus estimated for this subsample only, with and without some specific conditions:

$$S^{i}{}_{\mathrm{j}} = \beta_{j0} + \beta_{j1} \ln W^{i}{}_{\mathrm{j}} + \beta_{j2} H^{i}{}_{\mathrm{j}} + \beta_{j3} X^{i}{}_{\mathrm{j}} + \beta_{j4} \ln M^{i}{}_{\mathrm{j}} + \epsilon_{j2}{}^{i} \quad (3)$$

where j = 1 or 0 for any condition N, and where N represents three types of conditions: chronic conditions (asthma/chronic bronchitis, arthritis/fibromyalgia/back problems, heart disease/blood pressure and ulcers/bowel disorders), and bad work conditions (of which I have five).[39] The same matching procedure that is explained in the previous section is also applied in

[37] Rosenbaum and Rubin (1985) suggest defining close matches as those scores that fall within caliper of one-quarter (0.25) of the standard deviation of the propensity scores.

[38] I also find that weak non-insomniacs also act like insomniacs, but focus here on the crisper distinction between those who suffer from insomnia and those who do not.

[39] I have information on thirteen work conditions in CCHS 2001: must learn new things, needs high level of skill, freedom to decide how to do the work, repetitive tasks, hectic jobs, conflicting demands, job security, require

this section. The same vector Z is used in all the matching since all of the variables that affect insomnia also affect chronic diseases and work environment (Gortmaker et al. 1990, Blanc et al. 2001 and Park, 2007). Stuart (2010) explains that all variables that are related to treatment assignment and the outcome should be included in the matching procedure to achieve a good balance.

2.4. Data

This study uses the CCHS 2001 and 2002 (cycles 1.1 and 1.2). The CCHS is a cross-sectional survey which has information on health and the determinants of health for the Canadian population. The large sample size in this survey allows researcher to study issues dealing with the health of specific groups or specific regions. Our variable of interest, sleep time, is reported in hours per day in the CCHS and is less precise as the measure of sleep time in the GSS which reports sleep time in minutes per day. However, the CCHS includes a wide variety of information about health status and socio-economic characteristics of a representative sample of the Canadian population. While the survey was done each year from 2001 to 2009, only CCHS 2001 and CCHS 2002 asked questions about sleep problems and work environments to the entire sample; the 2002 survey is a small one which focuses on mental health. This chapter relies on the large, 2001, cycle.

2.4.1. Dependent variables

The dependent variable in this paper is hours spent sleeping per day. In the CCHS, there is a question that asks: "How long do you usually spend sleeping each night?" The options to

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physical activity, have own job input, hostility and conflicts with others, have a helpful supervisor, have a helpful co-workers and job satisfaction. I created five variables out of them based on Park (2007): high strain jobs, physically demanding jobs, job insecurity, low workplace social support and job dissatisfaction.

answer this question are presented in table 2.1. These answers are in "hours". The midpoints are chosen as the sleeping hours per day of each group.[40]

2.4.2. Explanatory variables

Table 2.2 contains the definitions of all the variables used in this study. As in my first chapter and in Biddle and Hamermesh (1990), the main variable of interest, wage, is created from information on the individual's annual personal income and the number of hours usually worked at all jobs in a week. I divide personal income by the weeks worked per year times the number of hours usually worked at all jobs in a week to get the hourly wage. The "other income" variable is created by subtracting personal income from total household income.

Four dummy variables represent four groups of chronic diseases: respiratory problems (asthma/chronic bronchitis); rheumatic problems (arthritis/fibromyalgia/back problems); heart problems (heart diseases/blood pressure); and gastrointestinal problems (ulcers/bowel disorders).[41] The chronic diseases are grouped based on health literature (Franklin et al. 2001, Montnémery et al. 2001, Edwards et al. 2006, Verdecchia et al. 2009 and Coury et al. 2009).

Finally, According to Park (2007), the CCHS uses twelve items[42] from Karasek's Job Content Questionnaire (JCQ) (Karasek 1985) to investigate work stress. These twelve items ask

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[40] The results of my study are not sensitive to using the maximum or the minimum of each group instead of the midpoint.

[41] I do not study chronic diseases with less than 500 observations.

[42] These twelve items are:
1-must learn new things at work (job control)
2- must have high level of skill at work (job control)
3- has freedom to decide how you did her/his job at work (job control)
4- job required that s/he do things over and over (job control)
5- has had a lot to say about what happened in her/his job at work (job control)
6- very hectic job (psychological demands)
7- free from conflicting demands that others made at work (psychological demands)
8- has good job security at work (job insecurity)
9- requires a lot of physical effort at work (physically demanding job)
10- was exposed to hostility or conflict from the people you worked with at work (social support)
11- supervisor was helpful in getting the job done at work (social support)
12- the people s/he worked with were helpful in getting the job done at work (social support)

about job control, psychological demands, job insecurity, physical exertion and workplace social support. There is also another item for job satisfaction. Park (2007) scored each item based on the answers: strongly agree (score: 5), agree (score: 4), neither agree nor disagree (score: 3), disagree (score: 2) and strongly disagree (score: 1). He scored items 4 and 7 reversely: strongly agree (score: 1), agree (score: 2), neither agree nor disagree (score: 3), disagree (score: 4) and strongly disagree (score: 5). The scores are calculated for each of the categories:; job control; psychological demands; job insecurity; physically demanding job; low workplace social support; and job dissatisfaction. According to Park (2007), I define high strain jobs as jobs that job control score is below median and the score for physiological demands is above median. I also use the other four variables, job insecurity; physically demanding job; low workplace social support; and job dissatisfaction in my analysis. Table 2.2 includes the definitions for these variables.

There is a total of 131,535 observations in the CCHS 2001, but I have some sample restrictions. First, I keep only people in the prime working age group of 23 to 65 years of age (86,583 observations). Second, I take students out of the sample because students may use reduced sleep time for studying instead of working. My sample is reduced to 81,377 observations. In addition, I restrict the sample to workers whose main source of household income is salaries and wages in order to have a better estimate of the wage.[43] At this step, the sample is reduced to 56,079 observations. In addition, I drop individuals whose number of hours

[43] It should be mentioned that there are almost 3,000 people in my final sample who are self-employed. These self-employed reported wages and salaries as the main source of their income.

usually worked at all jobs in a week, personal income or weeks worked is missing or zero.[44] That left me with 45,856 observations.

Moreover, to exclude outliers, I remove the top and bottom one percentiles of the wage variable. I keep only individuals whose hourly wage is more than 2.5 dollars and less than 100 dollars which corresponds to removing the top and lowest one percent of the sample. The sample is thus reduced to 42,653 observations. Then, I remove observations with missing information in sleep time and other control variables (excluding the work environment conditions). That left me with 40,131 observations. The work environment questions are only available for some provinces: PEI, Nova Scotia, Québec, Ontario, Manitoba, Saskatchewan and Alberta. At this point, the sample is reduced to 30,654 observations.[45]

Finally, unionization rate at province level and average employment income at the Census division level are used as instrument variables in all of the models. The observations with missing information for these variables are also removed. After these restrictions, I am left with 30176 observations.

Table 2.3 shows the average values of the variables of interest separated by gender from the CCHS 2001.[46] I see that, on average, people slept 7.26 hours per day; the average age is 40 years for both men and women and the average hourly wage is 21.4 dollars. Twenty percent of the individuals have at least one child under five years of age. Eleven percent of the sample suffers from insomnia, and 33 percent are weak non-insomniacs and 56 percent are strong non-insomniacs. Only 6 percent report their health condition as poor or fair. This table also shows the percentage of people with different chronic diseases. For example, nine percent have

[44] The wage rate is defined as annual personal income divided by week worked yearly times the number of hours usually worked at all jobs.
[45] The models in this study are also estimated without controlling for work environments to use the removed observations. The results of this study are not sensitive to inclusion of the removed observations.
[46] All the regressions and descriptive analysis are weighted using the person weight variable.

asthma/chronic bronchitis or 25 percent suffer from arthritis/fibromyalgia/back problems. Descriptive analysis also shows the percentage of people in different work conditions: 19 percent have high strain jobs; 14 percent have job insecurity; 41 percent have physically demanding jobs; 43 percent have low workplace social support and nine percent have job dissatisfaction.

The summary statistics are similar to those of my chapter one for the variables that are common to both chapters. For example, in my chapter one using the GSS 2005, I find that people slept on average 7 hours and 48 minutes per day; average age is 42 years for both men and women and 11 percent of the sample suffers from insomnia, and 6 percent report their health condition as poor or fair.

Table 2.4 provides the means of the same variables separately for insomniacs (group 1) and non-insomniacs (weak and strong non-insomniacs together) (group 2). Insomniacs sleep on average 6.52 hours per day whereas non-insomniacs sleep on average 7.35 hours. Insomniacs are less healthy than non-insomniacs. Insomniacs have more chronic diseases than non-insomniacs. For example, 41 percent of the insomniacs have arthritis/fibromyalgia/back problems where 23 percent of the non-insomniacs have arthritis/fibromyalgia/back problems. Stress indicators are also included in table 2.4. On average, non-insomniacs have less stress than insomniacs. Insomniacs' work environments are worse than non-insomniacs'. For example, 51 percent of insomniacs have low workplace social support where 41 percent of the non-insomniacs have low workplace social support. These are similar to my chapter one. For example, in my chapter one using the GSS 2005, I find that insomniacs are less healthy than non-insomniacs and non-insomniacs have less stress than insomniacs. However, in the GSS 2005, insomniacs sleep on average 7.7 hours per day whereas non-insomniacs sleep on average 7.8 hours. The different

results in sleep time may come from the differences between the insomnia or sleep time questions in the two surveys.

Table 2.5 compares insomniacs (group 1) with strong non-insomniacs (group 3), who never have trouble going to sleep or staying asleep, because most of my analysis is done on group 3 subsamples. Average sleep time for strong insomniacs, group 3, is 7.42. They are healthier, have less stress, less chronic diseases, and have better work environment conditions than insomniacs.[47]

Table 2.6 and 2.7 shows the means for group 1, 2 and 3 after propensity score matching, so that the insomniac sample (group 1) and non-insomniac samples (group 2 and group 3) have similar characteristics and sample sizes. Appendix, tables A2.4 and A2.8, shows the tests on the averages before and after matching to see how well the matching works. After matching, there is almost no significant difference in the averages of matched observations.[48]

2.5. Empirical results

The following four tables (2.8-2.11) present the estimated coefficients of the wage rate for a large number of regressions, as detailed below. However, I present only the estimated coefficients of the wage rate in order to focus the discussion on this key variable. The estimated coefficients on the other determinants, but they are available either in the appendix or upon request[49], as detailed in the text.

2.5.1. Dividing the sample into insomniacs and non-insomniacs

I begin by estimating the first sleeping model, equation (1), for Canadians using the CCHS 2001. Table 2.8 shows the results of the sleeping model for insomniacs (group 1) and

[47] Table A2.1 shows that strong non-insomniacs are also healthier and have less stress than weak non-insomniacs.
[48] Some tests are presented in the appendix to compare the averages.
[49] Appendix A2, A3, A5, A6, A7 and A9 report some of the results, but not all regressions are reported.

non-insomniacs (weak and strong non-insomniacs together, group 2) separately and appendix tables A2.1, A2.2, A2.3 and A2.4 provide the detailed results. The focus is on the impact of wage on sleep time for these two groups. The wage variable is instrumented in these IV models. Column 1 of table 2.8 suggests that an increase in the wage rate does not have an impact on insomniacs; however, column 4 shows that, before matching, a 10% percent increase in the wage rate significantly decreases the sleep time by 0.03 hours per day or 13 minutes per week for non-insomniacs (Coefficient: -0.30, significant at the 10 percent level).[50]

The same analysis is conducted using the method of propensity score matching in order to have similar sized insomniac and non-insomniac samples and to control for selection bias that may arise when dividing the main sample to these two groups: insomniacs (group 1) and non-insomniacs (weak and strong together, group 2). Table 2.8 also shows the results of the sleeping model after matching. The results show that the link between the wage and sleep time is broken for both groups after matching. In the next step, I exclude weak non-insomniacs and I compare insomniacs with strong non-insomniacs.

Since instrumental variables were used to control for the wage rate, some tests are reported on the quality of the instruments at the bottom of the relevant tables. To be a good instrument for the wage rate, two conditions must be satisfied: first, the instruments must be correlated with the wage rate; and second, the instruments must be uncorrelated with the error term in the sleep time equation. To check the first condition, F-statistics for the joint significance of the estimated coefficients on these instruments are calculated. Since the F-statistics are significant at the one percent level in most regressions to be reported later, the first condition is satisfied. The second condition cannot be checked directly, but a Wooldridge's robust score test

[50] In a linear-log regression, the coefficient of an explanatory variable in logarithm is divided by 100 to represent the effect on the dependent variable of a one percent change in the independent variable. For a ten percent change, it is divided by ten.

of over identifying restrictions is sometimes used, which is identical to Sargan's test statistic (Wooldridge, 2005). The null hypothesis is that the instruments are not correlated with the error term. The results of this test for some regressions suggest that the instruments are valid since the Wooldridge's robust score is insignificant at the one percent level and the null hypothesis is not rejected. However, the null hypothesises are rejected in some of the regressions at 5 or 10 percent level. In those cases, the instruments may not be valid.

Table 2.9 shows the results of the sleeping model for insomniacs (group 1) and strong non-insomniacs (group 3) separately and appendix tables A2.6, A2.7, A2.8 and A2.9 provide the detailed results.; Column 4 shows that, before matching, a 10% percent increase in the wage rate significantly decreases the sleep time by 0.07 hours per day or 28 minutes per week for strong non-insomniacs (Coefficient: -0.69, significant at the 1 percent level).

Strong non-insomniac men decrease their sleep time by 0.07 hours per day or 28 minutes per week for a 10% percent increase in the wage rate, whereas insomniac men do not change their sleep time for an increase in the wage rate. The women's regressions also show that insomniac women do not change their sleep time for an increase in the wage rate, and that strong non-insomniac women decrease their sleep time by 0.07 hours per day or 28 minutes per week. After matching, columns 1 and 4 suggest that an increase in the wage rate does not have an impact on insomniacs, but that a 10% percent increase in the wage rate significantly decreases the sleep time by 0.07 hours per day or 30 minutes per week for strong non-insomniacs (Coefficient: -0.71, significant at the 10 percent level).

After matching, the result for men suggests that insomnia breaks the link between the wage rate and sleep time. However, the women's regressions show that strong non-insomniac

women when have similar characteristics as the insomniacs do not change their sleep time for an increase in the wage rate.

2.5.2. Dividing the strong non-insomniac's sample into two groups according to chronic diseases

Table 2.10 shows the impact of the wage rate on sleep time before and after propensity score matching is implemented for strong non-insomniacs with and without different chronic conditions. Chronic conditions are aggregated taking comorbidity into account, that is, several conditions being present for the same individuals. The aggregations are based on health literature (Franklin et al. 2001, Montnémery et al. 2001, Edwards et al. 2006, Verdecchia et al. 2009 and Coury et al. 2009).

Before matching, I separate the sample of strong non-insomniacs into those who have and who do not have a given chronic condition to see the role of that condition on the relationship between wage and sleep time. In Table 2.10, for example, I see that, before matching, the link between wage and sleep time is broken for strong non-insomniacs with arthritis/fibromyalgia/back problems: a 10 percent increase in the wage rate decreases sleep time by 0.10 hours per day or 40 minutes per week (coefficient: -0.96, significant at the 1 percent level) for strong non insomniacs without arthritis, fibromyalgia or back problems.

After propensity score matching, I see that a 10 percent increase in the wage rate decreases sleep time by 0.15 hours per day or 62 minutes per week (coefficient: -1.48, significant at the 5 percent level) for strong non-insomniacs without arthritis/fibromyalgia/back problems. However, the results are not significant for strong non-insomniac men and women separate regressions.

Table 2.10 also shows the results of the sleeping model for the other chronic conditions before and after matching. It is found that after matching, there is nothing left to be explained by

chronic diseases such as asthma, chronic bronchitis, heart diseases, blood pressure, ulcers and bowel disorders and the coefficients of wage are not significant. Before matching, there is a significant relationship between wage and sleep time for a group of my sample without these chronic diseases. Propensity score matching helps me to see that some of the significant impacts may be due to larger samples or selection bias.

However, even after matching and controlling for individual's characteristics, there is some evidence that arthritis, fibromyalgia and back problems break the link between the wage rate and sleep time and there is a significant relationship between wage and sleep time for a group of our sample without those diseases. However, the evidence is weak because the results for these groups are only significant for both gender together regressions only.

2.5.3. Dividing the strong non-insomniacs' sample into two groups according to work environment

Table 2.11 reports the results of the sleeping model when the impact of wage on sleep time varies according to five conditions related to the work environment. The detailed results can be obtained from the author upon request. Before matching, the results suggest that work environments with high strain job, job insecurity and job dissatisfaction break the link between the wage rate and sleep time. In table 2.11, for example, I see that, before matching, the link between wage and sleep time is broken for strong non-insomniacs with high strain jobs; a 10 percent increase in the wage rate decreases sleep time by 0.09 hours per day or 36 minutes per week (coefficient: -0.87, significant at the 1 percent level).

After propensity score matching, it is found that there is nothing left to be explained by work environments with job insecurity, and with low job satisfaction. However, even after matching and controlling for individual's characteristics, I can see that some work environment characteristics do indeed matter. This is the case for environments with high strain jobs. There is

also a significant relationship between wage and sleep time for individuals with work environments with high strain jobs.

Table 2.11 suggest that an increase in the wage rate does not have an impact on strong non-insomniacs with high strain jobs; however, a 10% percent increase in the wage rate significantly decreases the sleep time by 0.19 hours per day or 77 minutes per week for non-insomniacs without high strain jobs (coefficient: -1.84, significant at the 5 percent level).

The results of this section suggest that some chronic diseases and bad work environments affect the link between wage and sleep. Individuals who work in an unsupportive environment (high strain jobs), for instance, will respond less to an increase in the wage rate than those who do not. Understanding the impact of wages on the choice of sleep time will help flesh out our understanding of the labour-leisure choice, a point to which I return in the concluding section that follows.

2.6. Conclusions

Individuals are much less attached to particular jobs and particular careers in the current labour market relative to the situation of a couple of generations ago. Workers change jobs and, indeed, careers, much more frequently than before. In such a climate, it is even more important to understand how the price of labour may affect decisions: are we observing individuals moving jobs because of earning differentials? Or is this a phenomenon linked to more precarious job security? In this chapter, I look at the decision as to how much to sleep, which is intimately tied to broader leisure and work decisions.

I use the CCHS Survey 2001 to investigate the role of chronic diseases and bad work environments on the relationship between wages and sleep time. I corroborate the findings of the first chapter that the link between wage and sleep time is broken for insomniacs, contributing to

our understanding of economic incentives and sleep decisions highlighted, among others, by the seminal work of Biddle and Hamermesh (1990). However, this paper was able to push further our understanding of economic incentives and sleep by zeroing in on individuals with no sleep problems but who have other conditions, notably chronic diseases and complicated work environments. I find that these factors can also sever the link between the price of time and sleep: strong non-insomniacs with certain chronic conditions such as arthritis, fibromyalgia and back problems no longer respond to an increase in the wage rate by sleeping less. Similarly, there is no relationship between the wage rate and sleep time for non-insomniacs with certain bad work environment conditions, such as high strain jobs.

In and of itself, the finding that insomnia and chronic conditions sever the link between the opportunity cost of time and sleeping is interesting. From an economics perspective, understanding better how workers react to wage changes certainly helps us to estimate more precisely the elasticity of demand for sleep for specific groups of individuals. However, it is not clear that there are any additional policy prescriptions available to tackle the issues associated with chronic conditions, that is to say, additional to the general goal of reducing the prevalence of such chronic illnesses. The same is not true, however, for the impact of work environment on sleep. Work environments and issues associated with work stress can be improved and addressed through public policies and work-place interventions. Hence, labour-market distortions arising from a severing of the link between the wage rate and sleep decisions can be ameliorated with well-designed policies and procedures that target the work environment. For example, employers could be helped (through information and training) to improve the context within which their employees work. Small, inexpensive, changes like spaces for breaks, team-building activities,

and a host of other possibilities, may help improve environments which, as the results of this paper have reinforced, can help promote worker sleep and, importantly, productivity.

Of course, empirical work is never without limitations. Although the data set provided a rich array of inputs, it was not perfect. It was unfortunate that the information on sleep was less precise than is available in the time-use surveys. Also, wage rates had to be estimated from data on personal income, better data on actual wage rates would certainly help to improve the estimates. Finally, the availability of suitable instruments presents an ongoing challenge for empirical work. Better instrumental variables for the wage variable such as industry codes or a person's union status would have been useful, but were not available.

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Table 2.1. Sleep time in CCHS

Choice of answering	Midpoint	%	Choice of answering	Midpoint	%
<2 hours sleep	1.5	0.09	7-8 hours sleep	7.5	32.40
2-3 hours sleep	2.5	0.27	8-9 hours sleep	8.5	25.63
3-4 hours sleep	3.5	0.80	9-10 hours sleep	9.5	5.03
4-5 hours sleep	4.5	2.81	10-11 hours sleep	10.5	1.98
5-6 hours sleep	5.5	8.22	11-12 hours sleep	11.5	0.39
6-7 hours sleep	6.5	22.08	>12 hours sleep	12.5	0.29

Table 2.2. Variable definitions		
Dependent variables		
Sleep time per day	S^i	Usual time spent sleeping each night (in hours).
Independent variables		
Insomnia	I^i	= 1 if the individual has most of the time trouble going to sleep or staying asleep, = 0 if the individual has never/ sometimes trouble going to sleep or staying asleep.
Non-insomniacs	NI^i	= 1 if the individual has never or sometimes trouble going to sleep or staying asleep, = 0 if the individual has most of the time trouble going to sleep or staying asleep.
Weak non-insomniacs	WNI^i	= 1 if the individual has sometimes trouble going to sleep or staying asleep, = 0 if the individual has never/ most of the time trouble going to sleep or staying asleep.
Strong non-insomniacs	SNI^i	= 1 if the individual has never trouble going to sleep or staying asleep, = 0 if the individual has sometimes/ most of the time trouble going to sleep or staying asleep.
Log(wage)	LnW^i	Natural log of annual personal income divided by week worked yearly times the number of hours usually worked at all jobs in a week to get the hourly wage.
Married/common law	MC^i	= 1 if married or common law, = 0 if widowed, separated, divorced, and single.
Age	A^i	Age.
Age square		Square of age.
Male	M^i	Male= 1, female= 0.
Excellent, very good, or Good health	H^i	= 1 if health situation is excellent, very good, or good, = 0 if health situation is fair or poor.
Children less than 5	$CH5^i$	= 1 if some children less than 5 years old are in the family, otherwise= 0.
Log(other income)	M^i	Natural log of household income excluding the individual personal income.
Immigrants	IM^i	= 1 if the individual is immigrants to Canada, otherwise= 0.
Weeks looked for a job	WLJ^i	Number of week in the last year that the individual looked for a job.
Self employed	SE^i	=1 if the individual is self-employed, = 0 if the individual is an employee.
Province	Pr^i	

British Columbia		British Columbia = 1, otherwise = 0. (The reference group)
Alberta		Alberta = 1, otherwise = 0.
Saskatchewan		Saskatchewan = 1, otherwise = 0.
Manitoba		Manitoba = 1, otherwise = 0.
Ontario		Ontario = 1, otherwise = 0.
Québec		Québec = 1, otherwise = 0.
New Brunswick		New Brunswick = 1, otherwise = 0.
Nova Scotia		Nova Scotia = 1, otherwise = 0.
Prince Edward Island		Prince Edward Island = 1, otherwise = 0.
Newfoundland and Labrador		Newfoundland and Labrador = 1, otherwise = 0.
CMA	CMA^i	=1 if CMA (metropolitan area), otherwise= 0.
White	Wh^i	=1 if the race is white only.
Work time per week	WT^i	Total usual hours worked - current jobs.
Shift work types	$SWTY^i$	
Regular day shift		= 1 if the individual has a regular daytime schedule or shift at work, otherwise= 0 (reference group).
Regular evening shift		= 1 if the individual has a regular evening shift at work, otherwise= 0.
Regular night shift		= 1 if the individual has a regular night shift at work, otherwise= 0.
Rotating shift		= 1 if the individual has a regular rotating shift at work, otherwise= 0.
Split shift/ On call/ Irregular schedule/ Other type of shift		= 1 if the individual has a split shift/ on call shift/ irregular schedule/ other type of shift at work, otherwise= 0.
Level of stress	St^i	
Low stress		=1 if not at all stressful or not very stressful, otherwise = 0. (The reference group)
Average stress		=1 if a bit stressful, otherwise = 0.
High stress		=1 if quite a bit stressful or extremely stressful, otherwise = 0.

Chronic condition:

Asthma/Chronic bronchitis	AC^i	= 1 if the individual has asthma or Chronic bronchitis, otherwise= 0.
Arthritis/Fibromyalgia/ Back problems	AFB^i	= 1 if the individual has arthritis or fibromyalgia or back problems, otherwise= 0.
Diabetes	Dia^i	= 1 if the individual has diabetes, otherwise= 0.
Heart disease/Blood pressure	HB^i	= 1 if the individual has heart disease or blood pressure, otherwise= 0.
Ulcers/Bowel disorders	UB^i	= 1 if the individual has ulcers or bowel disorders, otherwise= 0.
Work environment conditions:		
Active job	$WC1^i$	=1 if the scores for job control and psychological demands are above median, otherwise = 0.
High strain job	$WC2^i$	=1 if the score for job control is below median and the score for psychological demands is above median, otherwise = 0.
Low strain job	$WC3^i$	=1 if the score for psychological demands is below median and the score for job control is above median, otherwise = 0.
Job insecurity	$WC5^i$	=1 if it is disagreed or strongly disagreed with good job security at work, otherwise = 0.
Physically demanding job	$WC6^i$	= 1 if the individual strongly agree/agree that s/he requires a lot of physical effort at work, otherwise = 0.
Low workplace social support	$WC7^i$	= 1 if either agreed or strongly agreed with exposing to hostility or conflict from the people you worked with at work, disagreed or strongly disagreed with having helpful supervisor, or disagreed or strongly disagreed with having helpful co-workers, otherwise = 0.
Job dissatisfaction	$WC8^i$	= 1 if the individual is not too satisfied or not at all satisfied with the job, otherwise = 0.
Instrumental variables		
Unionization rate	UR^i	Unionization rate at province in which the individual lives.
Average employment income	AE^i	Average employment income at census divisions in which the individual lives.

Table 2.3. Summary Statistics: Mean and standard deviations of variables in CCHS 2001

	All (n=30,176)	men (n=15,481)	women (n=14,695)
Sleep hours per day	7.26	7.15	7.38
	(1.14)	(1.11)	(1.16)
Insomnia[51]	0.11	0.09	0.13
Strong non-insomniacs	0.56	0.59	0.51
Hourly wage	21.37	22.70	19.82
	(46.41)	(35.61)	(56.38)
Married/common law	0.72	0.74	0.71
Age	40.52	40.78	40.21
	(10.01)	(10.12)	(9.87)
Male	0.54	1.00	0.00
Good health	0.94	0.94	0.94
Having children less than 5	0.20	0.21	0.19
Other income per week	546.96	437.24	674.50
	(568.03)	(506.90)	(607.29)
CMA	0.71	0.70	0.73
White	0.87	0.87	0.87
Weeks looked for a job	1.05	1.11	0.97
	(4.79)	(4.89)	(4.68)
Self-employed	0.06	0.07	0.06
Regular evening shift	0.04	0.04	0.04
Regular night shift	0.03	0.03	0.02
Rotating shift	0.11	0.12	0.09
Split shift/ On call/ Irregular schedule/ Other	0.08	0.08	0.07
Average stress	0.43	0.42	0.44
High stress	0.30	0.29	0.33
Immigrant	0.20	0.21	0.19
Asthma/Chronic bronchitis	0.09	0.07	0.11
Arthritis/Fibromyalgia/Back problems	0.25	0.24	0.26
Heart disease/Blood pressure	0.10	0.10	0.09
Ulcers/Bowel disorders	0.04	0.04	0.05
Active job	0.33	0.33	0.33
High strain job	0.19	0.22	0.16
Low strain job	0.25	0.22	0.29
Job insecurity	0.14	0.13	0.16
Physically demanding job	0.41	0.46	0.35
Low workplace social support	0.43	0.43	0.42
Job dissatisfaction	0.09	0.09	0.09

These numbers are weighted

[51] We do not need to report the standard deviation for dummy variables. The standard deviation for dummy variables is : sd=[(mean of x)(1-mean of x)]^0.5

Table 2.4. Summary Statistics: Mean and standard deviations of variables for insomniacs (group 1) and non-insomniacs (group 2) before matching – CCHS 2001

	All (n=3,653) Group (1)	men (n=1,573) Group (1)	women (n=2,080) Group (1)	All (n=26,523) Group (2)	men (n=13,908) Group (2)	women (n=12,615) Group (2)
Sleep hours per day	6.52	6.41	6.61	7.35	7.23	7.49
	(1.42)	(1.44)	(1.40)	(1.07)	(1.05)	(1.07)
Weak non-insomniacs	0.00	0.00	0.00	0.39	0.36	0.40
Strong non-insomniacs	0.00	0.00	0.00	0.61	0.64	0.60
Hourly wage	20.26	21.55	19.17	21.50	22.82	19.92
	(55.08)	(16.26)	(73.33)	(45.23)	(37.03)	(53.45)
Married/common law	0.68	0.70	0.67	0.73	0.74	0.71
Age	41.95	42.27	41.69	40.34	40.63	39.99
	(9.96)	(10.03)	(9.89)	(10.00)	(10.11)	(9.85)
Male	0.46	1.00	0.00	0.55	1.00	0.00
Good health	0.85	0.85	0.84	0.95	0.95	0.95
Having children less than 5	0.16	0.17	0.16	0.21	0.21	0.20
Other income per week	518.80	434.36	590.26	550.41	437.53	686.83
	(555.38)	(546.49)	(552.94)	(569.47)	(502.68)	(613.90)
CMA	0.68	0.67	0.69	0.72	0.70	0.73
White	0.89	0.90	0.89	0.86	0.86	0.87
Weeks looked for a job	1.26	1.36	1.18	1.02	1.08	0.94
	(5.24)	(5.28)	(5.20)	(4.74)	(4.84)	(4.60)
Self-employed	0.06	0.06	0.06	0.06	0.07	0.06
Regular daytime schedule or shift	0.70	0.67	0.73	0.76	0.73	0.78
Regular evening shift	0.04	0.04	0.05	0.04	0.04	0.04
Regular night shift	0.04	0.05	0.03	0.02	0.03	0.02
Rotating shift	0.12	0.14	0.10	0.10	0.12	0.09
Split shift/ On call/ Irregular schedule/ Other	0.09	0.10	0.09	0.08	0.08	0.07
Average stress	0.35	0.35	0.35	0.44	0.43	0.45
High stress	0.47	0.45	0.48	0.28	0.27	0.30
Immigrant	0.16	0.16	0.16	0.21	0.21	0.20
Asthma/Chronic bronchitis	0.14	0.11	0.16	0.08	0.07	0.10
Arthritis/Fibromyalgia/Back problem	0.41	0.38	0.43	0.23	0.22	0.24
Heart disease/Blood pressure	0.15	0.16	0.14	0.09	0.10	0.08
Ulcers/Bowel disorders	0.08	0.08	0.09	0.04	0.03	0.04
Active job	0.32	0.31	0.32	0.33	0.33	0.34
High strain job	0.12	0.13	0.10	0.20	0.22	0.17
Low strain job	0.35	0.31	0.38	0.24	0.21	0.28
Job insecurity	0.20	0.19	0.20	0.14	0.13	0.15
Physically demanding job	0.48	0.52	0.44	0.40	0.45	0.33
Low workplace social support	0.51	0.51	0.51	0.41	0.42	0.40
Job dissatisfaction	0.16	0.19	0.14	0.08	0.08	0.09

These numbers are weighted

Table 2.5. Summary Statistics: Mean and standard deviations of variables for insomniacs (group 1) and strong non-insomniacs (group 3) before matching – CCHS 2001

	All (n=3,653) Group (1)	men (n=1,573) Group (1)	women (n=2,080) Group (1)	All (n=16,101) Group (3)	men (n=8,916) Group (3)	women (n=7,185) Group (3)
Sleep hours per day	6.52	6.41	6.61	7.42	7.30	7.57
	(1.42)	(1.44)	(1.40)	(1.07)	(1.05)	(1.08)
Weak non-insomniacs	0.00	0.00	0.00	0.00	0.00	0.00
Strong non-insomniacs	0.00	0.00	0.00	1.00	1.00	1.00
Hourly wage	20.26	21.55	19.17	21.49	22.60	19.99
	(55.08)	(16.26)	(73.33)	(37.24)	(31.50)	(43.74)
Married/common law	0.68	0.70	0.67	0.74	0.75	0.72
Age	41.95	42.27	41.69	40.27	40.72	39.66
	(9.96)	(10.03)	(9.89)	(10.08)	(10.27)	(9.78)
Male	0.46	1.00	0.00	0.57	1.00	0.00
Good health	0.85	0.85	0.84	0.96	0.96	0.97
Having children less than 5	0.16	0.17	0.16	0.22	0.22	0.21
Other income per week	518.80	434.36	590.26	538.75	437.62	674.71
	(555.38)	(546.49)	(552.94)	(562.20)	(499.47)	(611.08)
CMA	0.68	0.67	0.69	0.72	0.70	0.74
White	0.89	0.90	0.89	0.86	0.86	0.86
Weeks looked for a job	1.26	1.36	1.18	0.97	1.05	0.85
	(5.24)	(5.28)	(5.20)	(4.63)	(4.85)	(4.32)
Self-employed	0.06	0.06	0.06	0.07	0.07	0.06
Regular evening shift	0.04	0.04	0.05	0.04	0.04	0.04
Regular night shift	0.04	0.05	0.03	0.02	0.02	0.02
Rotating shift	0.12	0.14	0.10	0.10	0.11	0.08
Split shift/ On call/ Irregular schedule/ Other	0.09	0.10	0.09	0.07	0.08	0.06
Average stress	0.35	0.35	0.35	0.42	0.41	0.44
High stress	0.47	0.45	0.48	0.26	0.25	0.27
Immigrant	0.16	0.16	0.16	0.22	0.22	0.21
Asthma/Chronic bronchitis	0.14	0.11	0.16	0.09	0.06	0.10
Arthritis/Fibromyalgia/Back problem	0.41	0.38	0.43	0.25	0.19	0.20
Heart disease/Blood pressure	0.15	0.16	0.14	0.10	0.09	0.08
Ulcers/Bowel disorders	0.08	0.08	0.09	0.04	0.03	0.03
Active job	0.32	0.31	0.32	0.34	0.34	0.34
High strain job	0.12	0.13	0.10	0.22	0.24	0.19
Low strain job	0.35	0.31	0.38	0.22	0.29	0.25
Job insecurity	0.20	0.19	0.20	0.14	0.13	0.16
Physically demanding job	0.48	0.52	0.44	0.39	0.45	0.32
Low workplace social support	0.51	0.51	0.51	0.40	0.42	0.39
Job dissatisfaction	0.16	0.19	0.14	0.08	0.07	0.08

These numbers are weighted

Table 2.6. Summary Statistics: Mean and standard deviations of variables for insomniacs (group 1) and non-insomniacs (group 2) after matching – CCHS 2001

	All (n=3,646) Group (1)	men (n=1,572) Group (1)	women (n=2,074) Group (1)	All (n=3,648) Group (2)	men (n=1,532) Group (2)	women (n=2,116) Group (2)
Sleep hours per day	6.52	6.41	6.61	7.28	7.16	7.37
	(1.42)	(1.44)	(1.39)	(1.14)	(1.07)	(1.18)
Weak non-insomniacs	0.00	0.00	0.00	0.00	0.00	0.00
Strong non-insomniacs	0.00	0.00	0.00	1.00	1.00	1.00
Hourly wage	20.24	21.56	19.12	20.98	21.47	20.58
	(55.13)	(16.26)	(73.43)	(58.87)	(16.29)	(78.17)
Married/common law	0.68	0.69	0.67	0.68	0.71	0.66
Age	41.94	42.27	41.67	42.10	42.31	41.92
	(9.96)	(10.04)	(9.89)	(10.07)	(10.31)	(9.86)
Male	0.46	1.00	0.00	0.45	1.00	0.00
Good health	0.85	0.86	0.85	0.85	0.84	0.85
Having children less than 5	0.16	0.17	0.16	0.15	0.15	0.15
Other income per week	519.51	434.73	591.40	521.53	416.18	608.54
	(555.78)	(546.68)	(553.44)	(557.26)	(477.72)	(601.61)
CMA	0.68	0.67	0.69	0.70	0.68	0.72
White	0.89	0.90	0.89	0.89	0.88	0.91
Weeks looked for a job	1.23	1.37	1.12	1.46	1.75	1.22
	(5.10)	(5.28)	(4.94)	(5.79)	(6.40)	(5.21)
Self-employed	0.06	0.06	0.06	0.05	0.06	0.05
Regular evening shift	0.04	0.04	0.05	0.05	0.04	0.06
Regular night shift	0.04	0.05	0.03	0.04	0.06	0.03
Rotating shift	0.12	0.14	0.10	0.12	0.13	0.11
Split shift/ On call/ Irregular schedule/ Other	0.09	0.10	0.09	0.09	0.11	0.08
Average stress	0.35	0.35	0.35	0.36	0.35	0.37
High stress	0.47	0.45	0.48	0.45	0.43	0.46
Immigrant	0.16	0.16	0.16	0.17	0.19	0.16
Asthma/Chronic bronchitis	0.13	0.11	0.15	0.12	0.09	0.14
Arthritis/Fibromyalgia/Back problem	0.40	0.38	0.42	0.42	0.41	0.43
Heart disease/Blood pressure	0.13	0.15	0.14	0.15	0.16	0.14
Ulcers/Bowel disorders	0.08	0.08	0.09	0.07	0.07	0.07
Active job	0.32	0.31	0.32	0.31	0.34	0.28
High strain job	0.12	0.13	0.10	0.12	0.14	0.10
Low strain job	0.35	0.31	0.38	0.36	0.30	0.40
Job insecurity	0.20	0.19	0.20	0.19	0.18	0.21
Physically demanding job	0.48	0.52	0.44	0.48	0.54	0.42
Low workplace social support	0.51	0.51	0.51	0.50	0.52	0.48
Job dissatisfaction	0.16	0.19	0.14	0.16	0.15	0.16

These numbers are weighted

Table 2.7. Summary Statistics: Mean and standard deviations of variables for insomniacs (group 1) and strong non-insomniacs (group 3) after matching – CCHS 2001

	All (n=3,468) Group (1)	men (n=1,521) Group (1)	women (n=1,947) Group (1)	All (n=3,470) Group (3)	men (n=1,496) Group (3)	women (n=1,974) Group (3)
Sleep hours per day	6.54	6.44	6.64	7.38	7.24	7.49
	(1.39)	(1.41)	(1.37)	(1.15)	(1.13)	(1.15)
Weak non-insomniacs	0.00	0.00	0.00	0.00	0.00	0.00
Strong non-insomniacs	0.00	0.00	0.00	1.00	1.00	1.00
Hourly wage	20.41	21.69	19.29	21.16	21.94	20.54
	(56.27)	(16.41)	(75.49)	(45.44)	(13.44)	(59.77)
Married/common law	0.69	0.70	0.69	0.70	0.75	0.66
Age	41.82	42.23	41.47	42.09	43.42	41.03
	(9.95)	(10.08)	(9.83)	(9.98)	(10.09)	(9.76)
Male	0.47	1.00	0.00	0.44	1.00	0.00
Good health	0.89	0.88	0.89	0.88	0.85	0.90
Having children less than 5	0.17	0.17	0.17	0.17	0.17	0.16
Other income per week	537.75	438.56	605.75	534.39	433.67	596.95
	(561.63)	(550.94)	(559.42)	(531.83)	(480.26)	(559.35)
CMA	0.68	0.67	0.69	0.69	0.67	0.70
White	0.90	0.90	0.89	0.91	0.89	0.92
Weeks looked for a job	1.24	1.36	1.14	1.21	1.54	0.95
	(5.07)	(5.21)	(4.93)	(5.28)	(6.10)	(4.50)
Self-employed	0.06	0.07	0.06	0.05	0.06	0.05
Regular evening shift	0.04	0.04	0.04	0.05	0.04	0.06
Regular night shift	0.03	0.05	0.02	0.04	0.05	0.03
Rotating shift	0.12	0.14	0.10	0.12	0.12	0.12
Split shift/ On call/ Irregular schedule/ Other	0.09	0.10	0.08	0.09	0.11	0.08
Average stress	0.37	0.36	0.37	0.36	0.33	0.39
High stress	0.44	0.44	0.45	0.45	0.46	0.44
Immigrant	0.16	0.16	0.16	0.17	0.20	0.14
Asthma/Chronic bronchitis	0.12	0.10	0.14	0.13	0.09	0.17
Arthritis/Fibromyalgia/Back problem	0.38	0.36	0.40	0.39	0.40	0.39
Heart disease/Blood pressure	0.13	0.14	0.13	0.14	0.16	0.13
Ulcers/Bowel disorders	0.07	0.07	0.08	0.06	0.06	0.06
Active job	0.32	0.31	0.33	0.31	0.33	0.29
High strain job	0.12	0.14	0.11	0.13	0.16	0.12
Low strain job	0.33	0.30	0.36	0.34	0.30	0.38
Job insecurity	0.19	0.18	0.19	0.19	0.19	0.18
Physically demanding job	0.47	0.52	0.43	0.45	0.50	0.41
Low workplace social support	0.50	0.50	0.50	0.50	0.49	0.51
Job dissatisfaction	0.15	0.18	0.12	0.15	0.15	0.14

These numbers are weighted

Table 2.8. Impact of wage on sleep time (endogenous wage) for people with and without insomnia (suppressing the results from all other determinants) – CCHS 2001

Dependent variable: sleeping hours per day

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Men	Women	All	Men	Women
Condition: Insomnia	with	with	with	without	without	without
Before matching						
log wage	-0.30	-1.99	0.42	-0.30*	-0.33	-0.24
standard error	(0.74)	(1.33)	(0.84)	(0.17)	(0.24)	(0.24)
Obs.	3,653	1,573	2,080	26,523	13,908	12,615
Weak identification test						
First stage robust- F statistic	10.79***	7.08***	6.74***	155.75***	86.08***	71.81***
Overidentifying restrictions test						
Wooldridge's robust score test	0.01	0.00	0.01	0.00	0.00	0.00
Tests of endogeneity						
Robust score chi2	0.58	5.85**	0.12	6.77***	4.24**	2.23
Robust regression F	0.41	4.29**	0.09	4.73**	3.01*	1.55
After matching						
log wage	-0.24	-1.96	0.52	0.36	-0.38	0.79*
standard error	(0.75)	(1.32)	(0.86)	(0.36)	(0.71)	(0.42)
Obs.	3,646	1,572	2,074	3,648	1,532	2,116
Weak identification test						
First stage robust- F statistic	10.55***	7.15***	6.54**	28.12***	8.60***	19.36***
Overidentifying restrictions test						
Wooldridge's robust score test	0.00	0.01	0.01	0.00	0.00	0.00
Tests of endogeneity						
Robust score chi2	0.45	5.74**	0.24	0.38	0.70	3.09*
Robust regression F	0.32	4.20**	0.17	0.26	0.53	2.03

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1
I also controlled for age, gender, marital status, age squared, good health, having children less than 5, other income, CMA, race, weeks looked for job, self-employed, shift works, stress, immigrants, provinces, work environments and chronic diseases.
The complete regressions' tables are in appendix.

Table 2.9. Impact of wage on sleep time (endogenous wage) for insomniacs and strong non-insomniacs (suppressing the results from all other determinants) – CCHS 2001

Dependent variable: sleeping hours per day

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Men	Women	All	Men	Women
Condition: Insomnia (compared to strong non-insomniacs)	with	with	with	without	without	without
Before matching						
log wage	-0.30	-1.99	0.42	-0.69***	-0.69**	-0.66*
standard error	(0.74)	(1.33)	(0.84)	(0.24)	(0.33)	(0.34)
Obs.	3,653	1,573	2,080	16,101	8,916	7,185
Weak identification test						
First stage robust- F statistic	10.80***	7.08***	6.75***	89.04***	53.07***	38.60***
Overidentifying restrictions test						
Wooldridge's robust score test	0.01	0.00	0.01	0.00	0.00	0.01
Tests of endogeneity						
Robust score chi2	0.59	5.86**	0.13	15.40***	7.92***	7.20***
Robust regression F	0.41	4.29**	0.09	11.31***	5.77**	5.39**
After matching						
log wage	-0.49	-2.27	0.27	-0.71*	-1.25*	-0.41
standard error	(0.72)	(1.39)	(0.79)	(0.42)	(0.74)	(0.55)
Obs.	3,468	1,521	1,947	3,470	1,496	1,974
Weak identification test						
First stage robust- F statistic	11.42***	6.89***	7.39***	26.61***	13.11***	14.31***
Overidentifying restrictions test						
Wooldridge's robust score test	0.00	0.00	0.01	0.00	0.00	0.02
Tests of endogeneity						
Robust score chi2	1.17	7.48***	0.03	3.92**	4.05**	1.11
Robust regression F	0.84	5.75**	0.02	3.04*	3.31*	0.83

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1
I also controlled for age, gender, marital status, age squared, good health, having children less than 5, other income, CMA, race, weeks looked for job, self-employed, shift works, stress, immigrants, provinces, work environments and chronic diseases.
The complete regressions' tables are in appendix.

Table 2.10. Impact of wage on sleep time (endogenous wage) for strong non-insomniacs with and without a chronic condition (suppressing the results from all other determinants) – CCHS 2001

Dependent variable: sleeping hours per day

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Men	Women	All	Men	Women
Condition: Asthma/ Chronic bronchitis	with	with	with	without	without	without
Before matching						
log wage	0.21	-0.36	1.92	-0.76***	-0.69**	-0.80**
standard error	(0.87)	(0.67)	(3.16)	(0.25)	(0.35)	(0.35)
Obs.	1,240	555	685	14,861	8,361	6,500
Weak identification test						
First stage robust- F statistic	4.66**	6.45**	0.61	87.49***	49.53***	39.52***
Overidentifying restrictions test						
Wooldridge's robust score test	0.02	0.00	0.07	0.00	0.00	0.01
Tests of endogeneity						
Robust score chi2	0.04	0.54	0.79	17.75***	7.05***	10.65***
Robust regression F	0.03	0.47	0.66	12.99***	5.11**	7.94***
After matching						
log wage	0.93	-0.59	-17.02	-0.93	-1.40	-1.01
standard error	(3.17)	(1.26)	(159.38)	(0.57)	(1.37)	(0.67)
Obs.	1,043	465	578	1,439	642	797
Weak identification test						
First stage robust- F statistic	0.49	2.41	0.01	14.58***	3.37*	10.75***
Overidentifying restrictions test						
Wooldridge's robust score test	0.00	0.02	0.00	0.01	0.00	0.03
Tests of endogeneity						
Robust score chi2	0.12	0.27	1.08	6.71***	2.24	6.29**
Robust regression F	0.10	0.24	0.92	4.92**	1.76	4.14**

Dependent variable: sleeping hours per day						
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Men	Women	All	Men	Women
Condition: Arthritis/Fibromyalgia / Back problems	with	with	with	without	without	without
Before matching						
log wage	0.24	0.20	0.58	-0.96***	-1.07**	-0.89**
standard error	(0.48)	(0.50)	(0.94)	(0.29)	(0.44)	(0.37)
Obs.	3,254	1,745	1,509	12,847	7,171	5,676
Weak identification test						
First stage robust- F statistic	18.24***	16.70***	4.38**	70.85***	36.42***	34.63***
Overidentifying restrictions test						
Wooldridge's robust score test	0.00	0.00	0.00	0.00	0.00	0.00
Tests of endogeneity						
Robust score chi2	0.01	0.00	0.27	19.63***	10.37***	9.74***
Robust regression F	0.00	0.00	0.18	14.98***	7.68***	7.85***
After matching						
log wage	0.19	0.16	0.49	-1.48**	-5.19	-0.45
standard error	(0.48)	(0.49)	(1.00)	(0.60)	(4.21)	(0.37)
Obs.	3,235	1,735	1,500	3,242	1,738	1,504
Weak identification test						
First stage robust- F statistic	17.73***	16.63***	3.80*	18.43***	1.94	22.68***
Overidentifying restrictions test						
Wooldridge's robust score test	0.00	0.00	0.00	0.00	0.00	0.00
Tests of endogeneity						
Robust score chi2	0.00	0.02	0.14	12.42***	13.11***	1.57
Robust regression F	0.00	0.01	0.10	10.61***	10.51***	1.53

Dependent variable: sleeping hours per day						
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Men	Women	All	Men	Women
Condition: Heart disease/Blood pressure	with	with	with	without	without	without
Before matching						
log wage	-0.30	-0.19	-0.65	-0.73***	-0.75**	-0.66*
standard error	(0.65)	(0.91)	(0.75)	(0.26)	(0.36)	(0.37)
Obs.	1,441	882	559	14,660	8,034	6,626
Weak identification test						
First stage robust- F statistic	9.78***	5.51**	5.74**	80.41***	47.65***	34.56***
Overidentifying restrictions test						
Wooldridge's robust score test	0.02	0.03	0.58	0.00	0.01	0.00
Tests of endogeneity						
Robust score chi2	0.50	0.13	1.35	14.89***	7.88***	6.26**
Robust regression F	0.40	0.11	1.08	10.82***	5.63**	4.69**
After matching						
log wage	-0.32	-0.17	-0.70	0.03	-0.32	0.72
standard error	(0.66)	(0.94)	(0.77)	(0.77)	(0.95)	(1.56)
Obs.	1,430	873	557	1,428	887	541
Weak identification test						
First stage robust- F statistic	9.13***	5.01**	5.57**	5.29**	4.37**	1.47
Overidentifying restrictions test						
Wooldridge's robust score test	0.00	0.06	1.01	0.00	0.00	0.01
Tests of endogeneity						
Robust score chi2	0.52	0.10	1.50	0.02	0.33	0.25
Robust regression F	0.42	0.09	1.20	0.01	0.23	0.18

Dependent variable: sleeping hours per day						
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Men	Women	All	Men	Women
Condition: Ulcers/Bowel disorders	with	with	with	without	without	without
Before matching						
log wage	-0.35	0.64	-0.64	-0.71***	-0.73**	-0.67*
standard error	(0.74)	(1.07)	(0.77)	(0.25)	(0.35)	(0.36)
Obs.	578	287	291	15,523	8,629	6,894
Weak identification test						
First stage robust- F statistic	10.95***	5.92**	7.58***	80.35***	48.35***	34.37***
Overidentifying restrictions test						
Wooldridge's robust score test	0.72	0.00	0.02	0.00	0.00	0.00
Tests of endogeneity						
Robust score chi2	0.45	0.19	0.85	15.06***	8.09***	6.65***
Robust regression F	0.43	0.18	0.89	10.93***	5.84**	4.92**
After matching						
log wage	-0.35	0.64	-0.64	0.74	1.52	0.31
standard error	(0.74)	(1.07)	(0.77)	(0.94)	(1.08)	(1.12)
Obs.	578	287	291	573	275	298
Weak identification test						
First stage robust- F statistic	10.95***	5.92**	7.58***	7.15***	4.67**	3.67*
Overidentifying restrictions test						
Wooldridge's robust score test	0.72	0.00	0.02	0.16	0.29	0.00
Tests of endogeneity						
Robust score chi2	0.45	0.19	0.85	0.78	1.51	0.21
Robust regression F	0.43	0.18	0.89	0.66	1.82	0.16

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1
I also controlled for age, gender, marital status, age squared, good health, having children less than 5, other income, CMA, race, weeks looked for job, self-employed, shift works, stress, immigrants, provinces, work environments and chronic diseases.
The complete regressions' tables are in appendix.

Table 2.11. Impact of wage on sleep time (endogenous wage) for strong non-insomniacs with and without a work environment condition(suppressing the results from all other determinants) – CCHS 2001

Dependent variable: sleeping hours per day

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Men	Women	All	Men	Women
Condition: high strain job	Yes	Yes	Yes	No	No	No
Before matching						
log wage	-0.03	0.27	-0.58	-0.87***	-1.06**	-0.68*
standard error	(0.41)	(0.55)	(0.58)	(0.29)	(0.41)	(0.40)
Obs.	3,249	1,967	1,282	12,852	6,949	5,903
Weak identification test						
First stage robust-F statistic	17.41***	10.99***	6.84***	72.89***	43.73***	31.71***
Overidentifying restrictions test						
Wooldridge's robust score test	0.04	0.00	0.01	0.00	0.00	0.00
Tests of endogeneity						
Robust score chi2	0.16	0.15	1.76	16.94***	12.24***	5.51**
Robust regression F	0.11	0.11	1.49	12.45***	9.11***	4.04**
After matching						
log wage	-0.04	0.27	-0.59	-1.84**	-1.22*	-5.67
standard error	(0.41)	(0.55)	(0.59)	(0.76)	(0.69)	(6.07)
Obs.	3,248	1,967	1,281	3,269	1,979	1,290
Weak identification test						
First stage robust-F statistic	17.26***	10.99***	6.71***	12.74***	15.49***	0.84
Overidentifying restrictions test						
Wooldridge's robust score test	0.05	0.00	0.01	0.00	0.00	0.00
Tests of endogeneity						
Robust score chi2	0.15	0.15	1.74	14.20***	7.21***	10.99***
Robust regression F	0.11	0.11	1.48	10.16***	5.05**	8.19***

Dependent variable: sleeping hours per day						
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Men	Women	All	Men	Women
Condition: Job insecurity	Yes	Yes	Yes	No	No	No
Before matching						
log wage	-0.87	-2.68	-0.34	-0.65**	-0.54	-0.78*
standard error	(0.79)	(3.02)	(0.66)	(0.26)	(0.33)	(0.40)
Obs.	2,170	1,089	1,081	13,931	7,827	6,104
Weak identification test						
First stage robust-F statistic	8.46***	1.09	10.17***	81.51***	54.62***	28.74***
Overidentifying restrictions test						
Wooldridge's robust score test	0.00	0.00	0.00	0.00	0.00	0.00
Tests of endogeneity						
Robust score chi2	2.44	2.65	0.69	12.43***	5.29**	6.89***
Robust regression F	1.67	1.91	0.48	9.23***	3.87**	5.27**
After matching						
log wage	-0.86	-2.70	-0.41	-0.29	-0.75	0.02
standard error	(0.85)	(3.69)	(0.71)	(0.52)	(0.79)	(0.66)
Obs.	2,141	1,075	1,066	2,139	1,058	1,081
Weak identification test						
First stage robust-F statistic	7.36***	0.75	8.85***	16.44***	9.03***	8.55***
Overidentifying restrictions test						
Wooldridge's robust score test	0.00	0.00	0.01	0.00	0.00	0.00
Tests of endogeneity						
Robust score chi2	2.04	1.85	0.82	0.47	1.14	0.00
Robust regression F	1.40	1.34	0.58	0.35	0.89	0.00

Dependent variable: sleeping hours per day						
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Men	Women	All	Men	Women
Condition: Physically demanding job	Yes	Yes	Yes	No	No	No
Before matching						
log wage	-1.44**	-1.71*	-0.70	-0.41*	-0.28	-0.63*
standard error	(0.69)	(1.00)	(0.73)	(0.24)	(0.33)	(0.35)
Obs.	7,029	4,412	2,617	9,072	4,504	4,568
Weak identification test						
First stage robust-F statistic	17.14***	10.92***	8.69***	75.15***	40.10***	34.97***
Overidentifying restrictions test						
Wooldridge's robust score test	0.01	0.02	0.00	0.00	0.00	0.27
Tests of endogeneity						
Robust score chi2	11.51***	7.50***	2.22	4.82**	1.21	5.12**
Robust regression F	7.86***	5.07**	1.63	3.78*	0.97	4.02**
After matching						
log wage	-2.07**	-2.93	-1.02	-0.42	-0.23	-0.81
standard error	(1.02)	(2.05)	(0.83)	(0.35)	(0.49)	(0.50)
Obs.	5,637	3,277	2,360	5,640	3,308	2,332
Weak identification test						
First stage robust-F statistic	11.24***	4.63**	8.20***	36.82***	22.08***	17.43***
Overidentifying restrictions test						
Wooldridge's robust score test	0.00	0.01	0.05	0.00	0.00	0.00
Tests of endogeneity						
Robust score chi2	13.05***	7.03***	3.68*	2.42	0.26	6.05**
Robust regression F	9.17***	5.01**	2.66	1.82	0.20	4.45**

Dependent variable: sleeping hours per day						
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Men	Women	All	Men	Women
Condition: Low workplace social support	Yes	Yes	Yes	No	No	No
Before matching						
log wage	-0.70	-0.98	-0.36	-0.71**	-0.53	-0.92**
standard error	(0.45)	(0.72)	(0.50)	(0.29)	(0.36)	(0.47)
Obs.	6,543	3,628	2,915	9,558	5,288	4,270
Weak identification test						
First stage robust-F statistic	27.95***	12.81***	19.17***	59.77***	43.12***	21.08***
Overidentifying restrictions test						
Wooldridge's robust score test	0.00	0.00	0.00	0.00	0.00	0.00
Tests of endogeneity						
Robust score chi2	4.81**	3.37*	1.35	11.11***	4.09**	6.94***
Robust regression F	3.39*	2.34	1.00	8.52***	3.16*	5.30**
After matching						
log wage	-0.55	-0.54	-0.57	-0.27	-0.09	-0.68
standard error	(0.45)	(0.69)	(0.55)	(0.28)	(0.33)	(0.55)
Obs.	5,914	3,301	2,613	5,913	3,281	2,632
Weak identification test						
First stage robust-F statistic	25.91***	11.90***	16.09***	59.25***	52.43***	14.05***
Overidentifying restrictions test						
Wooldridge's robust score test	0.00	0.00	0.00	0.00	0.00	0.00
Tests of endogeneity						
Robust score chi2	2.93*	0.97	2.56	2.40	0.37	3.07*
Robust regression F	2.08	0.69	1.92	1.85	0.28	2.60

Dependent variable: sleeping hours per day						
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Men	Women	All	Men	Women
Condition: Job dissatisfaction	Yes	Yes	Yes	No	No	No
Before matching						
log wage	-1.69	-1.75	-1.26	-0.64***	-0.61*	-0.67*
standard error	(2.22)	(3.28)	(1.90)	(0.24)	(0.33)	(0.35)
Obs.	1155	592	563	14,946	8,324	6,622
Weak identification test						
First stage robust-F statistic	1.89	0.77	1.94	87.14***	52.24***	36.67***
Overidentifying restrictions test						
Wooldridge's robust score test	0.00	0.02	0.13	0.00	0.01	0.00
Tests of endogeneity						
Robust score chi2	1.73	0.81	0.95	13.09***	6.07**	7.24***
Robust regression F	1.42	0.64	0.84	9.55***	4.39**	5.37**
After matching						
log wage	-1.69	-1.75	-1.26	0.13	-0.26	-0.18
standard error	(2.22)	(3.28)	(1.90)	(0.80)	(1.82)	(0.76)
Obs.	1155	592	563	1152	602	550
Weak identification test						
First stage robust-F statistic	1.89	0.77	1.94	8.47***	2.26	7.36***
Overidentifying restrictions test						
Wooldridge's robust score test	0.00	0.02	0.13	0.01	0.00	0.01
Tests of endogeneity						
Robust score chi2	1.73	0.81	0.95	0.00	0.02	0.28
Robust regression F	1.42	0.64	0.84	0.00	0.02	0.28

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1
I also controlled for age, gender, marital status, age squared, good health, having children less than 5, other income, CMA, race, weeks looked for job, self-employed, shift works, stress, immigrants, provinces, work environments and chronic diseases.
The complete regressions' tables are in appendix.

Appendix 2
A technical explanation of propensity score matching

According to Becker and Ichino (2002), propensity score matching is a method to find treated and control groups with similar characteristics in order to get an unbiased treatment effect. In this method, the treated and control groups are matched based on some exogenous characteristics. Since matching based on more than one variable is difficult, Rosenbaum and Rubin (1983) propose the propensity score matching method where "a single-index variable (the propensity score)" is created to make the matching possible. Theoretically, in the propensity score matching, a variable such as D presents the treated and control groups (D=1 for the treated group and D=0 for the control group). Also, X is a vector of characteristics which may cause selection bias. "Rosenbaum and Rubin (1983) show that if the exposure to treatment is random within cells defined by X, it is also random within cells defined by the values of the one-dimensional variable p(X)" (Becker and Ichino, 2002 p. 359), where p(X) is defined as follows:

$$\text{“}p(X) \equiv Pr(D = 1|X) = E(D|X)\text{”}$$

(Becker and Ichino, 2002 p. 359)

There is also a Lemma for this step of matching: Balancing of pretreatment variables given the propensity score:

$$\text{“If } p(X) \text{ is the propensity score, then } D \perp X \mid p(X)\text{”}$$[52]

(Becker and Ichino, 2002 p. 359)

According to Becker and Ichino (2002), if this lemma is satisfied, a treated and a control observation are similar in their "observable (and unobservable) characteristics". Moreover, based on Becker and Ichino (2002), since it is not possible to always find the exact same propensity scores for a treated and a control observation, some methods must be used to solve this problem.

[52] This reads D is independent of X if p(x) holds.

The most popular methods include Nearest-Neighbour Matching, Radius Matching, Kernel Matching, and Stratification Matching.

In the Nearest-Neighbour Matching, the match for a treated observation is an observation in the control group whose propensity score has the smallest distance from the propensity score of that treated observation. However, some of the matched observations from the control group could be weak matches (meaning that the closest propensity score is not really close). According to Calinedo and Kopeinig (2008), an extension of this method is Caliper Matching (Nearest-Neighbour Matching within caliper). In this method, the longest possible distance between propensity score of a treated and a matched control is defined; then, a match that has the least distance from the propensity score of the treated observation in the defined interval is chosen.

In the Radius Matching, according to Becker and Ichino (2002) and Dehejia and Wahba (2002), the longest distance between propensity score of a treated and a matched control is defined and all the observations in the control group that fall in the defined interval are chosen as matches for the treated observation. Then a weight is applied to each matched control observation. In the Kernel Matching, "all treated are matched with a weighted average of all controls with weights that are inversely proportional to the distance between the propensity scores of treated and controls" (Becker and Ichino, 2002 p. 361).

Finally, "the Stratification method consists of dividing the range of variation of the propensity score in intervals such that within each interval, treated and control units have on average the same propensity score" (Becker and Ichino, 2002 p. 361). According to Becker and Ichino (2002), none of these methods is better than the other. There is always a tradeoff between quality and quantity of the matched individuals. In my chapter, I use the Nearest-Neighbour Matching within caliper because not only I have two samples with similar characteristics but also

I have two samples with almost similar sizes. In other methods, Radius Matching, Kernel Matching, and Stratification Matching, I do not have any control on the size of matches' sample.

Table A2.1. Summary Statistics: Mean and standard deviations of variables for weak non insomniacs (group 4) and strong non-insomniacs (group 3) before matching – CCHS 2001

	All (n=10,428) Group (4)	men (n=4,992) Group(4)	women (n=5,430) Group (4)	All (n=16,101) Group (3)	men (n=8,916) Group (3)	women (n=7,185) Group (3)
Sleep hours per day	7.22	7.08	7.37	7.42	7.30	7.57
	(1.05)	(1.02)	(1.05)	(1.07)	(1.05)	(1.08)
Weak non-insomniacs	1.00	1.00	1.00	0.00	0.00	0.00
Strong non-insomniacs	0.00	0.00	0.00	1.00	1.00	1.00
Hourly wage	21.53	23.23	19.80	21.49	22.60	19.99
	(56.10)	(45.74)	(64.89)	(37.24)	(31.50)	(43.74)
Married/common law	0.71	0.72	0.70	0.74	0.75	0.72
Age	40.46	40.47	40.45	40.27	40.72	39.66
	(9.86)	(9.79)	(9.94)	(10.08)	(10.27)	(9.78)
Male	0.50	1.00	0.00	0.57	1.00	0.00
Good health	0.93	0.93	0.93	0.96	0.96	0.97
Having children less than 5	0.19	0.20	0.18	0.22	0.22	0.21
Other income per week	569.83	437.34	704.07	538.75	437.62	674.71
	(580.88)	(508.76)	(617.50)	(562.20)	(499.47)	(611.08)
CMA	0.72	0.71	0.73	0.72	0.70	0.74
White	0.88	0.88	0.88	0.86	0.86	0.86
Weeks looked for a job	1.11	1.15	1.07	0.97	1.05	0.85
	(4.90)	(4.83)	(4.97)	(4.63)	(4.85)	(4.32)
Self-employed	0.06	0.06	0.06	0.07	0.07	0.06
Regular evening shift	0.04	0.04	0.03	0.04	0.04	0.04
Regular night shift	0.03	0.04	0.02	0.02	0.02	0.02
Rotating shift	0.11	0.13	0.09	0.10	0.11	0.08
Split shift/ On call/ Irregular schedule/ Other	0.08	0.09	0.08	0.07	0.08	0.06
Average stress	0.47	0.47	0.46	0.42	0.41	0.44
High stress	0.33	0.31	0.35	0.26	0.25	0.27
Immigrant	0.19	0.20	0.18	0.22	0.22	0.21
Asthma/Chronic bronchitis	0.10	0.08	0.11	0.09	0.06	0.10
Arthritis/Fibromyalgia/Back problem	0.29	0.29	0.29	0.25	0.19	0.20
Heart disease/Blood pressure	0.10	0.11	0.09	0.10	0.09	0.08
Ulcers/Bowel disorders	0.05	0.04	0.05	0.04	0.03	0.03
Active job	0.32	0.32	0.32	0.34	0.34	0.34
High strain job	0.17	0.20	0.14	0.22	0.24	0.19
Low strain job	0.28	0.24	0.31	0.22	0.29	0.25
Job insecurity	0.14	0.14	0.14	0.14	0.13	0.16
Physically demanding job	0.41	0.46	0.35	0.39	0.45	0.32
Low workplace social support	0.43	0.44	0.43	0.40	0.42	0.39
Job dissatisfaction	0.10	0.10	0.09	0.08	0.07	0.08

These numbers are weighted

Table A2.2.Complete regression results for insomniacs (group 1) and non-insomniacs (group 2) before matching – CCHS 2001

	All	men	women	All	men	women
	(n=3,653)	(n=1,573)	(n=2,080)	(n=26,523)	(n=13,908)	(n=12,615)
Dependent variable: Sleep hours per day	Group (1)	Group (1)	Group (1)	Group (2)	Group (2)	Group (2)
Log(wage)	-0.30	-1.99	0.42	-0.30*	-0.33	-0.24
	(0.74)	(1.33)	(0.84)	(0.17)	(0.24)	(0.24)
Married/common law	0.24*	0.68**	-0.01	0.16***	0.16***	0.12**
	(0.13)	(0.27)	(0.16)	(0.03)	(0.05)	(0.05)
Age	-0.03	0.05	-0.04	-0.04***	-0.03**	-0.04***
	(0.04)	(0.09)	(0.04)	(0.01)	(0.01)	(0.02)
Age square	0.00	-0.00	0.00	0.00***	0.00***	0.00**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Male	-0.13	---	---	-0.20***	---	---
	(0.17)			(0.04)		
Good health	0.31**	0.51*	0.20	0.07	-0.00	0.15*
	(0.14)	(0.27)	(0.17)	(0.05)	(0.06)	(0.08)
Having children less than 5	-0.22*	-0.11	-0.38**	-0.15***	-0.11***	-0.19***
	(0.13)	(0.20)	(0.18)	(0.03)	(0.03)	(0.04)
Log(other income per week)	-0.01	-0.05*	0.03	0.00	-0.00	0.01
	(0.02)	(0.03)	(0.03)	(0.01)	(0.01)	(0.01)
CMA	-0.08	-0.03	-0.13	-0.06**	-0.07**	-0.05
	(0.08)	(0.13)	(0.12)	(0.03)	(0.03)	(0.04)
White	-0.05	-0.19	0.21	0.17***	0.18**	0.17**
	(0.18)	(0.36)	(0.18)	(0.05)	(0.07)	(0.07)
Weeks looked for job	-0.00	0.01	-0.01	0.01***	0.01**	0.02**
	(0.01)	(0.02)	(0.02)	(0.00)	(0.00)	(0.01)
Self-employed	0.12	-0.07	0.21	0.10*	0.05	0.14**
	(0.25)	(0.36)	(0.30)	(0.05)	(0.08)	(0.07)
Regular evening shift	0.12	0.11	0.13	-0.14**	-0.08	-0.23***
	(0.17)	(0.28)	(0.25)	(0.06)	(0.07)	(0.09)
Regular night shift	-0.41**	-0.52*	-0.39*	-0.55***	-0.51***	-0.64***
	(0.17)	(0.28)	(0.22)	(0.08)	(0.12)	(0.11)
Rotating shift	-0.15	0.00	-0.04	-0.08**	-0.09**	-0.07
	(0.14)	(0.27)	(0.14)	(0.03)	(0.04)	(0.05)
Split shift/ On call/ Irregular schedule/ Other	-0.12	-0.21	0.03	-0.14***	-0.24***	-0.01
	(0.14)	(0.27)	(0.21)	(0.04)	(0.05)	(0.05)
Average stress	0.01	0.14	0.01	-0.08***	-0.06*	-0.10***
	(0.10)	(0.16)	(0.13)	(0.02)	(0.03)	(0.03)
High stress	-0.01	0.16	-0.06	-0.17***	-0.16***	-0.18***
	(0.10)	(0.17)	(0.11)	(0.03)	(0.04)	(0.04)
Immigrants	-0.13	-0.46*	-0.07	-0.10***	0.00	-0.23***
	(0.12)	(0.25)	(0.14)	(0.04)	(0.05)	(0.06)

Active job	0.01	-0.33	0.12	-0.07	-0.09	-0.03
	(0.19)	(0.37)	(0.20)	(0.06)	(0.07)	(0.09)
High strain job	-0.02	-0.18	0.02	0.02	-0.01	0.06
	(0.12)	(0.23)	(0.15)	(0.03)	(0.04)	(0.05)
Low strain job	-0.03	-0.40	0.06	-0.08*	-0.09	-0.06
	(0.15)	(0.32)	(0.16)	(0.05)	(0.06)	(0.07)
Job insecurity	-0.07	-0.16	0.01	-0.02	0.03	-0.05
	(0.10)	(0.19)	(0.12)	(0.03)	(0.04)	(0.05)
Physically demanding job	-0.28*	-0.49*	-0.24	-0.13***	-0.14**	-0.10*
	(0.15)	(0.29)	(0.17)	(0.04)	(0.06)	(0.05)
Low workplace social support	-0.12	-0.23*	-0.05	-0.07***	-0.09***	-0.06**
	(0.07)	(0.13)	(0.10)	(0.02)	(0.03)	(0.03)
Job dissatisfaction	0.11	0.23	-0.20	-0.00	-0.06	0.05
	(0.12)	(0.18)	(0.19)	(0.04)	(0.05)	(0.05)
Arthritis/Fibromyalgia/Back problems	-0.12*	-0.22*	-0.02	-0.07***	-0.09***	-0.03
	(0.07)	(0.13)	(0.09)	(0.02)	(0.03)	(0.04)
Asthma/Chronic bronchitis	-0.15	-0.33*	-0.05	-0.10***	-0.06	-0.13***
	(0.09)	(0.17)	(0.12)	(0.03)	(0.05)	(0.05)
Diabetes	0.08	-0.34	0.22	-0.07	0.00	-0.20**
	(0.18)	(0.31)	(0.27)	(0.06)	(0.08)	(0.09)
Heart disease/blood pressure	-0.17	-0.38**	-0.10	-0.07*	-0.05	-0.11*
	(0.10)	(0.19)	(0.13)	(0.03)	(0.04)	(0.06)
Ulcers/Bowel disorders	-0.34***	-0.39*	-0.28*	-0.06	0.01	-0.13*
	(0.12)	(0.21)	(0.16)	(0.05)	(0.08)	(0.07)
Constant	8.31***	11.07***	6.78***	9.00***	8.76***	8.95***
	(1.36)	(2.20)	(1.76)	(0.36)	(0.52)	(0.52)
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.02	.	0.06	0.05	0.02	0.08
Weak identification test						
First stage robust- F statistic	10.79***	7.08***	6.74***	155.75***	86.08***	71.81***
Overidentifying restrictions test						
Wooldridge's robust score test	0.01	0.00	0.01	0.00	0.00	0.00
Tests of endogeneity						
Robust score chi2	0.58	5.85**	0.12	6.77***	4.24**	2.23
Robust regression F	0.41	4.29**	0.09	4.73**	3.01*	1.55

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Table A2.3. Propensity matching score regression for insomnia – CCHS 2001	
Dependent variable: Having insomnia[53]	n = (30,669)
Log(wage)	-0.04**
	(0.02)
Married/common law	-0.09***
	(0.03)
Age	0.01
	(0.01)
Age square	-0.00
	(0.00)
Male	-0.17***
	(0.02)
Good health	-0.52***
	(0.03)
Having children less than 5	-0.05*
	(0.03)
Log(other income per week)	0.00
	(0.00)
CMA	-0.03
	(0.02)
White	0.07*
	(0.04)
Weeks looked for job	0.00*
	(0.00)
Self-employed	-0.03
	(0.04)
Regular evening shift	0.10**
	(0.05)
Regular night shift	0.37***
	(0.06)
Rotating shift	0.11***
	(0.03)
Split shift/ On call/ Irregular schedule/ Other	0.10***
	(0.03)
Average stress	0.06**
	(0.03)
High stress	0.37***
	(0.03)

[53] 1 for insomniacs and 0 for non-insomniacs

Immigrants	-0.12***
	(0.04)
Active job	0.05*
	(0.03)
High strain job	-0.06*
	(0.03)
Low strain job	0.09***
	(0.03)
Job insecurity	0.10***
	(0.03)
Physically demanding job	0.07***
	(0.02)
Low workplace social support	0.07***
	(0.02)
Job dissatisfaction	0.20***
	(0.03)
Arthritis/Fibromyalgia/Back problems	0.30***
	(0.02)
Asthma/Chronic bronchitis	0.17***
	(0.03)
Diabetes	0.07
	(0.06)
Heart disease/blood pressure	0.14***
	(0.03)
Ulcers/Bowel disorders	0.18***
	(0.04)
Constant	-1.23***
	(0.18)
Province fixed effect	Yes
Pseudo R2	0.08

Robust standard errors are in the parentheses.

*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Table A2.4. Tests on the means for insomniacs and non-insomniacs before and after matching– CCHS 2001

	All (n=3,653) Group (1)	All (n=26,523) Group (2)	P-value[1]	ASD[2]	All (n=3,646) Group (1)	All (n=3,648) Group (2)	P-value	ASD
Hourly wage	20.26 (55.08)	21.50 (45.23)	0.13	-0.02	20.24 (55.13)	20.98 (58.87)	0.58	-0.01
Married/common law	0.68	0.73	0.00***	-0.11	0.68	0.68	1.00	0.00
Age	41.95 (9.96)	40.34 (10.00)	0.00***	0.16	41.94 (9.96)	42.10 (10.07)	0.50	-0.02
Male	0.46	0.55	0.00***	-0.18	0.46	0.45	0.39	0.02
Good health	0.85	0.95	0.00***	-0.28	0.85	0.85	1.00	0.00
Having children less than 5	0.16	0.21	0.00***	-0.14	0.16	0.15	0.24	0.03
Other income per week	518.80 (555.38)	550.41 (569.47)	0.00***	-0.06	519.51 (555.78)	521.53 (557.26)	0.88	0.00
CMA	0.68	0.72	0.00***	-0.09	0.68	0.70	0.06*	-0.04
White	0.89	0.86	0.00***	0.10	0.89	0.89	1.00	0.00
Weeks looked for a job	1.26 (5.24)	1.02 (4.74)	0.00***	0.05	1.23 (5.10)	1.46 (5.79)	0.07*	-0.05
Self-employed	0.06	0.06	1.00	0.00	0.06	0.05	0.06*	0.04
Regular evening shift	0.04	0.04	1.00	0.00	0.04	0.05	0.04**	-0.05
Regular night shift	0.04	0.02	0.00***	0.10	0.04	0.04	1.00	0.00
Rotating shift	0.12	0.10	0.00***	0.06	0.12	0.12	1.00	0.00
Split shift/ On call/ Irregular schedule/ Other	0.09	0.08	0.04**	0.03	0.09	0.09	1.00	0.00
Average stress	0.35	0.44	0.00***	-0.19	0.35	0.36	0.37	-0.02
High stress	0.47	0.28	0.00***	0.38	0.47	0.45	0.09*	0.04
Immigrant	0.16	0.21	0.00***	-0.14	0.16	0.17	0.25	-0.03
Asthma/Chronic bronchitis	0.14	0.08	0.00***	0.17	0.13	0.12	0.20	0.03
Arthritis/Fibromyalgia/Back problem	0.41	0.23	0.00***	0.37	0.40	0.42	0.08*	-0.04
Heart disease/Blood pressure	0.15	0.09	0.00***	0.17	0.13	0.15	0.01**	-0.06
Ulcers/Bowel disorders	0.08	0.04	0.00***	0.15	0.08	0.07	0.10	0.04
Active job	0.32	0.33	0.23	-0.02	0.32	0.31	0.36	0.02
High strain job	0.12	0.20	0.00***	-0.25	0.12	0.12	1.00	0.00
Low strain job	0.35	0.24	0.00***	0.23	0.35	0.36	0.37	-0.02
Job insecurity	0.20	0.14	0.00***	0.15	0.20	0.19	0.28	0.03
Physically demanding job	0.48	0.40	0.00***	0.16	0.48	0.48	1.00	0.00
Low workplace social support	0.51	0.41	0.00***	0.20	0.51	0.50	0.39	0.02
Job dissatisfaction	0.16	0.08	0.00***	0.22	0.16	0.16	1.00	0.00

These numbers are weighted

1- P-value of two-tailed t-test on mean differences *** p-value<0.01, ** p-value<0.05, * p-value<0.1

2- The absolute standardized difference in means should be less than 0.25 for a good balance

Table A2.5. Complete regression results for insomniacs (group 1) and non-insomniacs (group 2) after matching – CCHS 2001

	All (n=3,646)	men (n=1,572)	women (n=2,074)	All (n=3,648)	men (n=1,532)	women (n=2,116)
Dependent variable: Sleep hours per day	Group (1)	Group (1)	Group (1)	Group (2)	Group (2)	Group (2)
Log(wage)	-0.24	-1.96	0.52	0.36	-0.38	0.79*
	(0.75)	(1.32)	(0.86)	(0.36)	(0.71)	(0.42)
Married/common law	0.23*	0.67**	-0.03	0.13	0.16	0.21*
	(0.13)	(0.27)	(0.16)	(0.08)	(0.15)	(0.12)
Age	-0.03	0.04	-0.04	-0.04*	-0.03	-0.03
	(0.04)	(0.09)	(0.04)	(0.03)	(0.05)	(0.03)
Age square	0.00	-0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Male	-0.15	---	---	-0.28***	---	---
	(0.17)			(0.09)		
Good health	0.30**	0.51*	0.17	-0.08	-0.05	-0.14
	(0.14)	(0.27)	(0.18)	(0.09)	(0.12)	(0.14)
Having children less than 5	-0.22*	-0.11	-0.40**	-0.21**	0.02	-0.35***
	(0.13)	(0.20)	(0.19)	(0.09)	(0.13)	(0.12)
Log(other income per week)	-0.01	-0.05*	0.03	0.00	0.00	-0.00
	(0.02)	(0.03)	(0.03)	(0.01)	(0.02)	(0.02)
CMA	-0.08	-0.03	-0.13	-0.13**	-0.08	-0.19**
	(0.08)	(0.13)	(0.12)	(0.06)	(0.08)	(0.09)
White	-0.05	-0.19	0.22	0.20*	0.17	0.40**
	(0.18)	(0.36)	(0.18)	(0.11)	(0.20)	(0.17)
Weeks looked for job	-0.00	0.01	-0.01	0.00	0.01	-0.01
	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
Self-employed	0.14	-0.06	0.25	0.12	-0.04	0.25
	(0.25)	(0.36)	(0.31)	(0.12)	(0.19)	(0.16)
Regular evening shift	0.11	0.11	0.12	0.04	0.22	-0.13
	(0.17)	(0.28)	(0.26)	(0.15)	(0.17)	(0.22)
Regular night shift	-0.44**	-0.57**	-0.42*	-0.72***	-0.75***	-0.89***
	(0.17)	(0.28)	(0.23)	(0.18)	(0.29)	(0.23)
Rotating shift	-0.16	-0.00	-0.05	-0.04	-0.19*	0.03
	(0.14)	(0.27)	(0.14)	(0.08)	(0.10)	(0.11)
Split shift/ On call/ Irregular schedule/ Other	-0.11	-0.21	0.04	-0.10	-0.27*	0.06
	(0.14)	(0.26)	(0.21)	(0.11)	(0.15)	(0.16)
Average stress	0.01	0.14	0.02	-0.10	-0.13	-0.10
	(0.10)	(0.16)	(0.13)	(0.08)	(0.10)	(0.11)
High stress	-0.01	0.15	-0.05	-0.14*	-0.10	-0.20*
	(0.10)	(0.17)	(0.11)	(0.08)	(0.10)	(0.12)
Immigrants	-0.13	-0.45*	-0.07	-0.03	-0.04	0.02

	(0.12)	(0.25)	(0.14)	(0.10)	(0.12)	(0.15)
Active job	0.03	-0.32	0.16	0.05	-0.06	0.14
	(0.19)	(0.36)	(0.21)	(0.12)	(0.18)	(0.17)
High strain job	-0.01	-0.18	0.04	0.23**	0.19	0.26*
	(0.12)	(0.22)	(0.16)	(0.09)	(0.12)	(0.13)
Low strain job	-0.03	-0.40	0.07	0.01	-0.02	0.03
	(0.15)	(0.32)	(0.16)	(0.11)	(0.20)	(0.14)
Job insecurity	-0.08	-0.18	-0.00	0.11	0.15*	0.10
	(0.09)	(0.19)	(0.12)	(0.08)	(0.09)	(0.11)
Physically demanding job	-0.26*	-0.49*	-0.22	-0.04	-0.14	0.03
	(0.16)	(0.29)	(0.18)	(0.07)	(0.12)	(0.10)
Low workplace social support	-0.12*	-0.23*	-0.06	-0.09*	-0.12	-0.02
	(0.08)	(0.13)	(0.10)	(0.05)	(0.08)	(0.08)
Job dissatisfaction	0.12	0.25	-0.18	-0.08	-0.06	-0.08
	(0.12)	(0.18)	(0.19)	(0.08)	(0.12)	(0.12)
Arthritis/Fibromyalgia/Back problems	-0.12*	-0.22*	-0.01	-0.11*	-0.16**	-0.08
	(0.07)	(0.12)	(0.09)	(0.06)	(0.08)	(0.08)
Asthma/Chronic bronchitis	-0.15	-0.35**	-0.04	-0.10	-0.20	-0.00
	(0.09)	(0.17)	(0.12)	(0.07)	(0.13)	(0.10)
Diabetes	0.06	-0.39	0.18	-0.12	-0.08	-0.20
	(0.18)	(0.31)	(0.28)	(0.11)	(0.15)	(0.18)
Heart disease/blood pressure	-0.17	-0.39**	-0.11	-0.14*	-0.11	-0.24*
	(0.10)	(0.19)	(0.13)	(0.08)	(0.11)	(0.13)
Ulcers/Bowel disorders	-0.31**	-0.39*	-0.23	-0.11	-0.20	-0.07
	(0.12)	(0.21)	(0.16)	(0.11)	(0.18)	(0.15)
Constant	8.20***	11.06***	6.47***	7.55***	8.98***	6.19***
	(1.38)	(2.19)	(1.81)	(0.77)	(1.24)	(1.08)
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.03	.	0.06	0.10	0.06	0.04
Weak identification test						
First stage robust- F statistic	10.55***	7.15***	6.54**	28.12***	8.60***	19.36***
Overidentifying restrictions test						
Wooldridge's robust score test	0.00	0.01	0.01	0.00	0.00	0.00
Tests of endogeneity						
Robust score chi2	0.45	5.74**	0.24	0.38	0.70	3.09*
Robust regression F	0.32	4.20**	0.17	0.26	0.53	2.03

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Table A2.6. Regression results for insomniacs (group 1) and strong non-insomniacs (group 3) before matching – CCHS 2001

	All	men	women	All	men	women
	(n=3,653)	(n=1,573)	(n=2,080)	(n=16,101)	(n=8,916)	(n=7,185)
Dependent variable: Sleep hours per day	Group (1)	Group (1)	Group (1)	Group (3)	Group (3)	Group (3)
Log(wage)	-0.30	-1.99	0.42	-0.69***	-0.69**	-0.66*
	(0.74)	(1.33)	(0.84)	(0.24)	(0.33)	(0.34)
Married/common law	0.24*	0.68**	-0.01	0.24***	0.23***	0.25***
	(0.13)	(0.27)	(0.16)	(0.05)	(0.07)	(0.07)
Age	-0.03	0.05	-0.04	-0.02	-0.01	-0.03
	(0.04)	(0.09)	(0.04)	(0.01)	(0.02)	(0.02)
Age square	0.00	-0.00	0.00	0.00*	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Male	-0.13	---	---	-0.13**	---	---
	(0.17)			(0.05)		
Good health	0.31**	0.51*	0.20	0.08	-0.02	0.23
	(0.14)	(0.27)	(0.17)	(0.08)	(0.09)	(0.15)
Having children less than 5	-0.22*	-0.11	-0.38**	-0.16***	-0.12***	-0.21***
	(0.13)	(0.20)	(0.18)	(0.03)	(0.04)	(0.05)
Log(other income per week)	-0.01	-0.05*	0.03	-0.01	-0.00	-0.02
	(0.02)	(0.03)	(0.03)	(0.01)	(0.01)	(0.01)
CMA	-0.08	-0.03	-0.13	0.01	-0.03	0.06
	(0.08)	(0.13)	(0.12)	(0.04)	(0.05)	(0.06)
White	-0.05	-0.19	0.21	0.28***	0.27***	0.27***
	(0.18)	(0.36)	(0.18)	(0.07)	(0.10)	(0.09)
Weeks looked for job	-0.00	0.01	-0.01	0.02***	0.02***	0.02***
	(0.01)	(0.02)	(0.02)	(0.00)	(0.01)	(0.01)
Self-employed	0.12	-0.07	0.21	-0.05	-0.07	-0.03
	(0.25)	(0.36)	(0.30)	(0.08)	(0.11)	(0.11)
Regular evening shift	0.12	0.11	0.13	-0.22***	-0.20**	-0.26**
	(0.17)	(0.28)	(0.25)	(0.08)	(0.09)	(0.13)
Regular night shift	-0.41**	-0.52*	-0.39*	-0.56***	-0.63***	-0.46***
	(0.17)	(0.28)	(0.22)	(0.11)	(0.16)	(0.16)
Rotating shift	-0.15	0.00	-0.04	-0.03	-0.05	-0.03
	(0.14)	(0.27)	(0.14)	(0.04)	(0.06)	(0.07)
Split shift/ On call/ Irregular schedule/ Other	-0.12	-0.21	0.03	-0.16***	-0.26***	-0.01
	(0.14)	(0.27)	(0.21)	(0.05)	(0.07)	(0.08)
Average stress	0.01	0.14	0.01	-0.07**	-0.04	-0.12***
	(0.10)	(0.16)	(0.13)	(0.03)	(0.04)	(0.04)
High stress	-0.01	0.16	-0.06	-0.16***	-0.16***	-0.18***
	(0.10)	(0.17)	(0.11)	(0.04)	(0.05)	(0.05)
Immigrants	-0.13	-0.46*	-0.07	-0.14***	-0.02	-0.31***
	(0.12)	(0.25)	(0.14)	(0.05)	(0.07)	(0.09)
Active job	0.01	-0.33	0.12	-0.18**	-0.18*	-0.17

	(0.19)	(0.37)	(0.20)	(0.08)	(0.10)	(0.13)
High strain job	-0.02	-0.18	0.02	0.01	-0.03	0.06
	(0.12)	(0.23)	(0.15)	(0.04)	(0.06)	(0.06)
Low strain job	-0.03	-0.40	0.06	-0.15**	-0.13*	-0.17
	(0.15)	(0.32)	(0.16)	(0.07)	(0.08)	(0.11)
Job insecurity	-0.07	-0.16	0.01	-0.05	-0.03	-0.06
	(0.10)	(0.19)	(0.12)	(0.04)	(0.05)	(0.07)
Physically demanding job	-0.28*	-0.49*	-0.24	-0.22***	-0.23***	-0.18***
	(0.15)	(0.29)	(0.17)	(0.05)	(0.08)	(0.07)
Low workplace social support	-0.12	-0.23*	-0.05	-0.09***	-0.14***	-0.03
	(0.07)	(0.13)	(0.10)	(0.03)	(0.04)	(0.04)
Job dissatisfaction	0.11	0.23	-0.20	0.03	-0.03	0.08
	(0.12)	(0.18)	(0.19)	(0.05)	(0.07)	(0.07)
Arthritis/Fibromyalgia/Back problems	-0.12*	-0.22*	-0.02	-0.04	-0.07	0.02
	(0.07)	(0.13)	(0.09)	(0.03)	(0.04)	(0.05)
Asthma/Chronic bronchitis	-0.15	-0.33*	-0.05	-0.08	0.02	-0.15**
	(0.09)	(0.17)	(0.12)	(0.05)	(0.07)	(0.06)
Diabetes	0.08	-0.34	0.22	0.02	0.14	-0.32**
	(0.18)	(0.31)	(0.27)	(0.09)	(0.10)	(0.15)
Heart disease/blood pressure	-0.17	-0.38**	-0.10	-0.08	-0.02	-0.16*
	(0.10)	(0.19)	(0.13)	(0.05)	(0.06)	(0.09)
Ulcers/Bowel disorders	-0.34***	-0.39*	-0.28*	-0.06	0.04	-0.16
	(0.12)	(0.21)	(0.16)	(0.08)	(0.11)	(0.10)
Constant	8.31***	11.07***	6.78***	9.60***	9.30***	9.71***
	(1.36)	(2.20)	(1.76)	(0.50)	(0.72)	(0.74)
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.02	.	0.06	.	.	.
Weak identification test						
First stage robust- F statistic	10.80***	7.08***	6.75***	89.04***	53.07***	38.60***
Overidentifying restrictions test						
Wooldridge's robust score test	0.01	0.00	0.01	0.00	0.00	0.01
Tests of endogeneity						
Robust score chi2	0.59	5.86**	0.13	15.40***	7.92***	7.20***
Robust regression F	0.41	4.29**	0.09	11.31***	5.77**	5.39**

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Table A2.7. Propensity matching score regression for insomnia – CCHS 2001	
Dependent variable: Having insomnia[54]	n = (20,065)
Log(wage)	-0.04**
	(0.02)
Married/common law	-0.15***
	(0.03)
Age	0.03***
	(0.01)
Age square	-0.00**
	(0.00)
Male	-0.25***
	(0.02)
Good health	-0.60***
	(0.04)
Having children less than 5	-0.09***
	(0.03)
Log(other income per week)	0.01
	(0.00)
CMA	-0.03
	(0.02)
White	0.06
	(0.05)
Weeks looked for job	0.00**
	(0.00)
Self-employed	-0.04
	(0.05)
Regular evening shift	0.11*
	(0.06)
Regular night shift	0.43***
	(0.06)
Rotating shift	0.16***
	(0.03)
Split shift/ On call/ Irregular schedule/ Other	0.14***
	(0.04)
Average stress	0.14***
	(0.03)
High stress	0.50***
	(0.03)

[54] 1 for insomniacs and 0 for strong non-insomniacs

Immigrants	-0.16***
	(0.04)
Active job	0.04
	(0.03)
High strain job	-0.09**
	(0.04)
Low strain job	0.11***
	(0.03)
Job insecurity	0.10***
	(0.03)
Physically demanding job	0.07***
	(0.02)
Low workplace social support	0.07***
	(0.02)
Job dissatisfaction	0.26***
	(0.04)
Arthritis/Fibromyalgia/Back problems	0.42***
	(0.02)
Asthma/Chronic bronchitis	0.21***
	(0.04)
Diabetes	0.09
	(0.07)
Heart disease/blood pressure	0.18***
	(0.04)
Ulcers/Bowel disorders	0.25***
	(0.05)
Constant	-0.91***
	(0.15)
Province fixed effect	Yes
Pseudo R2	0.06

Robust standard errors are in the parentheses.

*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Table A2.8. Tests on the means for insomniacs and strong non-insomniacs before and after matching – CCHS 2001

	All (n=3,653) Group (1)	All (n=16,101) Group (3)	P-value[1]	ASD[2]	All (n=3,468) Group (1)	All (n=3,470) Group (3)	P-value	ASD
Hourly wage	20.26 (55.08)	21.49 (37.24)	0.10*	-0.02	20.41 (56.27)	21.16 (45.44)	0.54	-0.01
Married/common law	0.68	0.74	0.00***	-0.13	0.69	0.70	0.37	-0.02
Age	41.95 (9.96)	40.27 (10.08)	0.00***	0.17	41.82 (9.95)	42.09 (9.98)	0.26	-0.03
Male	0.46	0.57	0.00***	-0.22	0.47	0.44	0.01**	0.06
Good health	0.85	0.96	0.00***	-0.31	0.89	0.88	0.19	0.03
Having children less than 5	0.16	0.22	0.00***	-0.16	0.17	0.17	1.00	0.00
Other income per week	518.80 (555.38)	538.75 (562.20)	0.05*	-0.04	537.75 (561.63)	534.39 (531.83)	0.80	0.01
CMA	0.68	0.72	0.00***	-0.09	0.68	0.69	0.37	-0.02
White	0.89	0.86	0.00***	0.10	0.90	0.91	0.16	-0.03
Weeks looked for a job	1.26 (5.24)	0.97 (4.63)	0.00***	0.06	1.24 (5.07)	1.21 (5.28)	0.81	0.01
Self-employed	0.06	0.07	0.03**	-0.04	0.06	0.05	0.07*	0.04
Regular evening shift	0.04	0.04	1.00	0.00	0.04	0.05	0.04**	-0.05
Regular night shift	0.04	0.02	0.00***	0.10	0.03	0.04	0.02**	-0.06
Rotating shift	0.12	0.10	0.00***	0.06	0.12	0.12	1.00	0.00
Split shift/ On call/ Irregular schedule/ Other	0.09	0.07	0.00***	0.07	0.09	0.09	1.00	0.00
Average stress	0.35	0.42	0.00***	-0.15	0.37	0.36	0.39	0.02
High stress	0.47	0.26	0.00***	0.42	0.44	0.45	0.40	-0.02
Immigrant	0.16	0.22	0.00***	-0.16	0.16	0.17	0.26	-0.03
Asthma/Chronic bronchitis	0.14	0.09	0.00***	0.14	0.12	0.13	0.21	-0.03
Arthritis/Fibromyalgia/Back problem	0.41	0.25	0.00***	0.33	0.38	0.39	0.39	-0.02
Heart disease/Blood pressure	0.15	0.10	0.00***	0.14	0.13	0.14	0.22	-0.03
Ulcers/Bowel disorders	0.08	0.04	0.00***	0.15	0.07	0.06	0.09*	0.04
Active job	0.32	0.34	0.00***	-0.04	0.32	0.31	0.37	0.02
High strain job	0.12	0.22	0.00***	-0.31	0.12	0.13	0.21	-0.03
Low strain job	0.35	0.22	0.00***	0.27	0.33	0.34	0.38	-0.02
Job insecurity	0.20	0.14	0.00***	0.15	0.19	0.19	1.00	0.00
Physically demanding job	0.48	0.39	0.00***	0.18	0.47	0.45	0.09*	0.04
Low workplace social support	0.51	0.40	0.00***	0.22	0.50	0.50	1.00	0.00
Job dissatisfaction	0.16	0.08	0.00***	0.22	0.15	0.15	1.00	0.00

These numbers are weighted

1- P-value of two-tailed t-test on mean differences *** p-value<0.01, ** p-value<0.05, * p-value<0.1

2- The absolute standardized difference in means should be less than 0.25 for a good balance

Table A2.9. Regression results for insomniacs (group 1) and strong non-insomniacs (group 3) after matching – CCHS 2001

	All (n=3,468)	men (n=1,521)	women (n=1,947)	All (n=3,470)	men (n=1,496)	women (n=1,974)
Dependent variable: Sleep hours per day	Group (1)	Group (1)	Group (1)	Group (3)	Group (3)	Group (3)
Log(wage)	-0.49	-2.27	0.27	-0.71*	-1.25*	-0.41
	(0.72)	(1.39)	(0.79)	(0.42)	(0.74)	(0.55)
Married/common law	0.27*	0.70**	-0.00	0.28***	0.36*	0.32**
	(0.14)	(0.28)	(0.18)	(0.11)	(0.19)	(0.14)
Age	-0.03	0.04	-0.03	-0.04	-0.00	-0.07*
	(0.03)	(0.09)	(0.04)	(0.03)	(0.04)	(0.04)
Age square	0.00	-0.00	0.00	0.00**	0.00	0.00*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Male	-0.06	---	---	-0.10	---	---
	(0.17)			(0.10)		
Good health	0.31**	0.49*	0.24	0.04	0.05	0.09
	(0.15)	(0.28)	(0.18)	(0.12)	(0.15)	(0.19)
Having children less than 5	-0.16	-0.05	-0.34*	-0.10	-0.12	-0.16
	(0.13)	(0.21)	(0.18)	(0.08)	(0.13)	(0.12)
Log(other income per week)	-0.01	-0.05	0.02	-0.02	-0.01	-0.04
	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)
CMA	-0.01	0.09	-0.07	-0.04	-0.10	-0.02
	(0.08)	(0.14)	(0.11)	(0.07)	(0.10)	(0.10)
White	-0.03	-0.08	0.23	0.07	0.27	0.05
	(0.18)	(0.38)	(0.18)	(0.15)	(0.34)	(0.17)
Weeks looked for job	0.00	0.01	-0.00	0.01*	0.01	0.02*
	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
Self-employed	0.09	-0.15	0.22	-0.17	-0.37	0.03
	(0.25)	(0.36)	(0.30)	(0.16)	(0.26)	(0.22)
Regular evening shift	0.13	0.08	0.22	-0.30*	-0.33*	-0.36
	(0.17)	(0.29)	(0.27)	(0.16)	(0.20)	(0.23)
Regular night shift	-0.57***	-0.79***	-0.43*	-0.53***	-0.72**	-0.25
	(0.18)	(0.30)	(0.24)	(0.20)	(0.32)	(0.25)
Rotating shift	-0.11	0.13	-0.03	-0.01	-0.21	0.11
	(0.14)	(0.29)	(0.14)	(0.09)	(0.14)	(0.12)
Split shift/ On call/ Irregular schedule/ Other	-0.16	-0.15	-0.09	-0.08	-0.20	-0.02
	(0.14)	(0.28)	(0.20)	(0.12)	(0.17)	(0.16)
Average stress	-0.00	0.14	-0.01	0.00	0.15	-0.17
	(0.10)	(0.17)	(0.13)	(0.08)	(0.12)	(0.11)
High stress	-0.01	0.19	-0.08	-0.20**	-0.07	-0.38***
	(0.10)	(0.17)	(0.11)	(0.08)	(0.13)	(0.10)
Immigrants	-0.15	-0.47*	-0.09	-0.25**	-0.10	-0.32**

	(0.12)	(0.26)	(0.14)	(0.10)	(0.15)	(0.14)
Active job	-0.02	-0.37	0.11	-0.36**	-0.44*	-0.29*
	(0.19)	(0.37)	(0.20)	(0.15)	(0.23)	(0.18)
High strain job	-0.01	-0.18	0.05	-0.09	-0.03	-0.15
	(0.12)	(0.24)	(0.15)	(0.09)	(0.13)	(0.12)
Low strain job	-0.07	-0.45	0.02	-0.24*	-0.43**	-0.09
	(0.15)	(0.33)	(0.16)	(0.13)	(0.20)	(0.17)
Job insecurity	-0.06	-0.23	0.04	0.08	0.17	0.06
	(0.10)	(0.21)	(0.12)	(0.09)	(0.13)	(0.13)
Physically demanding job	-0.32**	-0.55*	-0.26	-0.32***	-0.40**	-0.29**
	(0.15)	(0.30)	(0.17)	(0.10)	(0.19)	(0.12)
Low workplace social support	-0.13*	-0.22	-0.07	-0.07	-0.05	-0.13
	(0.07)	(0.14)	(0.09)	(0.07)	(0.10)	(0.09)
Job dissatisfaction	0.15	0.28	-0.18	-0.02	-0.06	-0.03
	(0.12)	(0.18)	(0.19)	(0.09)	(0.14)	(0.11)
Arthritis/Fibromyalgia/Back problems	-0.10	-0.16	-0.03	-0.21***	-0.14	-0.24***
	(0.07)	(0.13)	(0.09)	(0.06)	(0.10)	(0.08)
Asthma/Chronic bronchitis	-0.17*	-0.38**	-0.04	-0.08	0.00	-0.13
	(0.09)	(0.18)	(0.12)	(0.08)	(0.15)	(0.09)
Diabetes	-0.02	-0.41	0.08	-0.03	0.33	-0.30
	(0.21)	(0.35)	(0.31)	(0.18)	(0.22)	(0.24)
Heart disease/blood pressure	-0.15	-0.32*	-0.12	-0.23**	-0.25*	-0.22
	(0.11)	(0.19)	(0.13)	(0.10)	(0.14)	(0.14)
Ulcers/Bowel disorders	-0.37***	-0.44**	-0.29*	0.00	0.14	-0.11
	(0.13)	(0.22)	(0.17)	(0.13)	(0.21)	(0.16)
Constant	8.67***	11.81***	6.77***	10.39***	10.62***	10.43***
	(1.38)	(2.32)	(1.82)	(1.06)	(1.93)	(1.25)
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.02	.	0.06	.	.	0.07
Weak identification test						
First stage robust- F statistic	11.42***	6.89***	7.39***	26.61***	13.11***	14.31***
Overidentifying restrictions test						
Wooldridge's robust score test	0.00	0.00	0.01	0.00	0.00	0.02
Tests of endogeneity						
Robust score chi2	1.17	7.48***	0.03	3.92**	4.05**	1.11
Robust regression F	0.84	5.75**	0.02	3.04*	3.31*	0.83

Robust standard errors are in the parentheses.
*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Chapter Three

Are Québecers More Stressed Out at Work than Others? Investigation into the Differences between Québec and the Rest of Canada in the Level of Work Stress

3.1. Introduction

Work stress is something that most workers have to deal with at one point or another. Living in a world with rapidly changing technology, fierce competition for jobs, and job insecurity all contribute to stress in the workplace leading to health and family problems. Some level of stress is good when it pushes us to grow; however, work stress is at the root of many problems when it is not under our control. Workplace stress is defined as "…the harmful physical and emotional responses that can happen when there is conflict between job demands on the employee and the amount of control an employee has over meeting these demands" (The Canadian Centre for Occupational Health and Safety, 2012)

According to Bernèche (2010), more than 29 percent of Canadians report that they have a high level of work stress. The same thing is observed around the world. In a study of 15 European Union member states, Kompier et al. (2000) reveals that 28 percent of people in Europe suffer from high work stress. In addition, Bickford (2005) reports that 66 percent of Canadian CEOs think that stress is the most important problem at work in Canada, decreasing productivity at work more than any other factors.

Work stress not only affects individuals but it also has a negative impact on society. It causes low productivity and absenteeism, and increases health care costs (Park (2007). Health-care expenditures have been found to be nearly 50 percent greater for workers with high levels of stress (Williams, 2003, p1), and according to Conner (2005), mental disability claims related to work stress account for about 30 percent of all such claims in Canada. Bickford (2005) reports that mental health problems caused by work stress, result in a loss of about $33 billion every year in Canada because of reduced productivity. Moreover, it has been estimated that stress-related absences cost employers about $3.5 billion each year (Williams, 2003 p2). These numbers illustrate the economic importance of work stress and thus help to motivate this study on work stress.

In principle, occupational health and safety legislation in all jurisdictions requires that employers take care of the health and safety of their workers, including "… the management of stress-related hazards, work stress and mental as well as physical health outcomes" (Catenacci and Saint-Cyr, 2008 p1).[55] According to Williams (2003), Canadian employers often use employee assistance programs to deal with the high stress of employees. Almost 26 percent of private-sector employees use these programs according to the Workplace and Employee Survey. This number is higher in some industries such as communication and utilities (49 percent of employees). However, these employee assistance programs have only been successful with decreasing the symptoms of work stress and not with deleting the causes (Williams, 2003).

Catenacci and Saint-Cyr (2008) use the Watson Wyatt's 2007/2008 Staying@Work survey of more than 500,000 full-time Canadian employees to investigate work stress in Canada. Although they find that work stress is growing fast in Canada, employers have not done much to address that problem. Catenacci and Saint-Cyr (2008) report that 48 percent of employers claim

[55] http://www.hrinfodesk.com/Articles/workstressjobperformance.htm

that the main source of stress in Canada is long working hours. Employee assistance programs are not very useful for dealing with this issue.

This study investigates the factors that affect work stress, specifically, the work stress level reported across Canadian provinces. While studies such as Bordeleau and Traoré (2007) and Lesage et al. (2010) have noticed that the level of work stress is significantly higher in Québec than in other provinces, they have not looked thoroughly at the causes of this phenomenon. Using various cycles of the Canadian Community Health Survey (CCHS), this study finds persistence in the observation that people in Québec experience significantly more work stress relative to those elsewhere. For instance, in Québec 41 percent of the population had quite bit or extremely stressful jobs in 2001. In other provinces this number is much smaller: 30 percent in Ontario, Alberta, Manitoba and British Columbia, and even lower in the Atlantic Provinces. Figure 3.1 shows convincingly that this difference is also found in *all other cycles* of the CCHS: 2003, 2005, 2007, 2008, 2009, 2010, 2011 and 2012.

In this chapter, I control for demographic factors, economic factors, health factors, work environment, social support, and macroeconomic factors to see if they can explain the high level of work stress in Canada and, specifically, if they can shed light on the differences between Québec and other provinces. It is found that irrespective of a host of influences, work stress is always higher in Québec. One factor that may explain some of the differences is related to differences in legal environment between the Civil Law approach in Québec versus the Common Law that governs the Rest of Canada (Christie, 2010).

The contributions of this chapter to the literature are twofold. First, this study adds to the papers that empirically investigate work stress and it looks at the impact of new factors such as language and culture. Second, the paper looks at the difference between Québec and other

Canadian provinces in the level of reported work stress, and tries to explain why this difference persists. The next section reviews the economic literature on work stress. The third section presents the methodology used in the paper. The fourth section provides information about the database that is used and the fifth section includes the results and the econometric analysis. Section six concludes the chapter.

3.2. Literature review

In this section, I summarize some empirical studies on the determinants of work stress. I also discuss papers which have noticed the difference between the level of work stress in Québec and in the Rest of Canada. In the first section, I discuss the determinants of work stress to see how different factors affect work stress. In the second section, I discuss the impact of culture and location on work stress because Québec has some cultural difference with other provinces that might affect the level of work stress.

3.2.1. Work stress theoretical framework

Many studies have provided theoretical frameworks of the determinants and effects of work stress (see, for example, Summers et al., 1995; Hendrix et al., 1995; Cooper, 1998; Barling et al., 2005; and Dolan, 2007). Those frameworks usually include common factors that explain how work stress develops and grows. In addition, they frequently present some of the adverse effects of work stress, such as the negative impact on commitment, satisfaction or motivation. A good example of such a framework is a diagram shown in Summers et al. (1995) and reproduced in figure 3.2. According to this framework, work stress is mainly affected by personal, social, organizational, economic and role characteristics. The negative effects of work stress on commitment, satisfaction and motivation can be very strong and, according to the authors, they

can develop intention to leave a job and result in voluntary turnover. In this chapter, I am guided to some extent by this framework in my choice of variables that affect work stress.

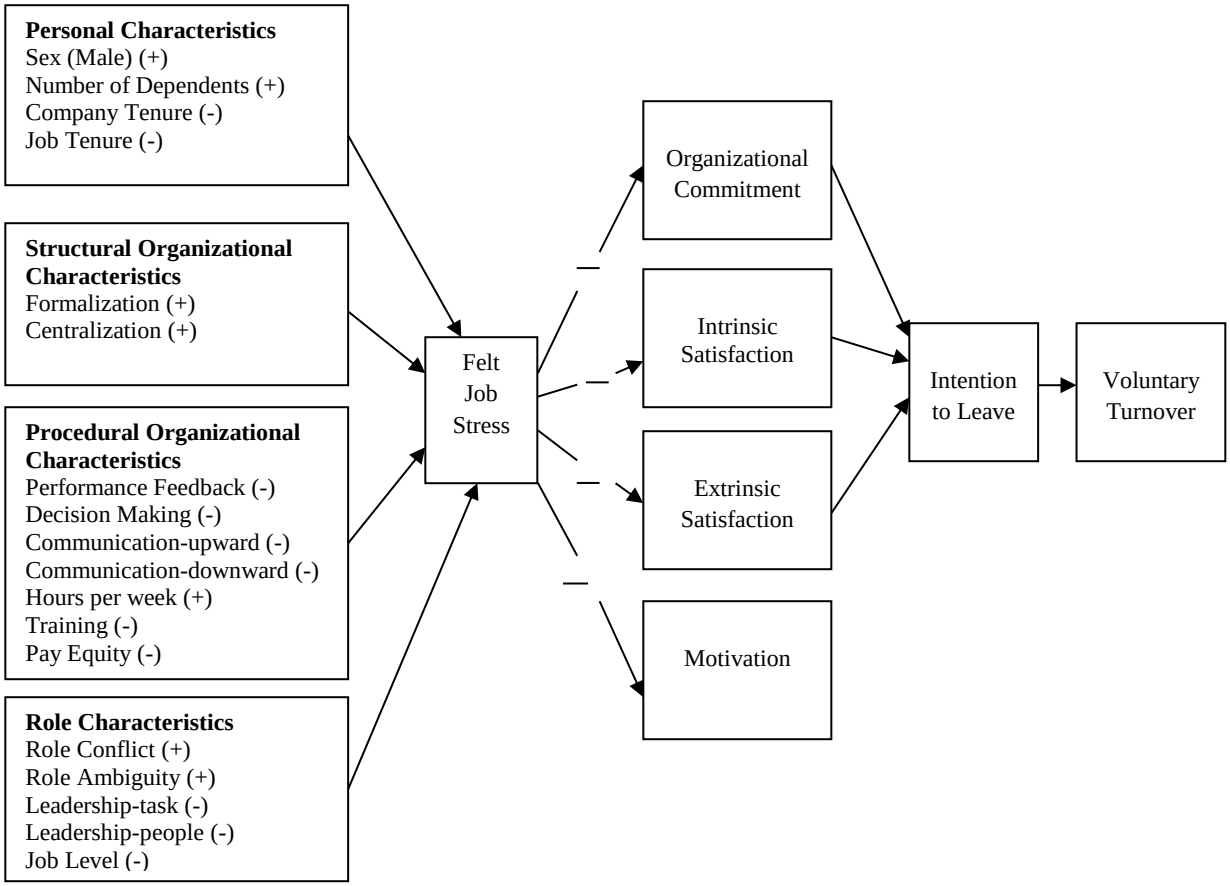

Figure 3.2. Work stress framework – (Summers et al. 1995, p.117)

3.2.2. Determinants of work stress

Work stress is caused by different factors, like demographics, economic and health conditions, work environment, social support, macroeconomic factors and culture. Demographic factors such as age, gender, marital status, and raising children may all affect work stress. Wilkins and Beaudet (1998), Michie (2002), Williams (2003) and Park (2007) find that women have higher work stress than men. Michie (2002) explains that this arises because women do more child caring than men and usually have more responsibilities at home. Williams (2003)

uses the 1994 and 2000 General Social Surveys and finds that women feel more stress than men as a result of working long hours or having demanding jobs. However, men have more stress than women when it comes to the potential for accidents and injuries at work.

Park (2007) reports that middle-aged workers have higher work stress based on the 2002 Canadian Community Health Survey (CCHS) and some cycles of the National Population Health Survey (NPHS). She finds that married workers have higher work stress. Moreover, according to Barling et al. (2005), keeping the balance between work and personal lives and avoiding conflicts between these two are stressful.

Bellavia and Frone (2005) discuss why, these days, married people have higher work stress in the United States relative to single people. Women in recent decades have become more involved in the labour market, and domestic chores are now on the shoulders of both partners. Therefore, a family of two has to handle the workload of three people instead of two (the woman's job, the man's job and the household chores). Also, a single parent has the workload of two people (the job and the household chores). Bellavia and Frone (2009) explain that jobs reduce the time available for household chores and leisure. According to them, trying to have fun around the job or household chores is not relaxing and actually, managing leisure activities in this way actually adds to the level of stress. Bellavia and Frone (2009) indicate that work-home conflicts are not only observed in the United States, but elsewhere as well, like in Canada, Europe, Dominican Republic, Mexico, Australia, New Zealand, China and many other countries around the world.

Economic factors that can affect work stress include education, income, working hours, shift work, part-time/full time job, occupation, self-employment, unionization and unemployment. Park (2007) observes a positive relationship between high education and high

work stress. In addition, she observes that higher personal income is associated with higher work stress, as is shift work and part-time work.

Williams (2003) notices that self-employed individuals have higher work stress relative to their paid-employed counterparts; Michie (2002) explains that long working hours is associated with work stress. Heisz and LaRochelle-Côté (2006) also discuss the negative impact of long working hours on work stress.

The occupation of the individual is a factor that affects work stress. Health professionals have usually high work stress. Burke and Richardsen (1990) use the National Survey of Canadian Physicians 1982, a survey of 2,087 Canadian physicians, to investigate the causes of work stress among physicians. They find that physicians have high work stress for many reasons such as high workload, lack of balance between work and personal lives and high responsibility of the lives of people.

Wilkins and Beaudet (1998) use the 1994/95 National Population Health Survey (NPHS) and report that work stress is high in service and blue-collar occupations but low in administrative and professional occupations. In another study, Park (2008) uses the Canadian Forces Supplement to the Canadian Community Health Survey (CCHS) - Mental Health and Well-Being to look at work stress in the Canadian forces. Canadian Forces' members who worked outside of Canada for more than 12 months had more work stress than those who worked internationally for fewer than 6 months.

Macroeconomic conditions may affect work stress. Fenwick and Tausig (1994) use the 1973-1977 Quality of Employment Panel Study and find that macroeconomic events such as recessions increase work stress, because recessions, for example, change the routines; therefore, they add to work pressures. According to Fenwick and Tausig (1994), the most important

macroeconomic variables that affect work stress are the unemployment rate, the unionization rate, the economic sectors of firms, and the number of employees at the workplace.

Health-related factors can play a role when it comes to stress at work. These factors include general health, mental health, having chronic diseases, physical activity, smoking and drinking. Barnes-Farrell (2005) explains that chronic diseases, such as arthritis and chronic back pain, put more pressure on work life and increase work stress level. Barnes-Farrell (2005) show that health problems not only affect directly work stress but they also increase stress by increasing worries about unemployment because of disabilities later on in life. Surti and Ambavale (2013) find that health has an impact on the work stress of sales employees in garment retail stores of Ahmedabad city; Michie (2002) explains that some health-related factors such as smoking, drinking and physical activities are used to cope with stress and they can decrease the stress level.

The environment in which the individual works will clearly have an influence on work stress. High strain jobs, low social supports at work, job dissatisfaction, job insecurity and physically demanding jobs have an impact on the level of work stress. Park (2007) explains that high strain jobs, insecure jobs and physically demanding jobs cause work stress. Williams (2003) observes that working too much or having a demanding job was a main source of work stress in Canada in 1994 and 2000. However, because of the recession, it is found that in 1994, job insecurity was another important source of work stress. Michie (2002) also agrees that bad work environments cause work stress. Workers who have to work without any break, deal with difficult tasks, work in uncomfortable physical conditions, or work without enough job training have more work stress. Michie (2002) also confirms that job insecurity also causes work stress.

Work stress is also a function of an individual's social support. For instance, the sense of belonging to the community can make a difference when it comes to managing stress at work – a finding supported by Park (2007) and Choenarom et al. (2005).

Probst (2005) explains that culture also has an impact on work stress, summarizing several studies on this topic, such as Triandis (1995), Probst and Lawler (2003) and Probst and Yi (2003). For example, Probst (2005) finds that cultural values cause people to react differently to job insecurity; therefore, their work stress changes accordingly. He explains that people with a "collectivist cultural orientation" report more work stress because of job insecurity than "individualistic" people.

Liu and Spector (2005) also find that culture affects the level of work stress. They demonstrate that people from different cultures have different perceptions about the level of work stress. If an individual likes to have control over his or her job, then the absence of control would precipitate stress. Rules are more important in some cultures than in others, which may lead to differing levels of stress in the work place. Liu and Spector (2005) suggest that not only does culture contribute to work stress but it also affects the ability to cope with that stress. First, they discuss Hofstede (1984) cultural theory to compare cultures. Hofstede (1984) discusses four cultural dimensions for 40 countries including France, Australia, Canada, Great Britain, Ireland, New Zealand, USA, many counties in Europe and Asia.

These four dimensions are individualism/collectivism, power distance, masculinity/femininity and uncertainty avoidance (Liu and Spector, 2005 p. 488-490).[56] An

[56] According to Hofstede (1984), an individualist's priorities are personal goals where the collectivist's priorities are group goals. In cultures with low power distance, people want equal distribution of power but in cultures with high power distance, people are fine to see the power in hand of some groups. A masculine culture's priorities are achieving goals and having higher income where a feminine culture's priorities are well-being and nurturance. In a feminine culture, social network at work is important. People with low uncertainty avoidance culture are risk takers where people with high uncertainty avoidance culture are risk avoiders.

individualist's priorities are personal goals where the collectivist's priorities are group goals. In cultures with low power distance, people want equal distribution of power but in cultures with high power distance, people are fine to see the power in hand of some groups. According to Liu and Spector (2005), an individualist[57] also likes to have control on his job and without the control, she feels more work stress. In addition, in cultures with high power distance, people have to obey the rules of others and that increases the stress at work.

3.2.3. Work Stress in Québec

Lesage et al. (2010) and Bernèche (2010) noted that the level of work stress is significantly higher in Québec than in other Canadian provinces. Bernèche (2010), using the CCHS 1.2, reports that the percentage of people with high work stress is larger in Québec than in the Rest of Canada (39 percent vs 29 percent). He also finds that the job security and social support at work are lower in Québec than in the Rest of Canada. However, workers in Québec have more work autonomy, less psychological demands at work and less physically demanding jobs.

Bordeleau and Traoré (2007) use the CCHS 2001 (cycle 1.1), 2003 (cycle 2.1) and 2005 (cycle 3.1) notice that people in Québec report better general and mental health than in the Rest of Canada. While they report higher life satisfaction than people in other provinces, individuals in Québec also report higher life and work stress compared to the Rest of Canada. Interestingly, Bordeleau and Traoré (2007) explain that the percentage of people who report good health has decreased and the percentage of people who report high stress and high work stress has also decreased in Québec between 2001 and 2005. This finding was unexpected, anticipating a negative relationship, not a positive one, between good health and high work stress. Bordeleau

[57] According to Hofstede (1984), Canadians are individualists.

and Traoré explain this finding by appealing to education: they suggest that educated people have both better health and higher stress.

Another interesting study, by Stephens et al. (1999), looks at the difference between Québec and other provinces in Canada. While not specifically about work stress, it covers four mental problems including distress. Stephens et al. (1999) use the National Population Health Survey (NPHS) 1994/95 and find that people in Québec have the "highest levels of self-esteem and mastery but the least happiness, lowest sense of coherence and most distress" (Stephens et al., 1999 p121). They estimate multiple logistic regressions to check the impact of demographic and psychosocial characteristics of individuals on different measures of mental health including distress. They explain that the differences between Québec and other provinces become insignificant when they control for age, gender, education, childhood traumas, life stress, life events, social support chronic problems and activity restriction.

Tézli and Gauthier (2009) use the Canadian General Social Survey 2005 to look at the impact of variations in family policy across provinces on the time stress of parents. They find that working parents in Québec do not have less time stress compared to those in other provinces, despite the number of family oriented policies in Québec. They suggest some reasons for the apparent ineffectiveness of family oriented policies in Québec to decrease time stress. One reason could be the relatively late entrance of Québec females in the labour market. Tézli and Gauthier (2009) also say that women still have lots of challenges to manage home and work responsibilities. They suggest that the relatively weak Québec economy (such as high unemployment rate, job insecurity and "financial insecurity") may contribute to the ineffectiveness of family oriented policies to decrease time stress (Tézli and Gauthier 2009, p. 456).

While the literature has pointed out that work stress in Québec seems to differ from the Rest of Canada, no one has tried to ascertain the reasons for this difference. This chapter represents a first attempt at filling this gap.

3.3. Data

This study uses the Canadian Community Health Surveys (CCHSs) 2001, 2003, 2005, 2007, 2008, 2009, 2010, 2011 and 2012, and the Canadian Community Health Survey- Mental health 2012. These surveys ask about socio-economic characteristics of the respondents. This study uses a pooled data of the CCHS surveys. This section shows, first, the percentage of people with high levels of work stress and then demonstrates that irrespective of a host of influences, work stress is always higher in Québec.

3.3.1. Some Visuals: Québec vs. the Rest of Canada

Figure 3.1 reveals that differences between Québec and the Rest of Canada in the level of work stress are found in all cycles of the CCHS (2001 to 2012). The following figures indicate that, regardless of many factors, work stress is always higher in Québec. Figure 3.3 shows for instance that the percentage of men and women with high work stress in Québec is larger than in the Rest of Canada. Figure 3.4 demonstrates that irrespective of age, work stress in higher in Québec; we also see that work stress is higher between 40 and 65 years old than in any other age group.

Figures 3.5 and 3.6 show the same for health and mental health. Québec has higher work stress, but the difference is smaller among people with poor health or poor mental health. Figure 6 and 7 reveal that irrespective of education and income, work stress is higher in Québec. These figures also show that work stress is higher for people with high education or high income.

Working hours (main job or all jobs) do not help explain this difference, as shown in Figures 3.9 and 3.10, which also reveal the positive correlation between working hours and high work stress.

Figure 3.11 shows that work stress is higher in Québec for all marital statuses. However, the difference is larger for common-law individuals and is smaller for widowed people. Figure 3.12 reveals that irrespective of immigration status, Québec has higher work stress. However, the difference is very small for immigrants and it is significantly bigger for non-immigrants. Finally, from Figure 3.13 we see that irrespective of mother tongue, work stress is higher in Québec. It also reveals that work stress is higher for Francophones and bilingual people.

In the rest of this paper, I consider the just mentioned and other factors to try to explain the difference between Québec and the Rest of Canada in the level of work stress.

3.3.2. Dependent variable

The dependent variable in this study is a binary variable which is one for those who report high work stress and zero for those who do not have high work stress. If the respondents say that most days is quite a bit or extremely stressful in the main job or business in the past 12 months, they are identified as people with high work stress. If the respondents say that most days is not at all, not very or a bit stressful in the main job or business in the past 12 months, they are identified as people with low work stress. Other studies such as Park (2007), Bordeleau and Traoré (2007), Park (2008) and Crompton (2011), use the same definition for this variable.[58]

3.3.3. Explanatory variables

As our literature review has revealed, work stress is thought to be affected by many factors: demographic, economic and health factors, work environment, social support,

[58] The measure that is used in this study is self-reported work stress. Ideally, objectively based measured work stress is preferred to self-reported work stress; however, this information is not available in the CCHS surveys.

macroeconomic factors and culture. Table 3.1 contains the definitions of all the variables used in in this study.

The variable of interest in this study, Québec, is a binary variable which is one for those who live in the province of Québec and zero for those who do not. There are two other binary variables representing those who live in the province of Ontario and those in the Rest of Canada. The Rest of Canada is the base group. The demographic variables in this study are age, gender, marital status, living arrangements, types of households, immigration status, having children between 0 and 5 and having children between 6 and 11. Three demographic variables are added because of the interests of this study: mother tongue, language of conversation and culture/racial origin.

Economic variables include the highest level of education of the individual, the highest level of education in the household, the main source of household income, working hours in the main job, student status, personal income and other income. Two economic variables, full time/ part time workers and shift work are not used in the main model because of the high number of missing observations as these questions are not asked in some of the CCHS surveys. However, the model is also estimated for a restricted sample which includes these variables, and is reported in the appendix. Since, I use data from different time periods, I use constant dollar personal income and constant dollar other income instead of current personal income and current other income. I use annual provincial consumer price index (CPI)[59] to create the constant income variables.

Health variables in this study are self-perceived general health, self-perceived mental health, having a chronic disease, physical activity index, frequency of physical activities, type of

[59] ***Source:*** Statistics Canada. *Table 326-0021 - Consumer Price Index (CPI), 2011 basket, annual (2002=100 unless otherwise noted), CANSIM (database)* (accessed: 2014-05-06).

smoker and type of drinker. I also use smoking restrictions at work, quality of health care in province, quality of health care in community, availability of health care in province and availability of health care in community in some regressions for robustness tests (reported in the appendix).

Work environment includes high strain jobs, active jobs, low strain jobs, passive jobs, job insecurity, physically demanding jobs, low social support at work and job dissatisfaction. These are not used in the main model because of the high amount of missing observations (again questions are not asked in some of the CCHS surveys). However, the appendix includes specifications with these variables for the restricted sample.

Social support variables include having social support, having emotional support, having positive support, having affective support and the respondent's sense of belonging to the community. These variables are also used in some regressions in the appendix for robustness checks and to see if they can help to explain the differences between Québec and the Rest of Canada in the level of work stress.

The macroeconomic variables that are used in this work are the unemployment rate, unionization rate, unemployment duration, average weekly hours worked and average weekly earnings at the province level. Unemployment rate and unionization rate are used in the main model and the rest is tried in some regressions reported in the appendix.

Starting with 782,529 observations from pooling the data from CCHS 2001, 2003, 2005, 2007, 2008, 2009, 2010, 2011 and 2012, I make the following sample restrictions.[60] The work stress question is only asked of people aged between 15 and 75 who worked in the 12 months

[60] 131,535 observations from the CCHS 2001, 135,573 observations from the CCHS 2003, 132,947 observations from the CCHS 2005, 65,946 observations from the CCHS 2007, 66,013 observations from the CCHS 2008, 61,679 observations from the CCHS 2009, 63,191 observations from the CCHS 2010, 63,542 observations from the CCHS 2011 and 62,103 observations from the CCHS 2012.

prior to the day of interview. I am left with 463,758 observations at this point. I remove the observations from Yukon, Northwest Territories and Nunavut because of their small samples, further decreasing my sample to 451,398. Once I eliminate those with missing information for demographic characteristics such as age and marital status, 439,712 observations are left. Some individuals failed to report personal income or household income, and hence they were removed from the sample, decreasing the sample to 299,196. Removing those who did not answer questions regarding other economic variables such as education and working hours, and health questions, I am left with 221,797 observations (66,700 with high work stress, 155,097 with low stress, 46,704 from Québec, 75,992 from Ontario and 99,101 from the Rest of Canada).

3.3.4. Descriptive statistics

To have a better understanding of the data, table 3.2 reports the mean values of the variables in my sample using the pooled data (2002-2012).[61] On average, 31 percent of the Canadian population during this period had a high level of work stress. In Québec, Ontario and Rest of Canada, this number is 40 percent, 30 percent and 28 percent respectively. 23 and 40 percent of my sample live in Québec and Ontario respectively. Almost half of the sample is men. More than 80 percent of my sample lives in urban areas. The average age in the sample is 41 (the sample includes only people between 15 and 75 years old).

There are different patterns for the marital status variable across Canada. In Québec, 40 percent of the people are married, 31 percent are common-law and 20 percent are single. In Ontario and the Rest of Canada, 64 percent and 63 percent are married respectively; 9 percent

[61] All the regressions and descriptive analysis are weighted using the person weight variable: WGHT_M. In the sample, each person represents herself/himself and at the same time some other of people. I also normalized the weights in each survey to add up to one (To give equal weights to each survey when I pool the data from different surveys).

and 11 percent are common-law respectively and 19 percent and 19 percent are single respectively.

Twenty two percent of my sample is immigrants. This percentage is lower in Québec (13 percent) and higher in Ontario (31 percent). Twenty eight percent of the sample consists of couples without children, 48 percent belong to couples with children under 25 years of age. In Québec and Ontario, 45 and 52 percent of respondents respectively are couples with children less than 25 years old. In the main sample, 12 percent of the respondents are unattached individuals (13 percent in Québec, 8 percent in Ontario and 13 percent in the Rest of Canada).

The mother tongue of 58 of the sample is English and 22 percent is French. In Québec, Ontario and the Rest of Canada, English is the mother tongue of 7, 69 and 79 percent of the people respectively. Moreover, 80 percent report a mother tongue of French in Québec, a number which drops to 4 percent in both Ontario and the Rest of Canada. Fifty four and 28 percent of people with high work stress has, respectively, English and French as mother tongue where 61 and 19 percent of people with low work stress has, respectively, English and French as mother tongue. Eighty four percent of the sample is white (91 percent in Québec, 78 percent in Ontario and 86 percent in the Rest of Canada).

Sixty eight percent of the sample has post-secondary education. The percentage of people with post-secondary education is higher among people who have high work stress compared to people who have low work stress (74 percent vs. 65 percent). The percentage of workers[62] with post-secondary education in Québec, Ontario and the Rest of Canada is 71, 68 and 66 percent respectively. Constant personal income is, on average, 43,870 dollars annually. The average constant personal income is higher among people who have high work stress compared to people who have low work stress (52,190 dollars vs. 40,060 dollars). Moreover, the average constant

[62] The sample includes only people between 15 and 75 years old.

personal income in Québec, Ontario and the Rest of Canada is 38,910, 46,160 and 44,540 dollars respectively.

The average amount of time at the main job per week is 37 hours (the sample includes only people between 15 and 75 years old) and, on average, people with high work stress work 6 hours per week more than people with low work stress. Interestingly, in Québec, the average working hours at the main job is 2 hours less than other parts of Canada. In the sample, 10 percent are students (full time students: 6 percent, part time students: 4 percent). These students are in the sample because they work either full time or part time.

Six percent report their health condition as poor or fair and only four percent report their mental health condition as poor or fair. In Québec, Ontario and Rest of Canada, five, seven and seven percent has poor or fair health condition, respectively. In addition, in Québec, Ontario and Rest of Canada, two, four and five percent has poor or fair health condition, respectively. Among people with high work stress, eight percent report their health condition as poor or fair where six percent report their health condition as poor or fair among people with low work stress.

Twenty six percent of the sample is physically active. In Québec, Ontario and the Rest of Canada, 21, 26 and 29 percent are physically active, respectively. Eighteen percent of the population is daily smokers. Québec has the highest percentage of smokers in Canada (20 percent vs. 17 percent in Ontario and the Rest of Canada). People with high work stress smoke more than people with low work stress (19 percent vs 17 percent). Seventy two percent of the population is regular drinkers. Québec has the highest percentage of smokers in Canada (20 percent vs. 17 percent in Ontario and the Rest of Canada). People with high work stress drink more than people with low work stress (75 percent vs 71 percent).

Sixty four percent of the sample report that their sense of belonging to the community is strong or very strong. In Québec, Ontario and Rest of Canada, 53, 66 and 67 percent respectively report a sense of belonging to the community as strong or very strong. Sixty percent of people who have high work stress have strong or very strong sense of belonging to the community, while 64 percent of the people who have low work stress have strong or very strong sense of belonging to the community.

Between 2001 and 2012, the average unionization rate in Canada was 32 percent. The average provincial unionization rate in Québec was 40 percent, in Ontario, 28 percent, and it was 30 percent in the Rest of Canada. The average unemployment rate in Canada over this period was 7 percent and average provincial unemployment rates in Québec, Ontario and Rest of Canada were 8, 7 and 6 per cent, respectively.

3.3.5. The CCHS 2012- Mental Health Survey

Some additional information can be gleaned from the CCHS 2012- Mental Health Survey. This survey includes variables that are not available in the other CCHS surveys used in this study. However, this survey is not used for the regression analysis because the sample size is much smaller than the pooled sample and it does not let us focus on a specific population (for example: common-law men with children).[63] However, this small survey can be used to help better understand the mental health of the population of Québec, Ontario and the Rest of Canada.

There are three questions about being worried in life in the 2012 mental health survey. The first one asks if the individual had a time in her life when she was worried more than other people. The second question asks if the individual had a time in her life when she was anxious/ nervous more than other people. This question is asked of people who answered no to the first

[63] Mental health Survey includes 25,113 observations.

question. The third question asks if the individual had a period of 6 months in her life when she was anxious and worried most days. Table 3.3 shows the mean values of the variables from the Mental Health Survey 2012.

Seventy two percent of people in Québec, 61 percent of people in Ontario and 63 percent of people in the Rest of Canada answered that they had a time in their lives when they were worried more than other people. Of those who did not have a time in their lives when they were worried more than other people, 26, 18, and 19 percent in Québec, Ontario and the Rest of Canada answered that had a time in their lives when they were nervous or anxious more than other people. Forty four percent of people in Québec, 32 percent of people in Ontario and 33 percent of people in the Rest of Canada answered that had a period of 6 months in their lives when they were anxious and worried most days.

Tables 3.4 and 3.5 present the reasons why respondents were worried, anxious or nervous: from table 3.4 one sees that people in Québec are more worried about their love life and relationships at school or work compared to those in Ontario and the Rest of Canada. In contrast, table 3.5 shows that worried, anxious or nervous people in Ontario and the Rest of Canada are more concerned about finances, success at work, health and many other factors in comparison to those in Québec.

3.4. Methodology

This study wants to estimate the factors influencing the difference in the level of work stress between Québec and the Rest of Canada after controlling for other covariates. I also extend the model to concentrate on special samples such as: men and women; immigrants and non-immigrants; and married, common-law, single, separated, widowed and divorced people. I divide my sample into these groups to compare the impact of geographical location, living in Québec

vs. living outside Québec, on work stress between the groups. In the second step, I decompose the differences in the probability of having high work stress between Québec and the Rest of Canada to understand better the difference using the Blinder–Oaxaca decomposition. In the third step, I look at life stress to see if there is a home-work balance in the level of stress. In the last step, I rerun the analysis with additional independent variables.

3.4.1. General model

To investigate the difference in the level of work stress between Québec, Ontario and the Rest of Canada, equation (1) is estimated using a probit model because the dependent variable is a binary variable . HWS^i is a dummy variable denoting the presence of high work stress. HWS^{*i} *is a continous variable and it is not observable. It* it is a function of the vector Z^i as follows:

$$HWS^{*i}{}_{\text{j}} = Z_j^i\beta + \epsilon_{1j}{}^i \qquad \text{j = group} \tag{1}$$

HWS^i is 1 if $\epsilon_1{}^{\text{i}} > -Z^i\beta$ and 0 if $\epsilon_1{}^{\text{i}} \leq -Z^i\beta$. The variables in Z that affect high work stress include age, gender, marital status, census metropolitan area (CMA), urban, immigrants, having young children, household type, living arrangement, mother tongue, language of conversation, race, education, highest level of education in household, personal income, other income, source of household income, working hours, part time job, student, health, mental health, chronic diseases, physical activity index, frequency physical activity, type of smoker, type of drinker, sense of belonging, provincial unionization rate, provincial unemployment rate and year dummies.

Two locational dummies are added in order to investigate the difference in the level of work stress between Québec, Ontario and the Rest of Canada. In the model, there is a binary variable which is 1 if the individual *i* lives in Québec and 0 if the individual *i* lives in the Rest of

Canada. There is also a binary variable which is 1 if the individual *i* lives in Ontario and 0 if the individual *i* lives in the Rest of Canada (the reference group). Finally, ${\epsilon_1}^i$ is the error term.

To test whether living in Québec affects the level of work stress differently in some groups of the Canadian population or not, equation (1) is re-estimated for group *j*, where *j*=male and female, immigrants and non-immigrants, Anglophones and Francophones and six categories of marital status (married, common-law, single, separated, widowed and divorced). All of the results are compared to the base case for the entire sample.

3.4.2. Oaxaca decomposition

To help illuminate further the differences in work stress between Québec and elsewhere, a Blinder–Oaxaca decomposition is employed. Originally introduced by Blinder (1973) and Oaxaca (1973) to decompose wage differences between men and women, I use it to decompose the differences in the probability of having high work stress between Québec and the rest of Canada (including Ontario in this section) into two parts: one that is explained by the differences in the mean values of the independent variables (the explained part), and another part that is due to differences in the regression coefficients (the unexplained part).

Work stress model can be estimated separately for Quebec and the rest of Canada (including Ontario) as follows:

$$HWS^*_{\text{QC}} = Z_{QC}\beta_{QC} + \epsilon_2 \quad (2)$$

HWS_{QC} is 1 if $\epsilon_2 > -Z_{QC}\beta_{QC}$ and 0 if $\epsilon_2 \leq -Z_{QC}\beta_{QC}$.

$$HWS^*_{\text{ROC}} = Z_{ROC}\beta_{ROC} + \epsilon_3 \quad (3)$$

HWS_{ROC} is 1 if $\epsilon_3 > -Z_{ROC}\beta_{ROC}$ and 0 if $\epsilon_3 \leq -Z_{ROC}\beta_{ROC}$.

They can be also written as follows:

$$\Pr\left(HWS_{QC} = 1 \middle| Z_{QC}\right) = \Phi(Z_{QC}\beta_{QC}) \quad (4)$$

$$\Pr(HWS_{ROC} = 1|Z_{ROC}) = \Phi(Z_{ROC}\beta_{ROC}) \quad (5)$$

where Φ is the cumulative normal distribution.

Accordingly to Yun (2004), the difference between the probability of having high work stress in Québec and in the rest of Canada can be written as follows:[64] [65]

$$\overline{HWS}_{QC} - \overline{HWS}_{ROC}$$

$$= \sum_{i=1}^{i=n} W_{\Delta Z}^{i} \left[\overline{\Phi\left(Z_{QC}\beta_{ROC}\right)} - \overline{\Phi(Z_{ROC}\beta_{ROC})}\right] + \sum_{i=1}^{i=n} W_{\Delta\beta}^{i} \left[\overline{\Phi\left(Z_{QC}\beta_{QC}\right)} - \overline{\Phi\left(Z_{QC}\beta_{ROC}\right)}\right] \quad (6)$$

$$W_{\Delta Z}^{i} = \frac{(\bar{z}_{QC}^{i} - \bar{z}_{ROC}^{i})\beta_{ROC}^{i}}{(\bar{Z}_{QC} - \bar{Z}_{ROC})\beta_{ROC}} \text{ and } W_{\Delta\beta}^{i} = \frac{\bar{z}_{QC}^{i}(\beta_{QC}^{i} - \beta_{ROC}^{i})}{\bar{Z}_{QC}(\beta_{QC} - \beta_{ROC})}$$

$$\sum_{i=1}^{i=n} W_{\Delta Z}^{i} = \sum_{i=1}^{i=n} W_{\Delta\beta}^{i} = 1.$$

Where the bar denotes averages.

$\hat{\beta}_{QC}$ is a vector of estimated coefficients of the high work stress equation for people in Québec and $\bar{Z}_{QC}$ is a vector of means of the control variables in the high work stress for Québec. $\hat{\beta}_{ROC+ON}$ is a vector of estimated coefficients of the high work stress equation for people in the rest of Canada (including Ontario in this model) and $\bar{Z}_{ROC+ON}$ is a vector of means of the control variables in the high work stress for the rest of Canada.

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[64] I use a version of the Oaxaca decomposition which considers discrimination toward one group (in this case: Quebec), but there are other versions in the literature, depending on which coefficients are used to evaluate the difference in attributes. The results of this study are not sensitive to the choice of the Oaxaca decomposition version.

[65] Equation (6) can be also written as

$$\overline{HWS}_{QC} - \overline{HWS}_{ROC}$$

$$= \sum_{i=1}^{i=n} W_{\Delta Z}^{i} \left[\overline{\Phi\left(Z_{QC}\beta_{QC}\right)} - \overline{\Phi\left(Z_{ROC}\beta_{QC}\right)}\right] + \sum_{i=1}^{i=n} W_{\Delta\beta}^{i} \left[\overline{\Phi\left(Z_{ROC}\beta_{QC}\right)} - \overline{\Phi(Z_{ROC}\beta_{ROC})}\right]$$

However, since I am interested in why Quebec is different from the Rest of Canada, I use the estimated β from the Rest of Canada variable in equation (6) as the reference coefficient.

The first part of the equation above, called the explained part, captures the portion of the difference between work stress in Québec and in the rest of Canada that comes from differences in their characteristics (differences in the means of the control variables). It captures the expected change in the Rest of Canada's mean outcome (work stress) if the rest of Canada had Québec's predictor levels.

The second part captures the expected change in the rest of Canada's mean outcome (work stress comes from differences between the returns to the characteristics (coefficients of the control variables). The second part is usually called as the unexplained part (Jann and Zürich, 2008). In the context of the labour market returns, this unexplained part is usually thought to capture the discrimination toward one group. In the context here, such an interpretation is not very useful. However, as discussed in Jann and Zürich, (2008 p. 455) this part of the decomposition may reflect any effects arising from differences in unobserved variables.

3.5. Results

3.5.1. General model

In Canada, as in other countries, demographic factors, economic factors, health factors and macroeconomic factors can cause high work stress. Table 3.6 reports the results (the marginal effects) arising when a probit model of equation (1) is estimated. These marginal effects are evaluated at the means of the explanatory variable.

The column 1 in the table 3.6, using the full sample, suggests that work stress goes up with age at a decreasing rate. The results suggest that the probability of having work stress is eight percentage points lower for men than for women. Living in a CMA increases the probability of having high work stress by two percentage points. There is a higher chance of having high work stress among Francophones and bilinguals than among Anglophones.

Similarly to other studies such as Park (2007), column 1 in table 3.6 shows that higher education and higher income are correlated with high work stress. People with post-secondary degrees have a higher probability (five percentage points, significant at the one percent level) of having high work stress. One thousand dollars increase in personal income increases the probability of having work stress by 0.1 percentage points (significant at the one percent level).

Michie (2002) and LaRochelle-Côté (2006) mention the correlation between long working hours and work stress. This study suggests that an extra hour worked per week, increases the probability of having work stress by 0.3 percentage points (significant at the one percent level). In addition, being a student and working at the same time adds to the probability of having work stress by at least three percentage points (higher for part-time students: five percentage points) relative to working non-students.

Poor/fair health increases the probability of having work stress by more than seven percentage points relative to those in excellent health. The impact of poor/fair mental health on work stress is stronger than poor/fair general health. The results of this study suggest that people who reported fair and poor mental health have 20 and 27 percentage points higher chance of having high work stress than people with excellent mental health, respectively. Having at least one chronic disease also increases the probability of having work stress by six percentage points. Moreover, having very week sense of belonging to community increases the probability of having work stress by four percentage points.

As discussed, Figure 3.1 shows that the level of work stress is significantly higher in Québec than the Rest of Canada confirming the findings of Lesage et al. (2010) and Bernèche (2010). Interestingly, table 3.6 suggests that the difference between Québec and the Rest of Canada cannot be explained by their differences in demographic factors, economic factors,

health factors and macroeconomic factors. After controlling for different factors, column 1 in table 3.6 suggests that people in Québec have still significantly higher work stress than the Rest of Canada. The probability of having high work stress in Québec is 10 percentage points (significant at the 1 percent level) higher than in the Rest of Canada (excluding Ontario).[66] It is also found that the probability of having high work stress in Ontario is three percentage points (significant at the 1 percent level) higher than in the Rest of Canada (excluding Québec).

Column 2 in table 3.6 demonstrates that the probability of having high work stress for men in Québec is 12 percentage points (significant at the 1 percent level) higher than men in the Rest of Canada. The difference between Québec and Rest of Canada in high work stress level is lower for women (Column 3 in table 3.6). The probability of having high work stress for women in Québec is 8 percentage points higher than in the Rest of Canada (significant at the 1 percent level). Figure 3.3 presented earlier shows that for both men and women, the work stress is higher in Québec (the difference is larger for women). The results of Columns 2 and 3 in table 3.6 show that the control variables capture more of the difference between Québec and the Rest of Canada for women than for men.

An interesting result appears when I separate immigrants and non-immigrants (columns 4 and 5 of table 3.6). There is no significant difference between Québec and the Rest of Canada in the level of work stress among immigrants. However, the non-immigrants inside Québec are significantly at higher risk of having high work stress compared to the non-immigrants outside Québec. The probability of having high work stress for non-immigrants in Québec is 12 percentage points higher than in the Rest of Canada (significant at the 1 percent level).

[66] Table A3.1 in the appendix shows that this significant difference between Quebec and the Rest of Canada in the level of work stress can be observed in all regions of Quebec (Chicoutimi, Quebec city, Sherbrooke, Trois-Rivieres, Montreal and non CMA areas).

Immigrants and non-immigrants living in Ontario have higher chance of having high work stress than the Rest of Canada (excluding Québec). [67]

It is also notable that an individual whose mother tongue is English has seven percentage points higher probability of having high work stress if he/she lives in Québec than in the Rest of Canada, while an individual whose mother tongue is French has a 17 percentage points higher probability of having high work stress if she lives in Québec than in other parts of Canada (columns 6 and 7 of table 3.6). Thus, the difference between Québec and the Rest of Canada cannot be explained only by the language factor because this difference is seen in both Anglophones and Francophones but the difference is smaller for Anglophones.

However, these results suggest that Anglophones in Québec have slightly higher work stress than the Anglophones outside Québec where Francophones in Québec have much higher work stress than the Francophones outside Québec. So, if I assume that the language differences captures some part of the cultural differences, I can conclude that Québec culture/Francophones' culture can explain some part of the difference between the level of work stress in Québec and in the Rest of Canada.

As previously discussed, figure 3.11 reveals that the difference in the level of work stress between Québec and the Rest of Canada is higher for married, common law and single people. From table 3.4 one sees that people in Québec are more worried about their love life and relationships at school or work compared to those in Ontario and the Rest of Canada, which suggests that marital status may be an interesting factor to explore further.

The results from the full sample reported in table 3.7 suggests that controlling for different socio-economic factors still cannot explain the difference between the level of work stress of Québec and of the Rest of Canada for these groups. There is no significant difference

[67] This result for Ontario could be investigated more; however, it is out of the scope of this study.

between the level of work stress of widowed, separated and divorced individuals of Québec and of the Rest of Canada. But the probability of having high work stress for married and single individuals in Québec is 10 percentage points (significant at the 1 percent level) higher than in the Rest of Canada (excluding Ontario). More interestingly, the probability of having high work stress for common-laws individuals in Québec is 14 percentage points (significant at the 1 percent level) higher than in the Rest of Canada (excluding Ontario). Looking at the results for men only and for women only (again, reported in table 3.7) confirm the findings from the full sample.

From table 3.2 one sees clearly that the population in Québec differs with respect to marital status when compared to the other parts of Canada. In Québec, 40 percent of the individuals are married and 31 percent are common-law, while in the Rest of Canada, more than 60 percent are married and only 10 percent are common-law. In addition, Québec has a civil law legal environment whereas the Common law legal system applies to the Rest of Canada.[68] Civil law allocates fewer benefits to unmarried couples living together than to married couples, compared to the Rest of Canada. For instance, common-laws' properties are not split between the partners at the end of the relationship in Québec in contract to the Rest of Canada. That might be a reason that table 3.7 shows that the probability of having high work stress for common-law is higher than for married in Québec.

It is interesting to check the impact of the presence of children among those who are "legally" married and those living in a common-law arrangement. Table 3.8 shows the

[68] The term common-law in marital status means living together without being married. But Common law is also a legal system which is not related to the term common-law in marital status. According to Wikipedia "In Canada, for instance, the term "common-law marriage" is widely used to describe cohabiting relationships; while these do grant couples many of the rights and responsibilities of a marriage (laws vary by province), these are not marriages; couples in common-law partnerships are not legally considered married, although for many purposes (such as taxes, financial claims, etc.)". Source: http://en.wikipedia.org/wiki/Common-law_marriage

coefficient of the Québec variable respectively for married, common-laws, separated, divorced and single individuals with and without children[69]. Married and common-laws with and without children have similar results about higher work stress in Québec. Interestingly, table 3.8 suggests that separated individuals[70] who do not live with children have 13 percentage points (significant at the 10 percent level) higher probability of having work stress in Québec than in the Rest of Canada. In contrast, separated individuals who have children are not significantly different in Québec than in the Rest of Canada in having high work stress. More interestingly, the probability of having high work stress is 21 percentage points (significant at the 1 percent level) higher for single individuals with children in Québec than in the Rest of Canada whereas the probability of having high work stress is 11 (significant at the 1 percent level) percentage points higher for single individuals without children in Québec than in the Rest of Canada only. It may suggest that there is less benefit and more pressure in Québec for single people with children than in the Rest of Canada.

Table 3.8 shows the results for married, common-laws, separated, divorced and single with children and without children for the two groups of men and women. Table 3.8 suggests that divorced men who do not live with children have 13 percentage points (significant at the 10 percent level) higher probability of having work stress in Québec than in the Rest of Canada.

Table 3.8 suggests that single women with children, have 22 percentage points (significant at the 1 percent level) higher probability of having high work stress in Québec than the Rest of Canada where the result is not significant for single men with children. Still, single

[69] A married or common-law individual is considered to be with children if living arrangement is a parent living with spouse or partner and children. A divorced, separated or single individual is considered to be with children if their living arrangement is a single parent living with children. A married or common-law individual is considered to be without children if living arrangement is a parent living with spouse or partner. A divorced, separated or single individual is considered to be without children if their living arrangement is unattached individual living alone or living with others.

[70] To be called separated, one should have been legally married before. Source: http://www.statcan.gc.ca/concepts/definitions/marital-matrimonial01-eng.htm

men and women without children have significantly higher chance of having work stress in Québec than in the Rest of Canada.

Thus, the results suggest that the probability of having high work stress for married, common-law individuals in Québec is higher than in the Rest of Canada irrespective of having or not having children. Separated individuals who do not live with children have higher probability of having work stress in Québec than in the Rest of Canada. In contrast, separated individuals who have children are not significantly different in Québec than in the Rest of Canada in having high work stress. The probability of having high work stress for single individuals without children is as high as married and common-laws in Québec compared to the Rest of Canada. Single women with children in Québec are in even a worse situation than married and common-laws and single individuals without children. In addition, divorced men who do not live with children have higher probability of having work stress in Québec than in the Rest of Canada.

3.5.2. Oaxaca decomposition

I use Oaxaca decomposition here to decompose the differences in the probability of having high work stress between Québec and the rest of Canada (including Ontario in this section) into two parts: one that is explained by the differences in the mean values of the independent variables (the explained part), and another part that is due to differences in the regression coefficients (the unexplained part). The results of Oaxaca decomposition is presented in table 3.9. It suggests that the differences in the probability of having high work stress in Québec and the rest of Canada (including Ontario) is 11 percentage points. This is consistent with previous results that the coefficients of the Québec dummy were in the order of magnitude of the gross gap (11 percentage points).

As table 3.9 shows, the difference between Québec and the rest of Canada cannot be explained by the differences in the mean values of the characteristics of people living in these regions. The explained part that captures the portion of the difference between having high work stress in Québec and in the rest of Canada that comes from differences in their characteristics (differences in the means of the control variables) is very small. But, the unexplained part that captures all the potential effects of differences in unobserved variables is large. This suggests that the control variable cannot explain the large difference between the probability of having high work stress in Québec and the Rest of Canada. The results of men and women also confirm the same results for both groups.

3.5.3. Work stress and life stress

A question that might be raised here concerns work-home stress balance. One possibility is that people in Québec have higher stress at work than in the Rest of Canada but that they have lower levels of other types of stress than in the Rest of Canada. If there is such a work-home balance, then the percentage of workers with high life stress[71] in Québec should be the same as in other parts of Canada. To check for that, I use the variable life stress in the CCHS. Figure 3.14 shows that life stress is also significantly higher in Québec than in the Rest of Canada over the period of 2001-2012. Overall, 34 percent of people in Québec have high life stress where 26 and 24 percent of people in Ontario and the Rest of Canada reports high life stress in this period. A t-test shows that the percentage of workers with high life stress in Québec is significantly higher than in the Rest of Canada.

3.5.4. Analysis with additional independent variables

In this section, I add some new variables such as shift work variables, work environment variables and social support variables to equation (1) to check their impact on the results of this

[71] Life stress includes any stress in life such as work stress.

study. These variables are not available in all of the surveys and by adding them sometimes the number of observations is dramatically decreased. These new variables are added to the model to see if they can explain high level of work stress in Canada or not. More importantly, they are added to see if these new variables can explain some part of the differences between Québec and the Rest of Canada or not (to see if the coefficient for the Québec dummy and its level of significancy changes or not).

Table 3.10 shows the results of the sensitivity analysis. Shift work is added to equation (1) in column 2 of table 3.10. As can be seen, the number of observations is dramatically decreased by adding this variable because the shift work question is only asked in two CCHS surveys (CCHS 2001 and CCHS 2003). However, the results with respect to Québec are still the same. The probability of having high work stress is higher in Québec than in the Rest of Canada. Controlling for part time jobs in column 3 does not also change the results and does not capture any part of the difference between Québec and the Rest of Canada.

I also added work environment variables to the model, as reported in column 4. These are highly correlated with work stress but cannot explain the difference between Québec and the Rest of Canada. Having high strain, low strain or active jobs (the reference category is passive jobs) negatively correlated with work stress. Job insecurity, low workplace social support and job dissatisfaction are positively correlated with high work stress.

Mood disorders and anxiety disorders are added in column 5 of table 3.10. They do not also capture any part of the difference between Québec and the Rest of Canada in the level of work stress. Having mood disorders or anxiety disorders increases work stress by four percentage points in Canada.

When I control for different types of social supports such as tangible support, affective support, positive support and emotional support, the coefficient of Québec dummy decreases. However, checking the regressions shows that the change in the Québec coefficient is due to the change in the sample and not because of controlling for these variables.

Having poor/fair availability of health care also increases work stress in Canada. Controlling for self-evaluation of availability of health care and quality of health care in the province increases the work stress difference between Québec and the Rest of Canada. However, checking the regressions shows that the change in the coefficient is due to the change in the sample and not because of controlling for these variables.

Finally, when I control for macroeconomic factors other than the unemployment rate and unionization such as provincial average weekly hours worked, provincial average weekly earnings and provincial unemployment duration, I still find that the probability of having high work stress is higher in Québec than in the Rest of Canada by 10 percentage points (significant at the one percent level). The differences between the rates of unemployment and unionization cannot also explain the difference between the level of work stress in Québec and in the Rest of Canada.

3.5.5. Discussion

In this study, it is observed that work stress in Québec is higher than in the Rest of Canada, a finding that persists even when account is taken of demographic factors, economic factors, health factors, work environment, social support, and macroeconomic factors. One factor that may explain some of this difference in work stress is related to differences in legal environments, namely: Civil Law in Québec versus Common Law in the Rest of Canada. As previously discussed, table 3.4 shows that people in Québec are more worried about their love

life and relationships at school or work compared to those in Ontario and the Rest of Canada. This chapter reveals that the difference between Québec and the Rest of Canada in the level of work stress reaches its peak for people living in common-law marital relationships. Perhaps this phenomenon reflects the disadvantages associated with being in a common-law relationship in Québec compared to those in the Rest of Canada.

According to Beaujot et al. (2013), a common-law relationship is legally similar to marriage in the Rest of Canada but it is an alternative to marriage in Québec because common-laws entail fewer legal obligations compared to marriage. Beaujot et al. (2013) explain the history of common-law relationships in Canada. In July 9th 1973, common-law relationships were defined as those relationships "… not properly solemnized before a Protestant parson or minster of Church of England" (Beaujot et al., 2013 p. 222). In addition, these relationships are legally treated as marriage if the relationship dures more than three years or if a child is born in the relationship in the Rest of Canada. However, Québec's civil law has defined marriage as a contract in which both sides have legal obligations toward each other, and hence where there is no contract, as in a common-law relationship, fewer legal obligations result. The lack of legal obligation in a common-law relationship means less legal support from the system in case of separation, which may lead to increased stress because of lack of good "property and inheritance rights" (Beaujot et al., 2013 p. 223). For instance, couple properties are not divided up at the end of a common-law relationship in Québec according to Beaujot et al. (2013).

Moreover, the Francophone work environment culture might be a factor that helps to explain the difference between Québec and the Rest of Canada in the level of work stress. Hofstede (1984) notes that some cultures, like the French and the Spanish ones, adhere to high power distance relationships at work, while low power distance is customary in other cultures,

such as found with Anglo-Saxons.[72] Liu and Spector (2005) argue that people have to obey the rules of others in cultures with high power distances and that this serves to increase the level of stress at work especially for an "individualist" who wants to have control on his job. However, in low power distance cultures, there is more equal distribution of power which is less stressful. Québec's culture is arguably similar to the French culture in this regard, and hence it might adhere to high power distances whereas the Rest of Canada is more similar to the Anglo-Saxon approach with low power distance at work. As a result, Liu and Spector (2005) argue that workers might tend to use *emotion-focused strategies,* like convincing themselves that they have to accept the bad conditions, rather than *problem-focused strategies (*like talking to supervisors and find solutions for causes of stress) to deal with work stress.

3.6. Conclusions

This study finds that people in Québec report significantly more work stress relative to those elsewhere in Canada. This gap has been noticed in Bordeleau and Traoré (2007) and Lesage et al. (2010) but no one has looked thoroughly at the causes of this phenomenon. This study looks at the difference between Québec and other Canadian provinces in the level of reported work stress, and tries to explain why this difference exists. It offers two new explanations as to why this difference persists: legal regimes and culture.

Work stress has negative effects on individuals and society. Low productivity and absenteeism and increases in health care costs are attributable to high levels of work stress (Park, 2007). Stressed workers have 50 percent higher health-care expenditures than their less-stressed counterparts (Williams, 2003), and 30 percent of all mental disability claims in Canada are

[72] Hofstede (1984) categorizes cultures of Australia, Canada, Great Britain, Ireland, New Zealand and USA as high individualism, low power distance, high masculine and with low uncertainty avoidance. Likewise, Hofstede (1984) categorizes some cultures like the ones in France and Spain as high individualism, high power distance, high feminine and with high uncertainty avoidance.

related to work stress according to Conner (2005). My study shows that in Canada excluding Québec, on average, 30 percent of the workers suffer from high level of work stress where this number is almost 40 percent in Québec.

This chapter finds that irrespective of a host of influences such as income, education, working hours, shift work, part-time/full time job, self-employment, unionization and unemployment, age, gender, marital status, health, physical activity, smoking, drinking and social support, work stress is always higher in Québec. In addition, having a high strain job, low social supports at work, job dissatisfaction, job insecurity and a physically demanding job could not explain the differences between Québec and other Canadian provinces in the level of reported work stress.

One factor that may explain some of these differences is related to differences in the legal environment between the Civil Law approach in Québec versus the Common Law that governs the Rest of Canada. The results of this study show that the difference between Québec and the Rest of Canada in the level of work stress reaches its peak for people living in common-law marital relationships. Perhaps this phenomenon reflects the disadvantages associated with being in a common-law relationship in Québec compared to those in the Rest of Canada? The lack of legal obligation in a common-law relationship in Québec means less legal support from the legal system, for instance, the properties are not divvied up after separation in Québec in contrast to the Rest of Canada and it can be stressful.

Moreover, the Francophone work environment culture might be a factor that can explain the difference between Québec and the Rest of Canada in the level of work stress. Liu and Spector (2005) argue that Québec's Francophone work environment has a higher power distance than that which exists in the rest of Canada, and hence people have to obey the rules of others

more and this increases the stress at work. Québec's high power distance culture, in addition to causing work stress, may also affect the ability to cope with that stress.

This study tries to explain the difference in the level of stress between Québec and the Rest of Canada by using the variables available in the CCHS surveys. Therefore, the analysis is limited to study the impact of the variables available in the CCHS surveys only. For instance, I could not look at the impact of occupation on the level of work stress because there is not a good occupation variable in the CCHS surveys. In addition, it would be interesting to look at the difference in the level of stress between Québec and the Rest of Canada in a longer period such as the periods before and after the Quite Revolution in Québec. However, the CCHS survey is only available for the period of 2001-2012.

Further work could be undertaken to understand the difference between Québec and the Rest of Canada in the level of work stress. Empirical work could be improved by more and better data. For instance, variables such as language of work could help to see if the difference between Québec and the Rest of Canada in the level of work stress can be explained by the difference in the work environment culture. Unfortunately, this information is also not available in the CCHS surveys.

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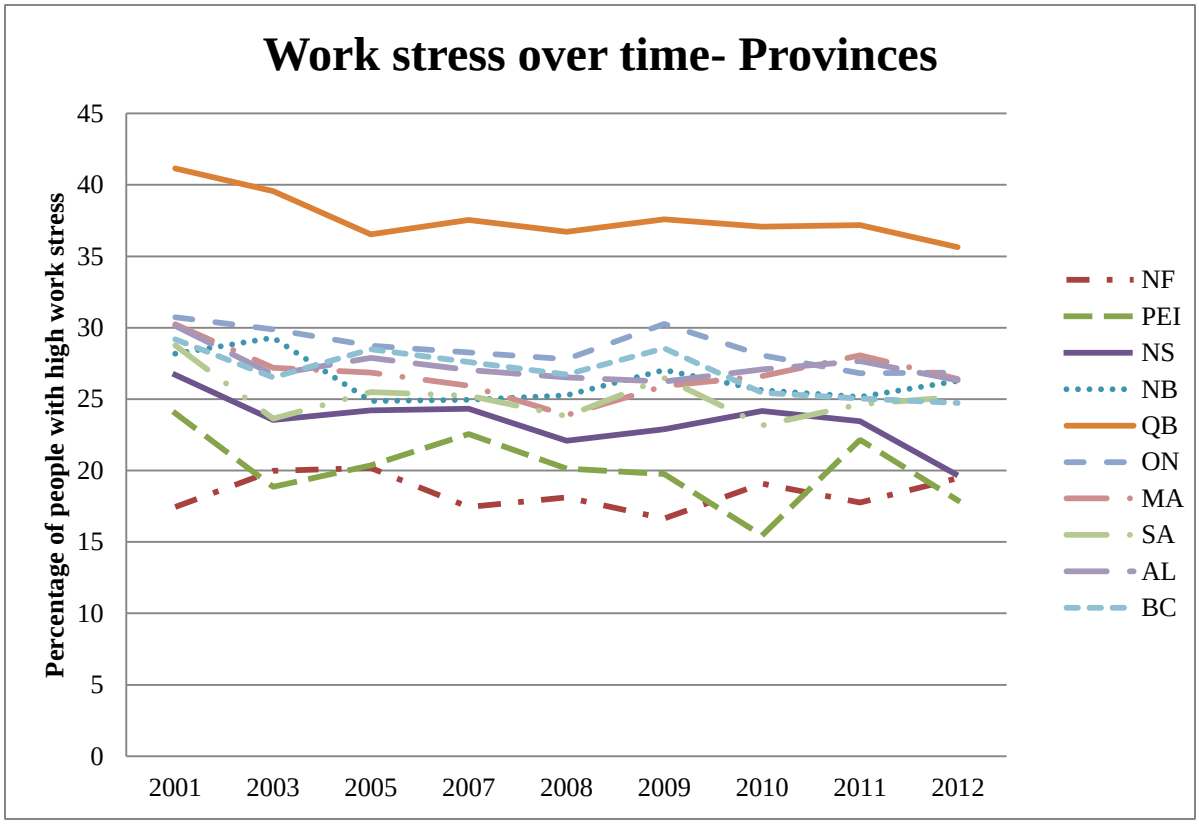
Figure 3.1. Work stress over time -provinces



Year	NF	PEI	NS	NB	QB	ON	MA	SA	AL	BC
2001	17.45	24.01	26.70	28.18	41.15	30.74	30.25	28.77	30.12	29.19
2003	19.97	18.87	23.54	29.29	39.56	29.88	27.19	23.63	26.72	26.52
2005	20.17	20.35	24.21	24.86	36.54	28.75	26.86	25.50	27.88	28.49
2007	17.45	22.55	24.32	24.95	37.54	28.27	25.94	25.24	27.03	27.59
2008	18.13	20.13	22.08	25.26	36.72	27.79	23.87	23.80	26.53	26.72
2009	16.64	19.75	22.89	27.03	37.58	30.27	25.92	26.47	26.24	28.57
2010	19.08	15.46	24.16	25.62	37.07	28.07	26.62	23.15	27.09	25.45
2011	17.77	22.15	23.46	25.16	37.18	26.82	28.06	24.64	27.67	25.04
2012	19.47	17.92	19.66	26.27	35.65	26.85	26.41	25.16	26.31	24.73

Source: CCHS 2001, 2003, 2005, 2007, 2008, 2009, 2010, 2011 and 2012.

Figure 3.3. Gender and work stress

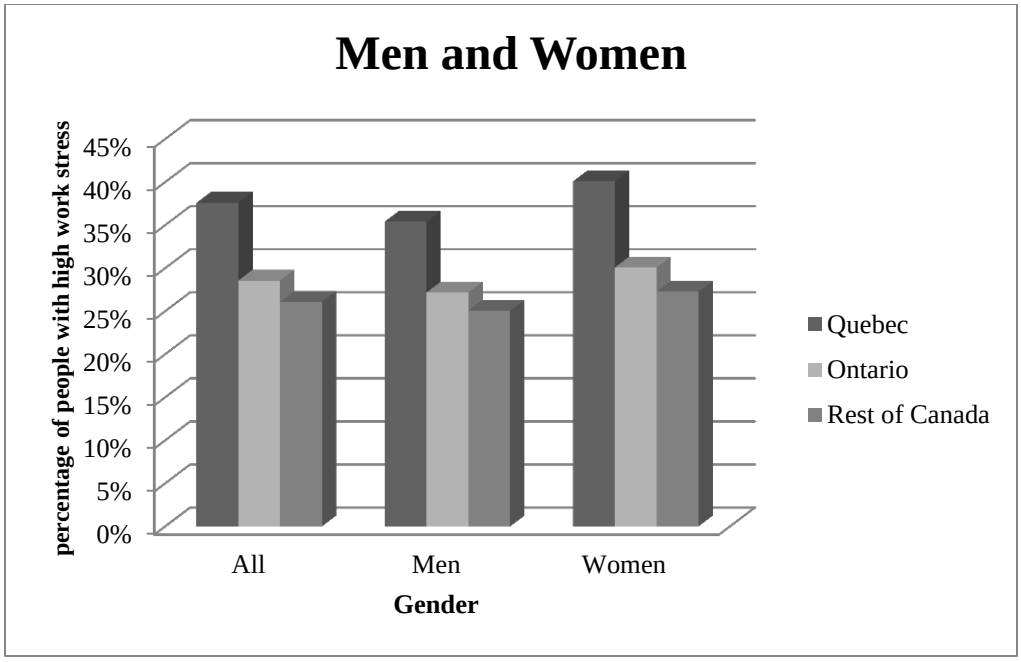


Figure 3.4. Age and work stress

Figure 3.5. Health and work stress

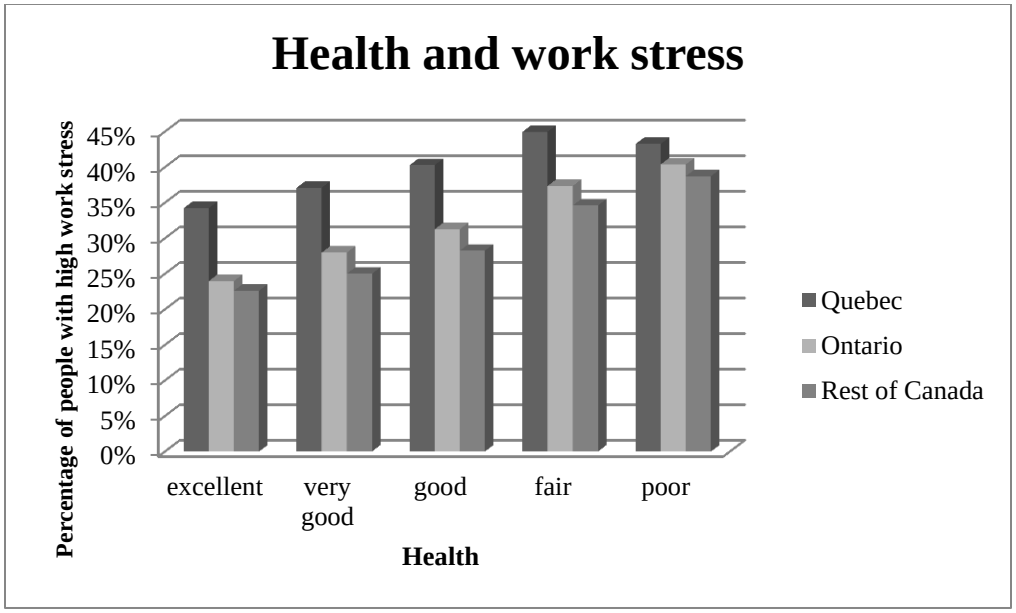


Figure 3.6. Mental health and work stress

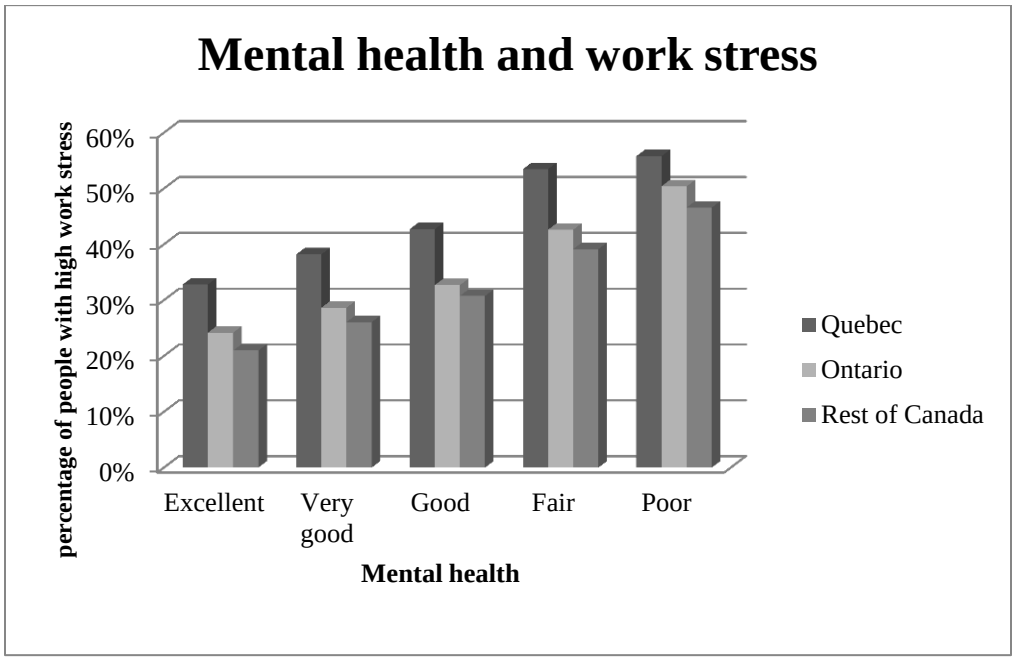


Figure 3.7. Education and work stress

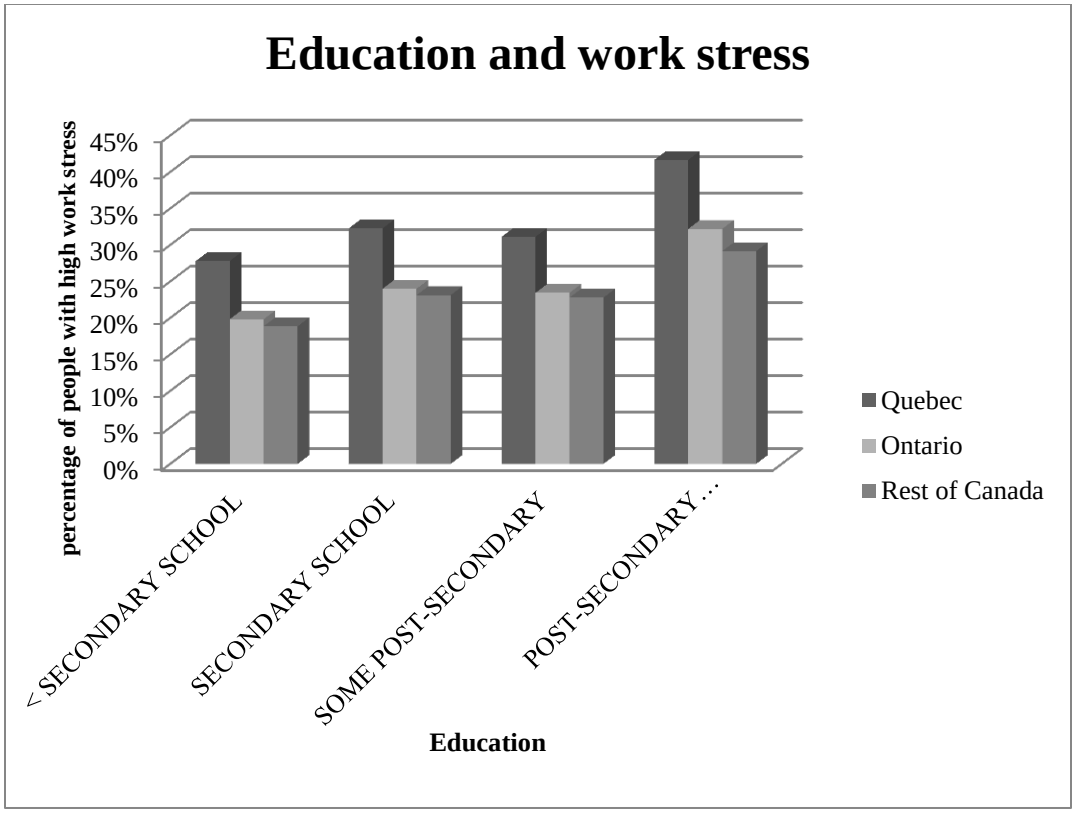


Figure 3.8. Income and work stress

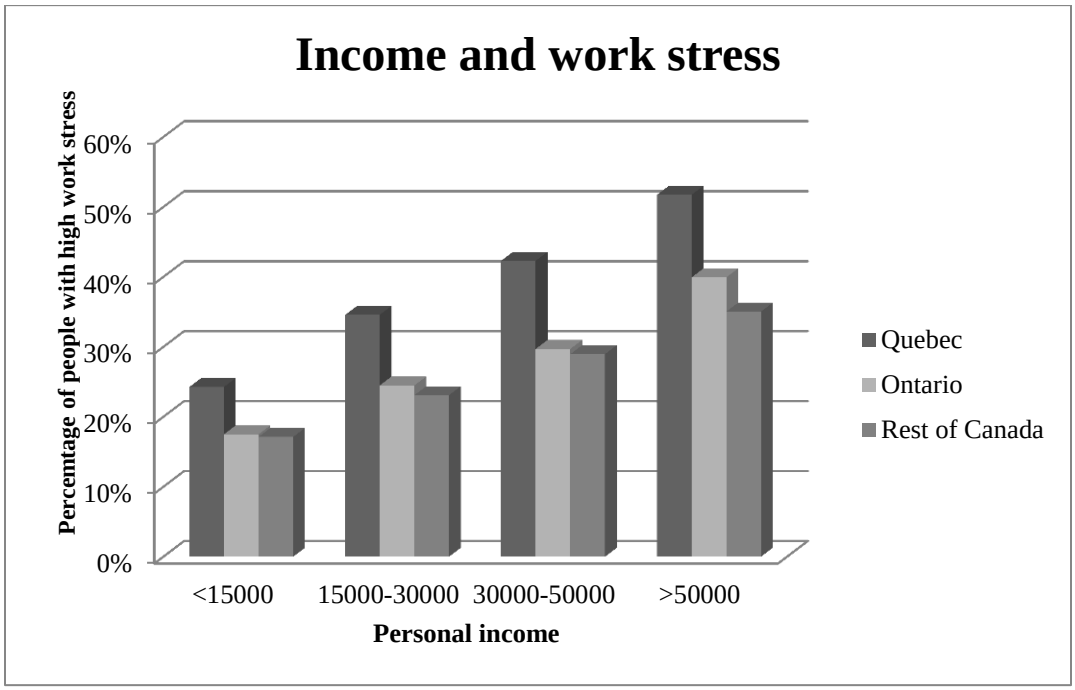


Figure 3.9. Working hours (main job) and work stress

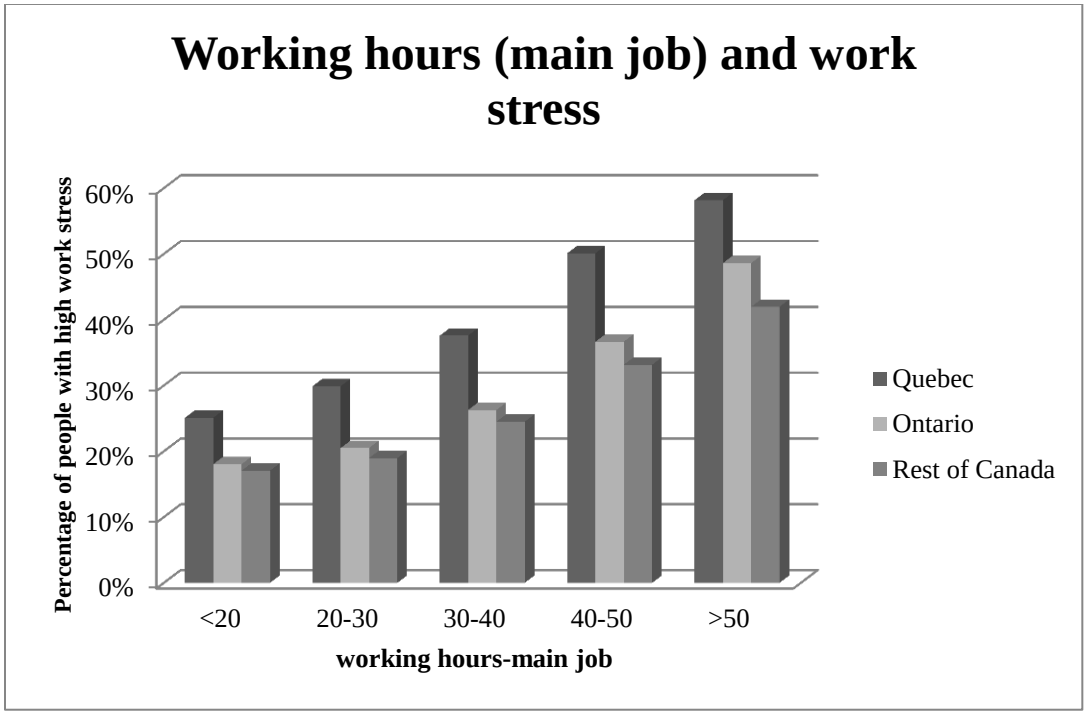


Figure 3.10. Working hours (all jobs) and work stress

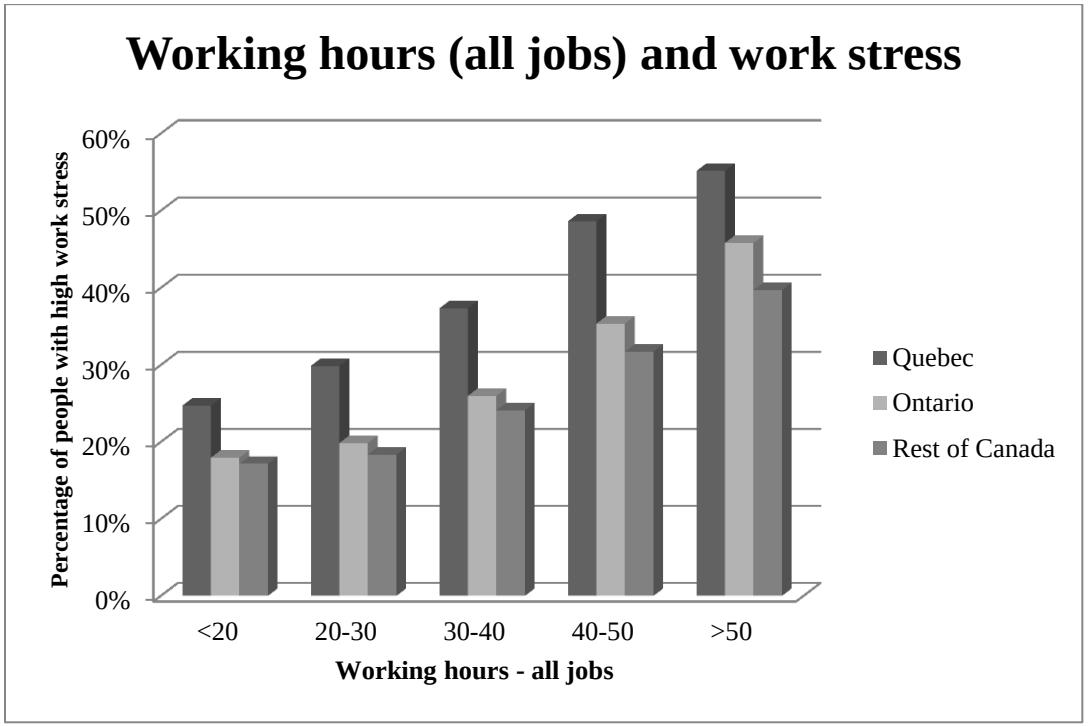


Figure 3.11. Marital Status and work stress

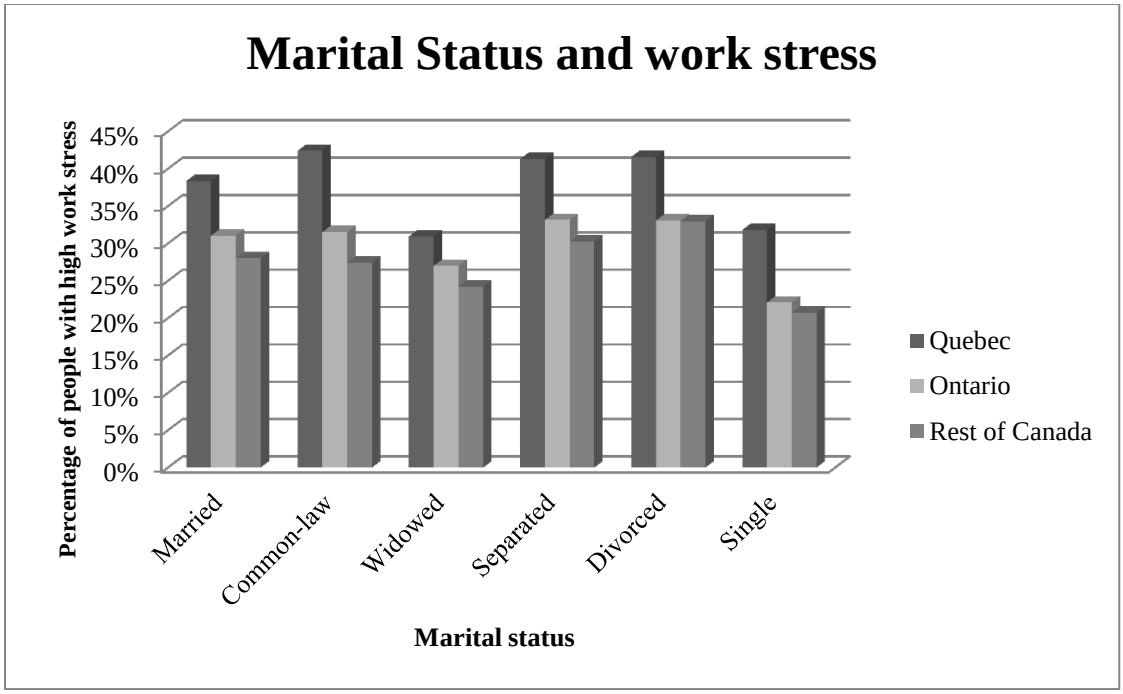


Figure 3.12. Immigration status and work stress

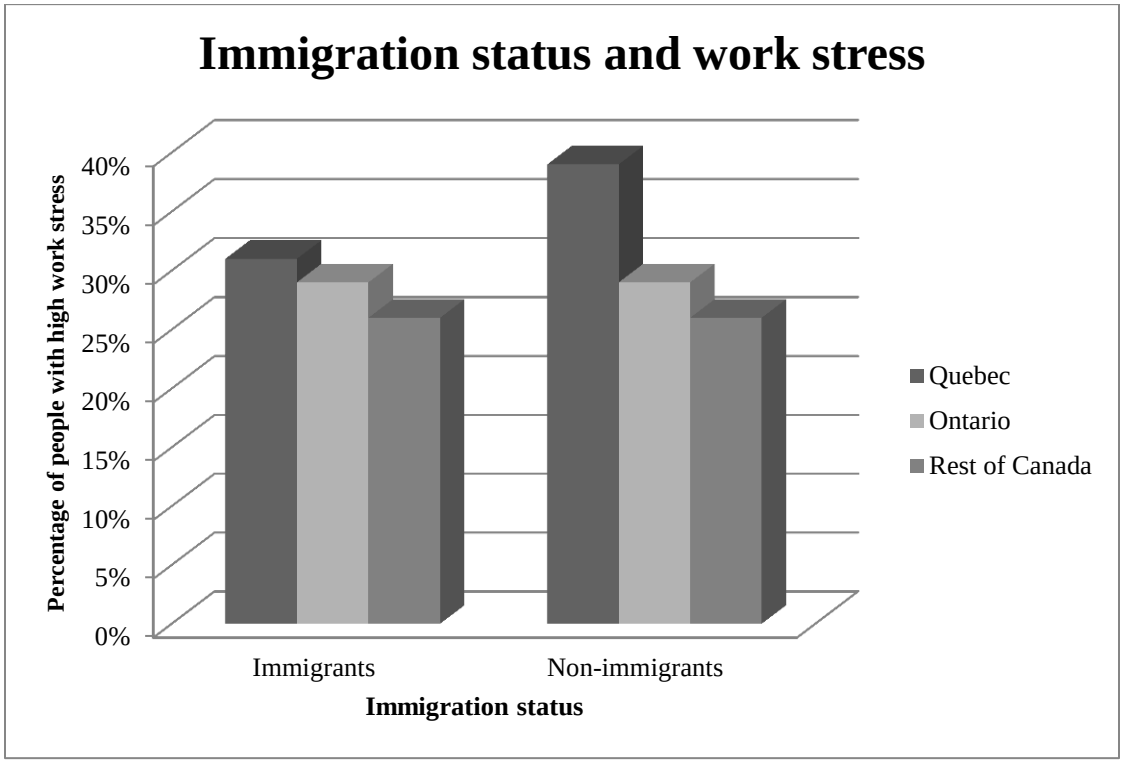


Figure 3.13. Mother tongue and work stress

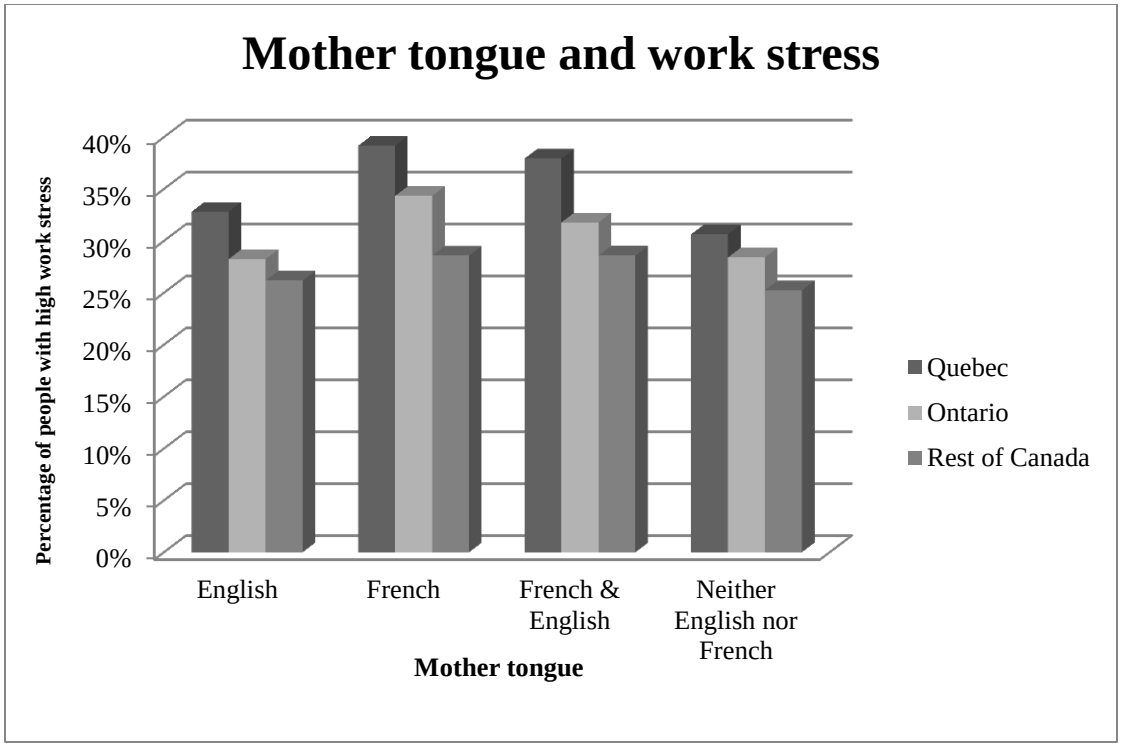


Table 3.1. Variable definitions

Variable name		Definition
Dependent variables		
High work stress	HWS^i	= 1 if most days is quite a bit or extremely stressful in the main job or business in the past 12 months, = 0 if most days is not at all, not very or a bit stressful in the main job or business in the past 12 months.
Independent variables		
Provinces	PR^i	
Québec	QC^i	= 1 if lives in Québec, = 0 if lives in other provinces.
Ontario	ON^i	= 1 if lives in Ontario, = 0 if lives in other provinces.
The Rest of Canada	ROC^i	= 1 if does not live in Québec or Ontario, = 0 if lives Québec or Ontario.
Male	$Male^i$	Male= 1, female= 0
Age	Age^i	Age
Age square	$Age2^i$	Square of age
Urban	Urb^i	= 1 if lives in an urban area, = 0 if lives in a rural area.
CMA	CMA^i	= 1 if lives in a CMA, otherwise= 0.
Marital Status	MS^i	
Married		= 1 if married, = 0 if common law, widowed, separated, divorced, and single.
Common law		= 1 if common law, = 0 if married, widowed, separated, divorced, and single.
Separated		= 1 if separated, = 0 if married, common law, widowed, divorced, and single.
Widowed		= 1 if widowed, = 0 if married, common law, separated, divorced, and single.
Divorced		= 1 if divorced, = 0 if married, common law, widowed, separated, and single.
Single		= 1 if single = 0 if common law, widowed, separated, divorced, and married. (The reference group)
Immigrants	Imm^i	= 1 if is an immigrant, = 0 if is not an immigrant
Have children less than 5 years old	$CH5^i$	= 1 if has children less than 5 years old, otherwise= 0.
Have children between 6 and 11	$CH11^i$	= 1 if has children between 6 and 11 years old, otherwise= 0.

Household type	HT^i
unattached individual	= 1 if household type is unattached individual, otherwise= 0. (The reference group)
Couple without children	= 1 if household type is couple without children, otherwise= 0.
Couple with children less than 25	= 1 if household type is couple with children less than 25, otherwise= 0.
Couple with all children more than 25	= 1 if household type is couple with all children more than 25, otherwise= 0.
Female alone with children less than 25	= 1 if household type is female alone with children less than 25, otherwise= 0.
Female alone with all children more than 25	= 1 if household type is female alone with all children more than 25, otherwise= 0.
Male alone with children less than 25	= 1 if household type is male alone with children less than 25, otherwise= 0.
Male alone with all children more than 25	= 1 if household type is male alone with all children more than 25, otherwise= 0.
Other type of household	= 1 if household type is other type of household, otherwise= 0.
Living arrangement	LA^i
unattached individual living alone	= 1 if living arrangement is unattached individual living alone, otherwise= 0. (The reference group)
unattached individual living with others	= 1 if living arrangement is unattached individual living with others, otherwise= 0.
living with spouse/partner	= 1 if living arrangement is living with spouse/partner, otherwise= 0.
living with spouse/partner, children	= 1 if living arrangement is living with spouse/partner, children, otherwise= 0.
single parent living with children	= 1 if living arrangement is single parent living with children, otherwise= 0.
child living with single parent	= 1 if living arrangement is child living with single parent, otherwise= 0.
child living with single parent, siblings	= 1 if living arrangement is child living with single parent, siblings, otherwise= 0.
child living with two parents	= 1 if living arrangement is child living with two parents, otherwise= 0.

	child living with two parents, siblings	= 1 if living arrangement is child living with two parents, siblings, otherwise= 0.
	other	= 1 if living arrangement is other, otherwise= 0.
Mother tongue	MT^i	
	English	= 1 if mother tongue is English, otherwise= 0. (The reference group)
	French	= 1 if mother tongue is French, otherwise= 0.
	English and French	= 1 if mother tongue is English and French, otherwise= 0.
	Neither English nor French	= 1 if mother tongue is neither English nor French, otherwise= 0.
Language of conversation	LC^i	
	English	= 1 if language of conversation is English only, otherwise= 0. (The reference group)
	French	= 1 if language of conversation is French only, otherwise= 0.
	English and French	= 1 if language of conversation is English and French, otherwise= 0.
	Neither English nor French	= 1 if language of conversation is neither English nor French, otherwise= 0.
Cultural / racial origin	$Race^i$	
	White	= 1 if culture/racial origin is white, otherwise= 0. (The reference group)
	Black	= 1 if culture/racial origin is black, otherwise= 0.
	Korean/Filipino/Japanese/Chinese	= 1 if culture/racial origin is Korean/Filipino/Japanese/Chinese, otherwise= 0.
	South Asian/South East Asian	= 1 if culture/racial origin is South Asian/south east Asian, otherwise= 0.
	Arab/West Asian	= 1 if culture/racial origin is Arab/West Asian, otherwise= 0.
	Multiple origin	= 1 if culture/racial origin is multiple origin, otherwise= 0.
	Other	= 1 if culture/racial origin is others, otherwise= 0.
Education	Edu^i	

Less than secondary school		= 1 if the highest level of respondent's education is less than secondary school, otherwise= 0.
Secondary school		= 1 if the highest level of respondent's education is secondary school, otherwise= 0. (The reference group)
Some post-secondary		= 1 if the highest level of respondent's education is some post-secondary, otherwise= 0.
Post-secondary		= 1 if the highest level of respondent's education is post-secondary, otherwise= 0.
Household education	$Hedu^i$	
Less than secondary school- Household		= 1 if the highest level of education in the household is less than secondary school, otherwise= 0.
Secondary school- Household		= 1 if the highest level of education in the household is secondary school, otherwise= 0. (The reference group)
Some post-secondary- Household		= 1 if the highest level of education in the household is some post-secondary, otherwise= 0.
Post-secondary- Household		= 1 if the highest level of education in the household is Post-secondary, otherwise= 0.
Constant personal income	$Pinc^i$	Constant personal income in 1000 dollars
Constant other income	$Oinc^i$	Constant household income in 1000 dollars minus constant personal income in 1000 dollars
Source of household income		
wage and salaries		= 1 if the source of household income is, otherwise= 0. (The reference group)
Self-employment		= 1 if the source of household income is, otherwise= 0.
Others		= 1 if the source of household income is, otherwise= 0.
Hours worked main job	$Hours^i$	Hours worked at the main job per week
Student	$Stud^i$	
Not student		= 1 if is not a student, otherwise= 0. (The reference group)
Full time		= 1 if is a full time student, otherwise= 0.
Part time		= 1 if is a part time student, otherwise= 0.
Health	$Health^i$	
Excellent		= 1 if health status is excellent, otherwise= 0. (The reference group)

	Very good	= 1 if health status is very good, otherwise= 0.
	Good	= 1 if health status is good, otherwise= 0.
	Fair	= 1 if health status is fair, otherwise= 0.
	Poor	= 1 if health status is poor, otherwise= 0.
Mental Health	MH^i	
	Excellent	= 1 if mental health status is excellent, otherwise= 0. (The reference group)
	Very good	= 1 if mental health status is very good, otherwise= 0.
	Good	= 1 if mental health status is good, otherwise= 0.
	Fair	= 1 if mental health status is fair, otherwise= 0.
	Poor	= 1 if mental health status is poor, otherwise= 0.
At least one chronic disease		= 1 if has at least one chronic disease, otherwise= 0.
Freq. physical activity	PA^i	
	Regular	= 1 if frequency of physical activity is regular, otherwise= 0. (The reference group)
	Occasional	= 1 if frequency of physical activity is occasional, otherwise= 0.
	Infrequent	= 1 if frequency of physical activity is infrequent, otherwise= 0.
Physical activity index	PAI^i	
	Active	= 1 if physical activity index is active, otherwise= 0. (The reference group)
	Moderate	= 1 if physical activity index is moderate, otherwise= 0.
	Inactive	= 1 if physical activity index is inactive, otherwise= 0.
Type of smoker	SMK^i	
	Daily	= 1 if type of smoker is daily smoker, otherwise= 0. (The reference group)
	Occasionally	= 1 if type of smoker is occasionally smoker, otherwise= 0.
	Not at all	= 1 if type of smoker is not at all smoker, otherwise= 0.
Type of drinker	DRI^i	
		= 1 if type of drinker is regular drinker, otherwise= 0. (The reference group)

Regular		= 1 if type of drinker is occasional drinker, otherwise= 0.
Occasional		= 1 if type of drinker is former or never drinker, otherwise= 0.
Former/Never		
Sense of belonging to community	SBC^i	
Very strong		= 1 if sense of belonging to community is very strong, otherwise= 0. (The reference group)
Strong		= 1 if sense of belonging to community is strong, otherwise= 0.
Somewhat weak		= 1 if sense of belonging to community is weak, otherwise= 0.
Very weak		= 1 if sense of belonging to community is very weak, otherwise= 0.
Unemployment rate in the region	UEM^i	Unemployment rate in the region (province level)
Unionization rate in the region	UNI^i	Unionization rate in the region (province level)
Years	YR^i	
2001		Data from the CCHS cycle 1.1 (2001)
2003		Data from the CCHS cycle 2.1 (2003) (The reference group)
2005		Data from the CCHS cycle 3.1 (205)
2007		Data from the CCHS cycle 4.1 (2007)
2008		Data from the CCHS 2008
2009		Data from the CCHS 2009
2010		Data from the CCHS 2010
2011		Data from the CCHS 2011
2012		Data from the CCHS 2012
Variables for the sensitivity analysis		
Shift work	SHI^i	
Regular day shift		= 1 if the type of the shift work is regular day shift, otherwise = 0 (The reference group).
Regular evening shift		= 1 if the type of the shift work is regular evening shift, otherwise = 0.

Regular night shift		= 1 if the type of the shift work is regular night shift, otherwise = 0.
Rotating shift		= 1 if the type of the shift work is rotating shift, otherwise = 0.
Split shift		= 1 if the type of the shift work is split shift, otherwise = 0.
On call		= 1 if the type of the shift work is on call, otherwise = 0.
Irregular schedule		= 1 if the type of the shift work is irregular schedule, otherwise = 0.
Other types of shifts		= 1 if the type of the shift work is other types of shifts, otherwise = 0.
Work part time	PAR^i	= 1 if works part time, = 0 if works full time.
Work environment	WEN^i	
Passive job		=1if the scores for job control and psychological demands are below median, otherwise = 0 (the reference group)
High strain job		= 1 if the score for job control is below median and the score for psychological demands is above median, otherwise = 0 (the reference group is passive jobs).
Low strain job		= 1 if the score for psychological demands is below median and the score for job control is above median, otherwise = 0 (the reference group is passive jobs).
Active job		= 1 if the scores for job control and psychological demands are above median, otherwise = 0 (the reference group is passive jobs).
Job insecurity		=1 if it is disagreed or strongly disagreed with good job security at work, otherwise = 0.
Physically demanding job		= 1 if the individual strongly agree/agree that s/he requires a lot of physical effort at work, otherwise = 0.
Low workplace social support		= 1 if either agreed or strongly agreed with exposing to hostility or conflict from the people you worked with at work, disagreed or strongly disagreed with having helpful supervisor, or disagreed or strongly disagreed with having helpful co-workers, otherwise = 0.
Job dissatisfaction		= 1 if the individual is not too satisfied or not at all satisfied with the job, otherwise = 0.
Mood disorders		=1 if does not have a mood disorder such as depression, bipolar disorder, mania or dysthymia, otherwise=0.

Anxiety disorders		=1 if does not have an anxiety disorder such as a phobia, obsessive-compulsive disorder or a panic disorder, otherwise=0.
Social support		
Tangible support		=1 if has tangible support, otherwise=0.
Affective support		=1 if has affective support, otherwise=0.
Positive social support		=1 if has positive social support, otherwise=0.
Emotional support		=1 if has emotional support, otherwise=0.
Health care		
Availability of health care		=1 if the availability of health care services in the province is rated poor or fair, =0 if the availability of health care services in the province is rated good or excellent.
Quality of health care		=1 if the quality of health care services in the province is rated poor or fair, =0 if the quality of health care services in the province is rated good or excellent.
Regional average weekly hours worked	AWH^i	Ave. weekly hours worked in the region (province level)
Regional average weekly earning	AWE^i	Av. Weekly earnings in the region (province level)
Regional unemployment duration	$UEMD^i$	Unemployment duration in the region (province level)

Table 3.2. Summary statistics. Mean and standard deviations of variables

	All	High work stress	Low work stress	Québec	Ontario	The Rest of Canada
	n= (221797)	n= (66700)	n= (155097)	n= (46704)	n= (75992)	n= (99101)
High work stress (reference: low work stress)	0.31	1.00	0.00	0.40	0.30	0.28
High life stress (reference: low life stress)	0.27	0.60	0.12	0.34	0.26	0.24
Québec (reference: Rest of Canada)	0.23	0.30	0.21	---	---	---
Ontario (reference: Rest of Canada)	0.40	0.38	0.41	---	---	---
Rest of Canada	0.37	0.32	0.38	---	---	---
Male (reference: female)	0.54	0.52	0.55	0.54	0.54	0.55
Urban (reference: rural)	0.83	0.83	0.82	0.80	0.86	0.81
CMA (reference: non-CMA)	0.71	0.73	0.70	0.70	0.80	0.61
Age	41.29	41.78	41.06	41.00	41.38	41.39
	(12.56)	(11.38)	(12.05)	(12.50)	(12.54)	(12.61)
Married (reference: single)	0.58	0.58	0.58	0.40	0.64	0.63
Common-law (reference: single)	0.15	0.17	0.14	0.31	0.09	0.11
Widowed (reference: single)	0.01	0.01	0.01	0.01	0.01	0.01
Separated (reference: single)	0.03	0.03	0.03	0.03	0.03	0.02
Divorced (reference: single)	0.04	0.05	0.04	0.05	0.04	0.04
Single	0.19	0.16	0.20	0.20	0.19	0.19
Immigrants (reference: non-immigrants)	0.22	0.20	0.23	0.13	0.31	0.18
Non-immigrants	0.78	0.80	0.77	0.87	0.69	0.82
Have children less than 5 years old (reference: not having children less than 5)	0.18	0.18	0.18	0.18	0.18	0.17
Have children between 6 and 11 (reference: not having children between 6 and 11)	0.19	0.20	0.19	0.18	0.20	0.18
unattached individual	0.12	0.11	0.12	0.13	0.08	0.13
Couple without children (reference: unattached individual)	0.28	0.28	0.28	0.29	0.25	0.3
Couple with children less than 25 (reference: unattached individual)	0.48	0.48	0.48	0.45	0.52	0.46
Couple with all children more than 25 (reference: unattached individual)	0.03	0.03	0.04	0.03	0.05	0.03

Female alone with children less than 25 (reference: unattached individual)	0.06	0.06	0.05	0.06	0.06	0.05
Female alone with all children more than 25 (reference: unattached individual)	0.01	0.01	0.01	0.01	0.02	0.01
Male alone with children less than 25 (reference: unattached individual)	0.01	0.02	0.01	0.02	0.01	0.01
Male alone with all children more than 25	0.00	0.00	0.00	0.00	0.00	0.00
Other type of household (reference: unattached individual)	0.01	0.01	0.01	0.01	0.01	0.01
Living arrangement: unattached individual living alone	0.08	0.09	0.07	0.08	0.06	0.08
Living arrangement: unattached individual living with others (reference: unattached individual living alone)	0.05	0.04	0.05	0.04	0.04	0.06
Living arrangement: living with spouse/partner (reference: unattached individual living alone)	0.27	0.27	0.27	0.29	0.24	0.29
Living arrangement: living with spouse/partner, children (reference: unattached individual living alone)	0.41	0.43	0.40	0.40	0.43	0.39
Living arrangement: single parent living with children (reference: unattached individual living alone)	0.05	0.06	0.05	0.06	0.05	0.05
Living arrangement: child living with single parent (reference: unattached individual living alone)	0.01	0.01	0.01	0.02	0.01	0.01
Living arrangement: child living with single parent, siblings (reference: unattached individual living alone)	0.01	0.01	0.01	0.01	0.01	0.01
Living arrangement: child living with two parents (reference: unattached individual living alone)	0.02	0.01	0.02	0.02	0.02	0.02
Living arrangement: child living with two parents, siblings (reference: unattached individual living alone)	0.04	0.02	0.05	0.04	0.06	0.03
Living arrangement: other (reference: unattached individual living alone)	0.06	0.06	0.07	0.04	0.08	0.06
Mother tongue: English	0.58	0.54	0.61	0.07	0.69	0.79
Mother tongue: French (reference: English)	0.22	0.28	0.19	0.8	0.04	0.04
Mother tongue: English and French (reference: English)	0.01	0.01	0.01	0.02	0.01	0.01

Mother tongue: Neither English nor French (reference: English)	0.19	0.17	0.19	0.11	0.26	0.16
Language of conversation: English	0.66	0.59	0.68	0.04	0.84	0.87
Language of conversation: French (reference: English)	0.10	0.12	0.10	0.43	0.00	0.00
Language of conversation: English and French (reference: English)	0.23	0.28	0.21	0.53	0.15	0.12
Language of conversation: neither English nor French (reference: English)	0.01	0.01	0.01	0.00	0.01	0.01
Cultural / racial origin: white	0.84	0.86	0.84	0.91	0.78	0.86
Cultural / racial origin: black (reference: white)	0.02	0.02	0.02	0.02	0.03	0.01
Cultural / racial origin: korean/filipino/japanese/chinese (reference: white)	0.05	0.04	0.05	0.01	0.07	0.06
Cultural / racial origin: south asian/south east Asian (reference: white)	0.05	0.04	0.05	0.01	0.07	0.04
Cultural / racial origin: arab/west Asian (reference: white)	0.01	0.01	0.01	0.02	0.02	0.01
Cultural / racial origin: multiple origin (reference: white)	0.01	0.01	0.01	0.01	0.01	0.01
Cultural / racial origin: other (reference: white)	0.02	0.01	0.02	0.02	0.02	0.01
Less than secondary school (reference: Secondary school)	0.09	0.07	0.1	0.1	0.09	0.09
Secondary school	0.16	0.13	0.17	0.12	0.16	0.17
Some post-secondary (reference: Secondary school)	0.07	0.06	0.08	0.07	0.07	0.08
Post-secondary (reference: Secondary school)	0.68	0.74	0.65	0.71	0.68	0.66
Less than secondary school- Household (reference: Secondary school)	0.03	0.03	0.03	0.03	0.03	0.02
Secondary school- Household	0.09	0.07	0.10	0.07	0.09	0.10
Some post-secondary- Household (reference: Secondary school)	0.05	0.04	0.05	0.05	0.04	0.06
Post-secondary- Household (reference: Secondary school)	0.83	0.86	0.82	0.85	0.84	0.82
Constant dollar personal income (x 1000)	43.87	52.19	40.06	38.91	46.16	44.54
	(49.30)	(68.41)	(36.84)	(32.34)	(48.20)	(58.40)
Constant dollar household income (x 1000)	45.84	43.97	46.69	40.98	48.59	46.02

	(103.41)	(91.78)	(108.29)	(108.02)	(103.18)	(100.51)
Source of household income: wage and salaries	0.83	0.86	0.83	0.84	0.84	0.82
Source of household income: self-employment (reference: wage and salaries)	0.12	0.11	0.12	0.1	0.11	0.13
Source of household income: others (reference: wage and salaries)	0.05	0.04	0.05	0.06	0.05	0.05
Hours worked main job	36.99	40.67	35.32	35.44	37.36	37.58
	(16.55)	(16.48)	(16.3)	(15.46)	(16.29)	(17.41)
Full time student (reference: not a student)	0.06	0.04	0.07	0.07	0.07	0.05
Part time student (reference: not a student)	0.04	0.05	0.04	0.04	0.04	0.04
Health: Excellent	0.25	0.22	0.25	0.27	0.25	0.23
Health: Very good (reference: excellent)	0.42	0.41	0.43	0.40	0.42	0.43
Health: good (reference: excellent)	0.27	0.29	0.26	0.28	0.26	0.27
Health: fair (reference: excellent)	0.05	0.07	0.05	0.04	0.06	0.06
Health: poor (reference: excellent)	0.01	0.01	0.01	0.01	0.01	0.01
Mental health: Excellent	0.39	0.34	0.43	0.43	0.41	0.37
Mental health: Very good (reference: excellent)	0.38	0.38	0.37	0.37	0.37	0.39
Mental health: good (reference: excellent)	0.19	0.22	0.17	0.18	0.18	0.19
Mental health: fair (reference: excellent)	0.03	0.05	0.03	0.02	0.03	0.04
Mental health: poor (reference: excellent)	0.01	0.01	0.00	0.00	0.01	0.01
at least one chronic disease (reference: no chronic disease)	0.48	0.53	0.46	0.45	0.49	0.49
Freq. physical activity: regular	0.68	0.67	0.68	0.63	0.67	0.70
Freq. physical activity: occasional (reference: regular)	0.17	0.18	0.17	0.20	0.17	0.17
Freq physical activity: infrequent (reference: regular)	0.15	0.15	0.15	0.17	0.16	0.13
Physical activity index: active	0.26	0.24	0.27	0.21	0.26	0.29
Physical activity index: moderate (reference: active)	0.26	0.27	0.26	0.27	0.26	0.27
Physical activity index: inactive (reference: active)	0.48	0.49	0.47	0.52	0.48	0.44
Type of smoker: daily	0.18	0.19	0.17	0.20	0.17	0.17
Type of smoker: occasionally	0.05	0.05	0.05	0.06	0.05	0.05

(reference: daily)						
Type of smoker: not at all (reference: daily)	0.77	0.76	0.78	0.74	0.78	0.78
Type of drinker: regular	0.72	0.75	0.71	0.79	0.69	0.70
Type of drinker: occasional (reference: regular)	0.15	0.14	0.15	0.12	0.16	0.16
Type of drinker: former/never (reference: daily)	0.13	0.11	0.14	0.09	0.15	0.14
Sense of belonging to community: very strong	0.16	0.14	0.15	0.10	0.17	0.17
Sense of belonging to community: strong (reference: very strong)	0.48	0.46	0.49	0.43	0.49	0.50
Sense of belonging to community: somewhat weak (reference: very strong)	0.28	0.30	0.28	0.36	0.26	0.26
Sense of belonging to community: very weak (reference: very strong)	0.08	0.10	0.08	0.11	0.08	0.07
Unemployment rate in the region	7.14	7.19	7.12	8.00	7.33	6.39
	(1.72)	(1.61)	(1.78)	(0.66)	(0.92)	(2.42)
Unionization rate in the region	31.61	32.21	31.35	39.85	28.14	30.14
	(5.45)	(5.68)	(5.32)	(0.55)	(0.36)	(4.70)
Year 2003	0.15	0.16	0.15	0.15	0.15	0.13
Year 2005 (reference: 2003)	0.14	0.14	0.13	0.14	0.14	0.14
Year 2007 (reference: 2003)	0.14	0.14	0.14	0.14	0.14	0.14
Year 2008 (reference: 2003)	0.14	0.13	0.14	0.14	0.14	0.14
Year 2009 (reference: 2003)	0.10	0.10	0.10	0.10	0.10	0.10
Year 2010 (reference: 2003)	0.11	0.11	0.11	0.11	0.11	0.11
Year 2011 (reference: 2003)	0.11	0.11	0.11	0.11	0.11	0.12
Year 2012 (reference: 2003)	0.11	0.11	0.12	0.11	0.11	0.12

These numbers are weighted. The weights are normalized for each survey to add up to one.

Table 3.3. Percentage of who are worried, nervous or anxious (CCHS 2012-mental health Survey)			
	Québec	**Ontario**	**The Rest of Canada**
Worried about things more than most people - life	72.44	61.08	62.8
More nervous/anxious than most people - life[73]	26.32	17.89	18.86
6 months when anxious/worried most days - life	43.64	31.95	32.95
These numbers are weighted.			

Table 3.4. Percentage of worried, nervous and anxious people who are worried about… (CCHS 2012-mental health Survey)			
	QC	**ON**	**ROC**
Worried - Love life	31.17	23.54	25.22
Worried - Relationships at school or work	18.75	14.99	16.56
Worried - Agoraphobia	2.78	2.34	2.58
Worried - Compulsions	2.88	2.2	2.48
Worried - Other	5.27	4.42	4.56
These numbers are weighted.			

Table 3.5. Percentage of worried, nervous and anxious people who are worried about… (CCHS 2012-mental health Survey)			
	QC	**ON**	**ROC**
Worried - Anxious or worried about everything	7.26	15.41	15.44
Worried - Anxious or worried about nothing in particular	5.89	8.94	11.42
Worried - Finances	40.38	50.09	49.53
Worried - Success at school or work	31.49	35.5	38.24
Worried - Social life	14.67	17.17	19.76
Worried - Relationships with family	23.66	34.79	33.62
Worried - Physical appearance	13.96	19.61	20.47
Worried - Own physical health	16.32	26.43	29.68
Worried - Own mental health	11.44	14.87	17.53
Worried - Alcohol or drug use	5.74	6.69	6.11
Worried - Being away from home or apart from loved ones	15.1	15.16	19.68
Worried - The health or welfare of loved ones	29.62	36.16	36.02
Worried - Social phobias	5.87	9.08	9.96
Worried - Specific phobias	4.64	5.24	5.71
Worried - Obsessions	2.47	3.4	3.95
Worried - Crime / violence	2.89	4.96	7.65
Worried - Economy	5.73	11.24	13.15
Worried - Environment	4.72	7.32	8.78
Worried - Moral decline of society	5.61	9.07	10.14
Worried - War / revolution	3.12	4.52	5.77
These numbers are weighted.			

[73] This question is asked from people who answered "No" to the previous question only.

Table 3.6. Work stress model (equation 1) – probit regressions- (marginal effects) - Pooled CCHSs (2003-2012)

Dependent variable: high work stress (a binary variable)	All	Men	Women	Immigrants	Non-immigrants	Anglophones	Francophones
Québec (reference: Rest of Canada)	0.104***	0.122***	0.085***	0.043	0.124***	0.074***	0.169***
	(0.011)	(0.015)	(0.016)	(0.028)	(0.012)	(0.021)	(0.036)
Ontario (reference: Rest of Canada)	0.030***	0.031***	0.026***	0.023*	0.030***	0.029***	0.021
	(0.005)	(0.006)	(0.007)	(0.013)	(0.005)	(0.005)	(0.020)
Male (reference: Female)	-0.079***	---	---	-0.056***	-0.086***	-0.077***	-0.110***
	(0.004)			(0.010)	(0.004)	(0.005)	(0.009)
Urban (reference: rural)	0.007	0.009	0.004	-0.009	0.009*	0.010*	0.004
	(0.005)	(0.006)	(0.007)	(0.020)	(0.005)	(0.005)	(0.010)
CMA (reference: non-CMA)	0.017***	0.018***	0.012**	0.016	0.017***	0.017***	0.019**
	(0.004)	(0.005)	(0.006)	(0.013)	(0.004)	(0.005)	(0.009)
Age	0.012***	0.010***	0.011***	0.015***	0.011***	0.011***	0.011***
	(0.001)	(0.002)	(0.002)	(0.003)	(0.001)	(0.001)	(0.003)
Age squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married (reference: single)	0.001	0.038*	-0.030	-0.000	0.004	0.022	0.028
	(0.015)	(0.019)	(0.022)	(0.027)	(0.017)	(0.019)	(0.033)
Common-law (reference: single)	0.005	0.026	-0.010	0.003	0.007	0.019	0.032
	(0.015)	(0.021)	(0.023)	(0.032)	(0.017)	(0.020)	(0.032)
Widowed (reference: single)	-0.011	-0.070*	-0.003	0.014	-0.018	-0.010	-0.084*
	(0.023)	(0.042)	(0.028)	(0.054)	(0.025)	(0.027)	(0.044)
Separated (reference: single)	-0.015	0.001	-0.025	-0.027	-0.010	-0.007	-0.013
	(0.013)	(0.018)	(0.017)	(0.030)	(0.014)	(0.015)	(0.029)
Divorced (reference: single)	0.028***	0.015	0.027*	0.025	0.029**	0.021*	0.032
	(0.011)	(0.015)	(0.015)	(0.026)	(0.011)	(0.013)	(0.022)
Immigrants (reference: non-immigrants)	0.016**	0.021**	0.011	---	---	0.020**	0.010
	(0.007)	(0.010)	(0.011)			(0.010)	(0.030)
Have children less than 5 years old (reference: not having children less than 5)	0.001	-0.013	0.015*	0.011	-0.003	-0.007	0.011
	(0.006)	(0.008)	(0.009)	(0.014)	(0.007)	(0.007)	(0.014)
Have children between 6 and 11 (reference: not having children between 6 and 11)	-0.009	-0.002	-0.014*	-0.020	-0.005	-0.001	-0.016

	(0.006)	(0.008)	(0.008)	(0.013)	(0.006)	(0.007)	(0.013)
Couple without children (reference: unattached individual)	0.003	0.017	-0.004	-0.004	0.012	0.002	-0.111
	(0.035)	(0.047)	(0.054)	(0.069)	(0.040)	(0.042)	(0.078)
Couple with children less than 25 (reference: unattached individual)	-0.002	0.001	0.006	0.045	-0.011	-0.014	-0.035
	(0.031)	(0.041)	(0.051)	(0.062)	(0.035)	(0.037)	(0.082)
Couple with all children more than 25 (reference: unattached individual)	-0.025	-0.019	-0.017	0.020	-0.033	-0.039	-0.035
	(0.032)	(0.042)	(0.052)	(0.068)	(0.036)	(0.037)	(0.086)
Female alone with children less than 25 (reference: unattached individual)	0.004	-0.011	0.006	-0.002	0.016	0.013	-0.046
	(0.030)	(0.039)	(0.051)	(0.063)	(0.035)	(0.036)	(0.076)
Female alone with all children more than 25 (reference: unattached individual)	-0.001	0.008	-0.015	-0.027	0.019	0.002	-0.037
	(0.035)	(0.049)	(0.054)	(0.069)	(0.041)	(0.044)	(0.085)
Male alone with children less than 25 (reference: unattached individual)	0.005	0.008	0.055	0.001	0.019	0.005	0.009
	(0.034)	(0.051)	(0.067)	(0.078)	(0.039)	(0.041)	(0.085)
Male alone with all children more than 25 (reference: unattached individual)	-0.020	-0.024	0.021	-0.004	-0.014	-0.012	-0.033
	(0.047)	(0.057)	(0.076)	(0.123)	(0.047)	(0.052)	(0.103)
Other type of household (reference: unattached individual)	-0.012	0.014	-0.024	0.050	-0.022	-0.047	-0.005
	(0.035)	(0.049)	(0.056)	(0.083)	(0.039)	(0.039)	(0.090)
Living arrangement: unattached individual living with others (reference: unattached individual living alone)	-0.006	-0.014	0.008	-0.040	0.002	0.004	-0.009
	(0.010)	(0.014)	(0.016)	(0.024)	(0.011)	(0.013)	(0.023)
Living arrangement: living with spouse/partner (reference: unattached	0.010	-0.024	0.039	0.025	-0.004	-0.009	0.095

individual living alone)							
	(0.035)	(0.047)	(0.055)	(0.072)	(0.040)	(0.042)	(0.086)
Living arrangement: living with spouse/partner, children (reference: unattached individual living alone)	0.012	-0.003	0.018	-0.025	0.016	0.002	0.005
	(0.032)	(0.043)	(0.052)	(0.063)	(0.037)	(0.039)	(0.087)
Living arrangement: single parent living with children (reference: unattached individual living alone)	0.014	0.023	0.009	0.058	-0.008	0.005	0.011
	(0.032)	(0.055)	(0.052)	(0.073)	(0.035)	(0.038)	(0.082)
Living arrangement: child living with single parent (reference: unattached individual living alone)	0.032	0.015	0.049	0.071	0.011	0.043	0.030
	(0.036)	(0.047)	(0.058)	(0.086)	(0.039)	(0.045)	(0.089)
Living arrangement: child living with single parent, siblings (reference: unattached individual living alone)	0.018	0.018	0.017	0.071	-0.010	-0.005	0.006
	(0.037)	(0.048)	(0.058)	(0.086)	(0.039)	(0.043)	(0.091)
Living arrangement: child living with two parents (reference: unattached individual living alone)	0.002	-0.010	0.000	0.004	0.000	0.017	-0.026
	(0.034)	(0.044)	(0.054)	(0.073)	(0.038)	(0.041)	(0.085)
Living arrangement: child living with two parents, siblings (reference: unattached individual living alone)	-0.022	-0.041	-0.015	-0.042	-0.023	-0.011	-0.037
	(0.032)	(0.042)	(0.053)	(0.065)	(0.037)	(0.040)	(0.084)
Living arrangement: other (reference: unattached individual living alone)	0.010	-0.008	0.013	-0.020	0.010	0.007	0.049
	(0.031)	(0.041)	(0.051)	(0.060)	(0.035)	(0.037)	(0.082)
Mother tongue: French (reference: English)	0.068***	0.059***	0.079***	0.073**	0.057***	---	---
	(0.009)	(0.013)	(0.013)	(0.030)	(0.010)		
Mother tongue: English and French (reference: English)	0.033*	0.031	0.040	-0.051	0.034*	---	---
	(0.019)	(0.027)	(0.028)	(0.090)	(0.020)		
Mother tongue: neither English nor French	0.001	0.004	-0.001	-0.005	0.004	---	---

(reference: English)							
	(0.008)	(0.010)	(0.011)	(0.011)	(0.010)		
Language of conversation: French (reference: English)	-0.039***	-0.055***	-0.020	-0.066**	-0.037***	0.038	-0.051
	(0.010)	(0.013)	(0.014)	(0.028)	(0.010)	(0.065)	(0.043)
Language of conversation: English and French (reference: English)	0.010	0.011	0.007	0.028*	0.010	0.018**	-0.007
	(0.007)	(0.009)	(0.009)	(0.016)	(0.007)	(0.008)	(0.042)
Language of conversation: neither English nor French (reference: English)	-0.072***	-0.068**	-0.070*	-0.071***	-0.076*	0.012	0.014
	(0.025)	(0.033)	(0.038)	(0.027)	(0.043)	(0.061)	(0.116)
Cultural / racial origin: black (reference: white)	-0.073***	-0.088***	-0.058***	-0.076***	-0.024	-0.088***	-0.074
	(0.015)	(0.019)	(0.022)	(0.017)	(0.033)	(0.017)	(0.054)
Cultural / racial origin: korean/filipino/japanese/Chinese (reference: white)	-0.015	-0.035**	0.005	-0.016	0.017	0.027	0.181*
	(0.012)	(0.016)	(0.017)	(0.014)	(0.025)	(0.024)	(0.093)
Cultural / racial origin: south asian/south east Asian (reference: white)	-0.021*	-0.003	-0.057***	-0.023	-0.005	-0.014	-0.164
	(0.013)	(0.017)	(0.019)	(0.015)	(0.029)	(0.022)	(0.118)
Cultural / racial origin: arab/west Asian (reference: white)	0.005	-0.015	0.034	0.021	-0.099	-0.065	0.005
	(0.023)	(0.028)	(0.038)	(0.024)	(0.061)	(0.055)	(0.083)
Cultural / racial origin: multiple origin (reference: white)	-0.057***	-0.054***	-0.060***	-0.048***	-0.057***	-0.066***	0.058
	(0.014)	(0.019)	(0.020)	(0.017)	(0.020)	(0.021)	(0.086)
Cultural / racial origin: other (reference: white)	0.036	0.059*	0.011	0.086**	-0.011	0.021	0.096
	(0.023)	(0.032)	(0.030)	(0.038)	(0.025)	(0.026)	(0.081)
Less than secondary school (reference: secondary school)	-0.007	-0.012	0.001	-0.014	-0.004	-0.007	-0.003
	(0.009)	(0.011)	(0.015)	(0.028)	(0.009)	(0.010)	(0.019)
Some post-secondary (reference: secondary school)	0.005	0.006	0.002	-0.000	0.006	-0.007	0.035
	(0.010)	(0.014)	(0.015)	(0.028)	(0.011)	(0.011)	(0.025)

Post-secondary (reference: secondary school)	0.047***	0.041***	0.047***	0.043**	0.047***	0.037***	0.065***
	(0.007)	(0.009)	(0.010)	(0.017)	(0.007)	(0.008)	(0.016)
Less than secondary school- Household (reference: secondary school)	-0.007	0.001	-0.017	0.011	-0.012	0.006	-0.023
	(0.013)	(0.017)	(0.021)	(0.040)	(0.013)	(0.016)	(0.026)
Some post-secondary- Household (reference: secondary school)	0.026**	0.015	0.039**	0.035	0.023*	0.048***	-0.016
	(0.013)	(0.017)	(0.020)	(0.038)	(0.013)	(0.015)	(0.029)
Post-secondary- Household (reference: secondary school)	0.013	0.009	0.019	0.001	0.017**	0.029***	-0.018
	(0.008)	(0.011)	(0.013)	(0.024)	(0.008)	(0.009)	(0.019)
Constant dollar personal income	0.001***	0.001***	0.003***	0.001***	0.001***	0.001***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant dollar other income	-0.000	0.000	-0.000**	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Source of household income: self-employment (reference: wages and salaries)	-0.023***	-0.007	-0.043***	-0.008	-0.030***	-0.035***	-0.001
	(0.006)	(0.008)	(0.010)	(0.014)	(0.007)	(0.007)	(0.015)
Source of household income: others (reference: wages and salaries)	-0.020**	-0.014	-0.025**	0.000	-0.026***	-0.029***	-0.017
	(0.008)	(0.012)	(0.011)	(0.021)	(0.009)	(0.010)	(0.018)
Hours worked main job	0.004***	0.003***	0.004***	0.004***	0.004***	0.004***	0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Full time student (reference: non-students)	0.030***	0.028*	0.034**	0.080***	0.017	0.029**	-0.010
	(0.010)	(0.015)	(0.015)	(0.027)	(0.011)	(0.013)	(0.021)
Part time student (reference: non-students)	0.049***	0.054***	0.042***	0.094***	0.034***	0.018	0.065***
	(0.010)	(0.015)	(0.013)	(0.025)	(0.010)	(0.012)	(0.021)
Health: Very good (reference: excellent)	0.018***	0.011	0.030***	0.016	0.020***	0.015**	0.031***
	(0.005)	(0.007)	(0.007)	(0.013)	(0.005)	(0.006)	(0.011)
Health: good (reference: excellent)	0.040***	0.031***	0.057***	0.038***	0.041***	0.034***	0.053***

	(0.006)	(0.008)	(0.009)	(0.014)	(0.006)	(0.007)	(0.012)
Health: fair (reference: excellent)	0.083***	0.089***	0.084***	0.055**	0.095***	0.074***	0.136***
	(0.010)	(0.014)	(0.015)	(0.024)	(0.011)	(0.012)	(0.023)
Health: poor (reference: excellent)	0.074***	0.023	0.143***	0.035	0.089***	0.106***	0.078
	(0.023)	(0.030)	(0.033)	(0.050)	(0.025)	(0.026)	(0.063)
Mental health: Very good (reference: excellent)	0.052***	0.045***	0.062***	0.049***	0.053***	0.056***	0.051***
	(0.004)	(0.006)	(0.006)	(0.011)	(0.005)	(0.005)	(0.010)
Mental health: good (reference: excellent)	0.102***	0.100***	0.107***	0.076***	0.109***	0.112***	0.107***
	(0.006)	(0.008)	(0.009)	(0.014)	(0.006)	(0.007)	(0.012)
Mental health: fair (reference: excellent)	0.196***	0.229***	0.171***	0.156***	0.209***	0.201***	0.226***
	(0.012)	(0.017)	(0.017)	(0.028)	(0.013)	(0.014)	(0.027)
Mental health: poor (reference: excellent)	0.273***	0.271***	0.274***	0.292***	0.264***	0.274***	0.242***
	(0.027)	(0.042)	(0.035)	(0.064)	(0.029)	(0.033)	(0.063)
at least one chronic disease (reference: no chronic disease)	0.061***	0.057***	0.067***	0.077***	0.057***	0.055***	0.066***
	(0.004)	(0.005)	(0.006)	(0.010)	(0.004)	(0.005)	(0.009)
Freq. physical activity: occasional (reference: regular)	0.009	-0.004	0.023**	-0.005	0.013*	0.007	0.020
	(0.006)	(0.009)	(0.009)	(0.015)	(0.007)	(0.008)	(0.013)
Freq physical activity: infrequent (reference: regular)	0.001	-0.007	0.011	0.000	0.002	0.004	-0.006
	(0.007)	(0.010)	(0.010)	(0.015)	(0.008)	(0.009)	(0.014)
Physical activity index: moderate (reference: active)	0.001	0.006	-0.004	0.003	0.001	0.002	-0.003
	(0.005)	(0.007)	(0.007)	(0.014)	(0.005)	(0.006)	(0.012)
Physical activity index: inactive (reference: active)	-0.008	0.002	-0.016*	-0.007	-0.008	-0.007	-0.022
	(0.006)	(0.009)	(0.008)	(0.015)	(0.006)	(0.007)	(0.014)
Type of smoker: occasionally (reference: daily)	-0.037***	-0.040***	-0.035**	-0.081***	-0.026***	-0.032***	-0.026
	(0.009)	(0.011)	(0.013)	(0.019)	(0.010)	(0.011)	(0.020)
Type of smoker: not at all (reference: daily)	-0.030***	-0.022***	-0.041***	-0.052***	-0.024***	-0.030***	-0.022**

	(0.005)	(0.007)	(0.008)	(0.015)	(0.005)	(0.006)	(0.010)
Type of drinker: occasional (reference: regular)	-0.009*	-0.004	-0.009	-0.017	-0.006	-0.000	-0.024**
	(0.005)	(0.009)	(0.007)	(0.013)	(0.006)	(0.006)	(0.012)
Type of drinker: former/never (reference: regular)	-0.032***	-0.025***	-0.031***	-0.036***	-0.028***	-0.019**	-0.055***
	(0.006)	(0.009)	(0.009)	(0.012)	(0.007)	(0.007)	(0.014)
Sense of belonging to community: strong (reference: very strong)	-0.017***	-0.011	-0.026***	0.004	-0.025***	-0.029***	-0.007
	(0.006)	(0.007)	(0.008)	(0.013)	(0.006)	(0.006)	(0.013)
Sense of belonging to community: somewhat weak (reference: very strong)	-0.004	-0.005	-0.005	0.018	-0.012*	-0.019**	0.009
	(0.006)	(0.008)	(0.009)	(0.015)	(0.007)	(0.007)	(0.014)
Sense of belonging to community: very weak (reference: very strong)	0.040***	0.042***	0.036***	0.055***	0.033***	0.047***	0.017
	(0.009)	(0.012)	(0.013)	(0.019)	(0.009)	(0.011)	(0.018)
Unionization rate in the region	0.001	0.001	0.001	0.002	0.000	0.001*	-0.004
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.004)
Unemployment rate in the region	-0.006***	-0.006***	-0.006***	-0.003	-0.006***	-0.008***	0.005
	(0.001)	(0.001)	(0.002)	(0.005)	(0.001)	(0.001)	(0.006)
Year 2005 (reference: 2003)	-0.003	0.007	-0.017**	-0.006	-0.002	0.004	-0.021*
	(0.005)	(0.006)	(0.007)	(0.012)	(0.005)	(0.005)	(0.012)
Year 2007 (reference: 2003)	-0.008	0.004	-0.025***	0.007	-0.012*	-0.014**	-0.000
	(0.006)	(0.008)	(0.008)	(0.016)	(0.006)	(0.007)	(0.018)
Year 2008 (reference: 2003)	-0.019***	-0.012	-0.032***	-0.017	-0.019***	-0.021***	-0.013
	(0.006)	(0.008)	(0.009)	(0.015)	(0.007)	(0.007)	(0.018)
Year 2009 (reference: 2003)	0.007	0.022**	-0.015	0.022	0.002	0.014	-0.031*
	(0.007)	(0.010)	(0.011)	(0.019)	(0.008)	(0.009)	(0.017)
Year 2010 (reference: 2003)	-0.005	-0.006	-0.008	-0.029	0.001	0.016*	-0.028
	(0.008)	(0.011)	(0.011)	(0.018)	(0.008)	(0.010)	(0.018)
Year 2011 (reference: 2003)	-0.020***	-0.013	-0.033***	-0.030*	-0.017**	-0.015*	-0.020

	(0.007)	(0.010)	(0.010)	(0.017)	(0.008)	(0.009)	(0.018)
Year 2012 (reference: 2003)	-0.035***	-0.029***	-0.045***	-0.044***	-0.032***	-0.029***	-0.034*
	(0.007)	(0.010)	(0.010)	(0.017)	(0.008)	(0.009)	(0.018)
Observations	221797	113276	108521	29446	192351	143256	50544
R-squared	0.071	0.066	0.081	0.066	0.073	0.066	0.071

Robust standard errors in parentheses.

Sample weights used in these regressions. The weights are normalized for each survey to add up to one.

*** p<0.01, ** p<0.05, * p<0.1

Table 3.7. Work stress model (equation 1) - probit regressions - marital status- (marginal effects) - Pooled CCHSs (2003-2012)

Dependent variable: high work stress
(a binary variable)

Section A-All						
	Married	Common-law	Widowed	Separated	Divorced	Single
Québec	0.10***	0.14***	0.07	0.06	0.04	0.10***
	(0.02)	(0.03)	(0.08)	(0.06)	(0.05)	(0.02)
Ontario	0.03***	0.05***	0.04	0.01	0.02	0.02**
	(0.01)	(0.02)	(0.04)	(0.03)	(0.02)	(0.01)
Observations	116248	29733	3510	7789	13540	50961
R-squared	0.07	0.07	0.18	0.08	0.09	0.08
Section B- Men						
	Married	Common-law	Widowed	Separated	Divorced	Single
Québec	0.12***	0.14***	0.13	0.07	0.08	0.10***
	(0.02)	(0.04)	(0.11)	(0.09)	(0.07)	(0.03)
Ontario	0.03***	0.03	-0.00	-0.01	-0.01	0.02**
	(0.01)	(0.02)	(0.04)	(0.04)	(0.03)	(0.01)
Observations	61477	14760	861	3455	5602	27074
R-squared	0.06	0.07	0.32	0.13	0.10	0.07
Section C- Women						
	Married	Common-law	Widowed	Separated	Divorced	Single
Québec	0.08***	0.13***	0.12	0.04	0.04	0.10***
	(0.02)	(0.04)	(0.10)	(0.08)	(0.07)	(0.03)
Ontario	0.02***	0.07***	0.04	0.04	0.02	0.02
	(0.01)	(0.02)	(0.04)	(0.04)	(0.03)	(0.01)
Observations	54771	14961	2619	4334	7938	23887
R-squared	0.08	0.09	0.20	0.11	0.10	0.09

Robust standard errors in parentheses.

Sample weights used in these regressions. The weights are normalized for each survey to add up to one.

I also controlled for age, gender, census metropolitan area (CMA), urban, immigrants, having young children, household type, living arrangement, mother tongue, language of conversation, race, education, highest level of education in household, personal income, other income, source of household income, working hours, part time job, student, health, mental health, chronic diseases, physical activity index, frequency physical activity, type of smoker, type of drinker, sense of belonging, provincial unionization rate, provincial unemployment rate and year dummies.

*** p<0.01, ** p<0.05, * p<0.1

Table 3.8. Work stress model (equation 1) - probit regressions - marital status and children- (marginal effects) - Pooled CCHSs (2003-2012)

Dependent variable: high work stress

(a binary variable)

Section A-All

	Married with children	Married without children	Common-laws with children	Common-laws without children	Separated with children	Separated without children	Divorced with children	Divorced without children	Single with children	Single without children
Québec	0.09***	0.11***	0.13***	0.13***	0.03	0.13*	0.02	0.00	0.21***	0.11***
	(0.02)	(0.02)	(0.05)	(0.03)	(0.09)	(0.07)	(0.09)	(0.05)	(0.08)	(0.03)
Ontario	0.03***	0.03***	0.05	0.05***	0.02	0.02	0.04	-0.00	-0.02	0.02
	(0.01)	(0.01)	(0.03)	(0.02)	(0.04)	(0.03)	(0.04)	(0.02)	(0.04)	(0.01)
Observations	55053	55100	11071	16891	3126	4057	2959	9685	3612	27597
R-squared	0.07	0.07	0.07	0.09	0.08	0.15	0.12	0.09	0.09	0.07

Section B- Men

	Married with children	Married without children	Common-laws with children	Common-laws without children	Separated with children	Separated without children	Divorced with children	Divorced without children	Single with children	Single without children
Québec	0.11***	0.12***	0.14**	0.15***	0.07	0.06	0.06	0.13*	0.24	0.10***
	(0.03)	(0.03)	(0.06)	(0.05)	(0.16)	(0.08)	(0.16)	(0.07)	(0.15)	(0.04)
Ontario	0.03***	0.03**	-0.00	0.04*	-0.05	-0.02	-0.06	-0.00	-0.17***	0.02
	(0.01)	(0.01)	(0.04)	(0.03)	(0.07)	(0.03)	(0.07)	(0.03)	(0.06)	(0.02)
Observations	29397	28950	5546	8217	762	2397	648	4567	490	15718
R-squared	0.06	0.07	0.08	0.09	0.21	0.19	0.25	0.09	0.42	0.07

Section C- Women

	Married with children	Married without children	Common-laws with children	Common-laws without children	Separated with children	Separated without children	Divorced with children	Divorced without children	Single with children	Single without children
Québec	0.05*	0.10***	0.12*	0.12**	-0.02	0.10	0.06	-0.09	0.22***	0.13***
	(0.03)	(0.03)	(0.07)	(0.05)	(0.09)	(0.11)	(0.11)	(0.06)	(0.08)	(0.04)
Ontario	0.02	0.03**	0.09**	0.06**	0.02	0.10**	0.04	-0.00	-0.02	0.02
	(0.01)	(0.01)	(0.04)	(0.03)	(0.05)	(0.04)	(0.05)	(0.03)	(0.04)	(0.02)
Observations	25656	26150	5525	8674	2345	1654	2296	5105	3109	11878
R-squared	0.09	0.08	0.09	0.10	0.12	0.16	0.12	0.11	0.10	0.08

Robust standard errors in parentheses.

Sample weights used in these regressions. The weights are normalized for each survey to add up to one.

I also controlled for all the variables of the table 3.6.

*** p<0.01, ** p<0.05, * p<0.1

Table 3.9. Work stress model- Oaxaca decomposition - probit regressions - (marginal effects) - Pooled CCHSs (2003-2012)

	All	Men	Women
	overall	overall	overall
Québec	0.396***	0.376***	0.419***
	(0.004)	(0.006)	(0.006)
The Rest of Canada	0.288***	0.274***	0.304***
	(0.002)	(0.003)	(0.003)
Mean differential	0.108***	0.102***	0.114***
	(0.005)	(0.006)	(0.007)
Explained part	0.004	-0.021	0.028
	(0.012)	(0.015)	(0.018)
Unexplained part	0.104***	0.123***	0.087***
	(0.012)	(0.015)	(0.019)
Observations	221797	113276	108521

Robust standard errors in parentheses.
Sample weights used in these regressions. The weights are normalized for each survey to add up to one.
*** p<0.01, ** p<0.05, * p<0.1
The complete results is in appendix, table A3.2.

Figure 3.14. Workers' life stress over time - provinces

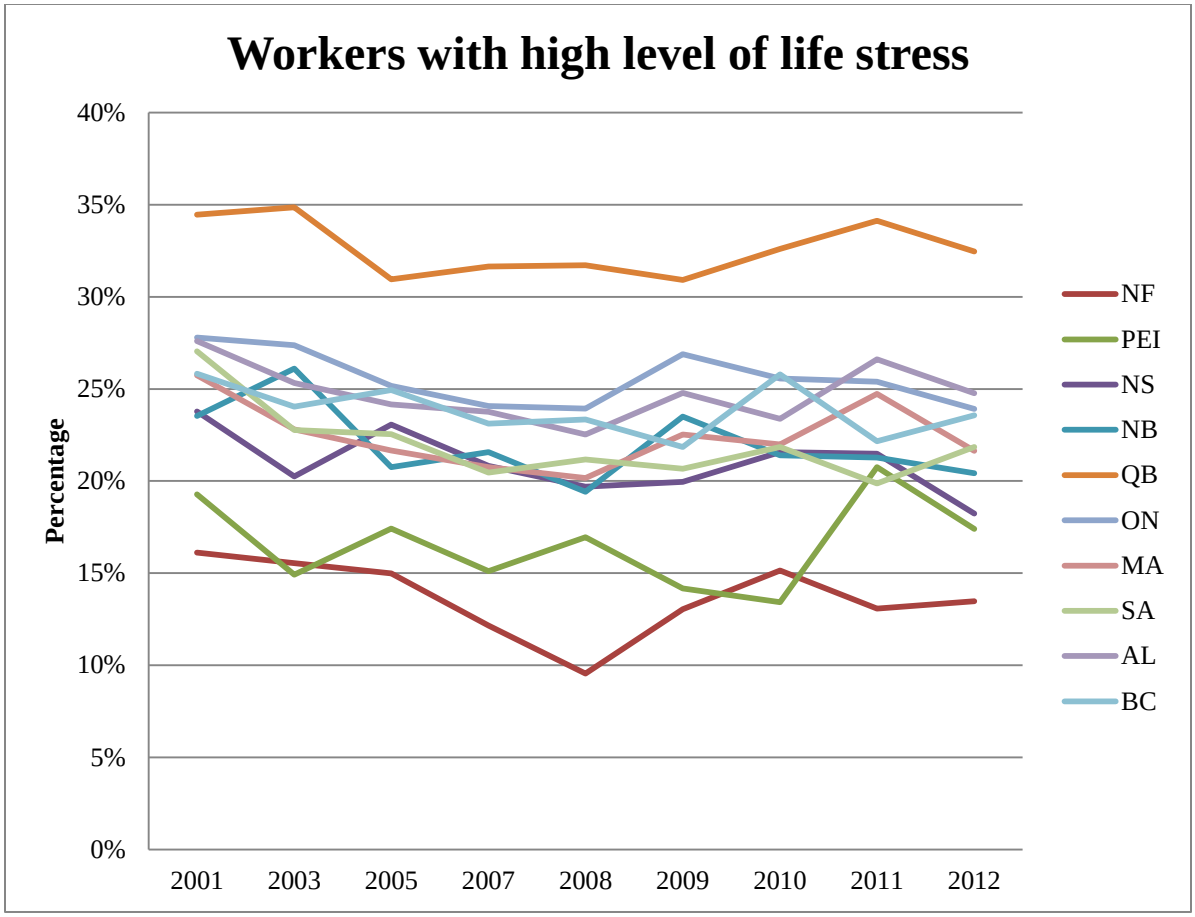


Table 3.10. Work stress model (equation 1) - probit regressions - Sensitivity analysis- (marginal effects) - Pooled CCHSs (2003-2012)

Dependent variable: high work stress (a binary variable)								
Québec	0.10***	0.08***	0.11***	0.12***	0.10***	0.05*	0.19***	0.10***
	(0.01)	(0.02)	(0.01)	(0.03)	(0.01)	(0.03)	(0.03)	(0.01)
Ontario	0.03***	0.04***	0.03***	0.01	0.03***	--	-0.02	0.02***
	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)		(0.02)	(0.00)
Regular evening shift	--	0.01	--	--	--	--	--	--
		(0.02)						
Regular night shift	--	-0.04*	--	--	--	--	--	--
		(0.01)						
Rotating shift	--	0.02*	--	--	--	--	--	--
		(0.01)						
Split shift	--	0.07*	--	--	--	--	--	--
		(0.04)						
On call	--	0.05	--	--	--	--	--	--
		(0.03)						
Irregular schedule	--	-0.02	--	--	--	--	--	--
		(0.01)						
Other types of shifts	--	-0.02	--	--	--	--	--	--
		(0.03)						
Work part time	--	--	0.00	--	--	--	--	--
			(0.01)					
High strain job	--	--	--	-0.24***	--	--	--	--
				(0.01)				
Low strain job	--	--	--	-0.08***	--	--	--	--
				(0.01)				
Active job	--	--	--	-0.28***	--	--	--	--
				(0.01)				
Job insecurity	--	--	--	0.03**	--	--	--	--
				(0.01)				
Physically demanding job	--	--	--	0.02	--	--	--	--
				(0.01)				
Low workplace social support	--	--	--	0.12***	--	--	--	--
				(0.01)				
Job dissatisfaction	--	--	--	0.24***	--	--	--	--
				(0.02)				
Mood disorders	--	--	--	--	-0.04***	--	--	--
					(0.01)			
Anxiety disorders	--	--	--	--	-0.04***	--	--	--
					(0.01)			
Tangible support	--	--	--	--	--	0.05***	--	--
						(0.01)		
Affective support	--	--	--	--	--	0.02	--	--
						(0.02)		
Positive social support	--	--	--	--	--	-0.04	--	--
						(0.03)		

Emotional support	--	--	--	--	--	-0.00	--	--
						(0.02)		
Availability of health care	--	--	--	--	--	--	0.03***	--
							(0.01)	
Quality of health care	--	--	--	--	--	--	0.01	--
							(0.01)	
Regional average weekly hours worked	--	--	--	--	--	--	--	-0.01**
								(0.00)
Regional average weekly earning	--	--	--	--	--	--	--	0.00
								(0.00)
Regional unemployment duration	--	--	--	--	--	--	--	0.00
								(0.00)
Observations	221797	55446	206204	26452	221685	37051	63245	221797
R-squared	0.07	0.08	0.08	0.17	0.07	0.07	0.07	0.07

Robust standard errors in parentheses

Sample weights used in these regressions. The weights are normalized for each survey to add up to one.

I also controlled for all the variables of the table 3.6: age, gender, marital status, census metropolitan area (CMA), urban, immigrants, having young children, household type, living arrangement, mother tongue, language of conversation, race, education, highest level of education in household, personal income, other income, source of household income, working hours, part time job, student, health, mental health, chronic diseases, physical activity index, frequency physical activity, type of smoker, type of drinker, sense of belonging, provincial unionization rate, provincial unemployment rate and year dummies.

*** p<0.01, ** p<0.05, * p<0.1

Appendix 3

Table A3.1. Work stress model (equation 1) -Québec regions- (marginal effects) - Pooled CCHSs (2003-2012)

Dependent variable: high work stress

(a binary variable)

Region in Québec:	All	Chicoutimi	Québec City	Sherbrooke	Trois-Rivieres	Montreal	Non CMA
Region in Québec	0.10***	0.12***	0.14***	0.09***	0.11***	0.11***	0.10***
	(0.01)	(0.03)	(0.02)	(0.03)	(0.03)	(0.01)	(0.01)
Ontario	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Observations	221797	176584	179478	176445	176396	189364	111974
R-squared	0.07	0.06	0.07	0.06	0.06	0.07	0.07

Robust standard errors in parentheses.

Sample weights used in these regressions. The weights are normalized for each survey to add up to one.

I also controlled for all the variables of the table 3.6: age, gender, marital status, census metropolitan area (CMA), urban, immigrants, having young children, household type, living arrangement, mother tongue, language of conversation, race, education, highest level of education in household, personal income, other income, source of household income, working hours, part time job, student, health, mental health, chronic diseases, physical activity index, frequency physical activity, type of smoker, type of drinker, sense of belonging, provincial unionization rate, provincial unemployment rate and year dummies.

*** p<0.01, ** p<0.05, * p<0.1

Table A3.2. Work stress model- Oaxaca decomposition - (marginal effects) - Pooled CCHSs (2003-2012)

Dependent variable: high work stress (a binary variable)	All		Men		Women	
	explained	unexplained	explained	unexplained	explained	unexplained
Male	0.000	-0.001	0.000	0.000	0.000	0.000
	(0.000)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)
Female	0.000	0.001	0.000	0.000	0.000	0.000
	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)
Urban	-0.000	-0.003	-0.000	-0.002	-0.000	-0.003
	(0.000)	(0.005)	(0.000)	(0.006)	(0.000)	(0.006)
Rural	-0.000	0.001	-0.000	0.001	-0.000	0.001
	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)
CMA	-0.000	0.001	-0.000**	0.004	-0.000	-0.004
	(0.000)	(0.004)	(0.000)	(0.005)	(0.000)	(0.005)
Non CMA	-0.000	-0.000	-0.000**	-0.002	-0.000	0.002
	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)
Age	-0.004	-0.091	-0.002	-0.246	-0.006***	0.102
	(0.003)	(0.119)	(0.002)	(0.163)	(0.002)	(0.168)
Age squared	0.004	0.015	0.003	0.081	0.006***	-0.060
	(0.003)	(0.063)	(0.002)	(0.086)	(0.002)	(0.087)
Single	0.000	-0.000	0.000	-0.001	0.000	0.002
	(0.000)	(0.004)	(0.000)	(0.006)	(0.000)	(0.005)
Married	0.001	0.012	-0.006*	0.014	0.005	0.012
	(0.002)	(0.010)	(0.004)	(0.015)	(0.004)	(0.013)
Common law	-0.001	0.011	0.001	0.015	-0.002	0.009
	(0.002)	(0.008)	(0.003)	(0.011)	(0.004)	(0.011)
Widowed	-0.000	-0.001	-0.000	-0.000	-0.000	-0.001
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)

Separated	0.000	0.000	-0.000	0.000	0.000	-0.001
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Divorced	0.000	0.000	0.000	-0.000	0.000	0.001
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)
Immigrants	-0.001	-0.001	-0.001**	0.000	-0.001*	-0.003
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Non-immigrants	-0.001	0.009	-0.001**	-0.000	-0.001*	0.024
	(0.001)	(0.010)	(0.001)	(0.013)	(0.001)	(0.016)
Having children less than 5 years old	0.000	0.002	0.000	-0.002	-0.000	0.006***
	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)
Not having children less than 5 years old	0.000	-0.008	0.000	0.011	-0.000	-0.029***
	(0.000)	(0.006)	(0.000)	(0.008)	(0.000)	(0.009)
Having children between 6 and 11	0.000	-0.001	-0.000	-0.003	0.000	0.001
	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)
Not having children between 6 and 11	0.000	0.007	-0.000	0.013	0.000	-0.003
	(0.000)	(0.006)	(0.000)	(0.008)	(0.000)	(0.008)
unattached individual	0.000	0.004	-0.000	0.011	0.000	-0.006
	(0.000)	(0.008)	(0.000)	(0.009)	(0.001)	(0.013)
Couple without children	0.000	-0.037**	0.001	-0.046*	0.000	-0.023
	(0.000)	(0.018)	(0.001)	(0.024)	(0.000)	(0.026)
Couple with children less than 25	-0.000	-0.023	-0.000	-0.012	-0.000	-0.020
	(0.001)	(0.020)	(0.001)	(0.028)	(0.001)	(0.028)
Couple with all children more than 25	0.000	-0.000	0.000	0.000	0.000	-0.000
	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)
Female alone with children less than 25	0.000	0.001	-0.000	0.000	-0.000	0.003
	(0.000)	(0.002)	(0.000)	(0.001)	(0.000)	(0.006)
Female alone with all children more than 25	-0.000	0.000	0.000	0.000	0.000	0.000

	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Male alone with children less than 25	-0.000	0.001	0.000	0.001	0.000	-0.000
	(0.000)	(0.001)	(0.001)	(0.003)	(0.000)	(0.000)
Male alone with all children more than 25	0.000	0.000	0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Other type of household	-0.000	0.000	0.000	0.000	0.000	0.001*
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Living arrangement: unattached individual living alone	-0.000	-0.000	0.000	-0.004	-0.000	0.005
	(0.000)	(0.005)	(0.001)	(0.006)	(0.001)	(0.008)
Living arrangement: unattached individual living with others	0.000	0.000	0.000	-0.001	-0.000	0.002
	(0.000)	(0.002)	(0.000)	(0.003)	(0.000)	(0.004)
Living arrangement: living with spouse/partner	-0.000	0.031*	-0.001	0.041*	0.000	0.016
	(0.000)	(0.017)	(0.001)	(0.022)	(0.000)	(0.025)
Living arrangement: living with spouse/partner, children	0.000	0.010	0.000	0.016	-0.000	-0.009
	(0.000)	(0.017)	(0.001)	(0.024)	(0.000)	(0.023)
Living arrangement: single parent living with children	0.000	-0.002	0.000	0.002	0.000	-0.009
	(0.000)	(0.003)	(0.001)	(0.003)	(0.000)	(0.006)
Living arrangement: child living with single parent	0.000	-0.001	0.000	-0.001	0.000	-0.000
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Living arrangement: child living with single parent, siblings	0.000	-0.001	0.000	-0.001	-0.000	-0.000
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Living arrangement: child living with two parents	-0.000	-0.000	-0.000	-0.001	0.000	-0.000
	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.001)
Living arrangement: child living with two parents, siblings	0.000	-0.000	0.000	-0.001	0.000	0.000
	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)
Living arrangement: other	0.000	0.003*	0.000	0.003	0.000	0.001
	(0.000)	(0.001)	(0.000)	(0.002)	(0.001)	(0.002)

Mother tongue: English	0.007	-0.002*	0.005	-0.003	0.012**	-0.002
	(0.006)	(0.001)	(0.006)	(0.002)	(0.006)	(0.002)
Mother tongue: French	0.013	0.010	0.009	0.016	0.022**	0.004
	(0.011)	(0.012)	(0.009)	(0.016)	(0.009)	(0.017)
Mother tongue: English and French	0.000	0.000	0.000	0.000	0.000	-0.000
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Mother tongue: neither English nor French	0.001	0.001	0.000	-0.000	0.002**	0.003
	(0.001)	(0.002)	(0.001)	(0.003)	(0.001)	(0.003)
Language of conversation: English	-0.012	-0.001	-0.016	0.002	-0.015	-0.005***
	(0.008)	(0.001)	(0.010)	(0.002)	(0.010)	(0.002)
Language of conversation: French	0.005	-0.027	-0.001	-0.015	0.011	-0.030
	(0.008)	(0.017)	(0.010)	(0.016)	(0.012)	(0.027)
Language of conversation: English and French	0.011	-0.022	0.019***	-0.017	0.009**	-0.020
	(0.007)	(0.019)	(0.005)	(0.018)	(0.004)	(0.025)
Language of conversation: neither English nor French	0.000	0.000	0.001*	0.000	0.001**	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Less than secondary school	-0.000	-0.000	-0.000*	-0.001	-0.000	0.001
	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)
Secondary school	0.000	-0.003**	0.000	-0.003	0.000	-0.004**
	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)
Some post-secondary	0.000	0.002	0.000	0.003*	0.000	0.000
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)
Post-secondary	0.001	0.003	0.001***	-0.005	0.001***	0.013
	(0.001)	(0.008)	(0.000)	(0.010)	(0.000)	(0.012)
Less than secondary school- Household	-0.000	0.000	-0.000	0.001	-0.000	-0.001
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Secondary school- Household	0.000	0.003**	0.000	0.003**	0.000*	0.003*

	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)
Some post-secondary- Household	-0.000	-0.002**	-0.000	-0.003**	-0.000	-0.001
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Post-secondary- Household	0.000	-0.005	0.000	-0.007	0.000	-0.004
	(0.000)	(0.011)	(0.000)	(0.014)	(0.000)	(0.016)
Constant personal income	-0.006	0.031***	-0.008***	0.031***	-0.007***	0.023*
	(0.004)	(0.008)	(0.001)	(0.009)	(0.001)	(0.013)
Constant other income	0.000	0.001	0.000	0.001	0.000*	-0.000
	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.004)
Source of household income: wage and salaries	0.000	-0.023***	0.000**	-0.027***	0.000**	-0.014
	(0.000)	(0.007)	(0.000)	(0.010)	(0.000)	(0.011)
Source of household income: self-employment	0.000	0.001	0.000	0.001	0.000**	0.001
	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)
Source of household income: others	-0.000	0.001	-0.000	0.001	0.000	0.000
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Hours worked main job	-0.006	-0.002	-0.009***	0.020	-0.003***	-0.015
	(0.004)	(0.012)	(0.001)	(0.018)	(0.001)	(0.017)
Full time student	0.000	-0.001	0.000	-0.002	0.000	0.001
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)
Part time student	0.000	0.001	0.000	0.002**	0.000	-0.001
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Not a student	0.000	-0.011	0.000*	-0.025*	0.000**	0.001
	(0.000)	(0.010)	(0.000)	(0.014)	(0.000)	(0.013)
Health: Excellent	-0.001	0.004	-0.001***	0.004	-0.001**	0.000
	(0.001)	(0.004)	(0.000)	(0.006)	(0.000)	(0.005)
Health: Very good	0.000	0.006	0.001***	0.015**	0.000	-0.009
	(0.000)	(0.006)	(0.000)	(0.007)	(0.000)	(0.008)

Health: good	-0.000	0.004	-0.000	0.008	-0.000	-0.002
	(0.000)	(0.004)	(0.000)	(0.006)	(0.000)	(0.005)
Health: fair	-0.000	0.001	-0.001***	0.001	-0.000	0.000
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Health: poor	-0.000	-0.000	-0.000	-0.001	-0.000**	0.000
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Mental health: Excellent	-0.003	0.001	-0.005***	0.006	-0.003***	-0.007
	(0.002)	(0.007)	(0.001)	(0.009)	(0.001)	(0.009)
Mental health: Very good	0.000	-0.005	0.001	-0.009	0.001*	-0.000
	(0.000)	(0.006)	(0.000)	(0.008)	(0.000)	(0.008)
Mental health: good	0.000	-0.001	0.000*	-0.001	0.000	-0.001
	(0.000)	(0.003)	(0.000)	(0.004)	(0.000)	(0.004)
Mental health: fair	-0.001	-0.000	-0.001***	-0.001	-0.000**	0.001
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Mental health: poor	-0.000	0.000	-0.000	0.000	-0.000***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
at least one chronic disease	-0.001	0.000	-0.001***	0.002	-0.001***	-0.002
	(0.001)	(0.002)	(0.000)	(0.003)	(0.000)	(0.003)
No chronic disease	-0.001	-0.000	-0.001***	-0.002	-0.001***	0.003
	(0.001)	(0.003)	(0.000)	(0.004)	(0.000)	(0.003)
Freq. physical activity: regular	0.000	0.008	0.000	0.014*	0.001**	0.006
	(0.000)	(0.006)	(0.000)	(0.008)	(0.000)	(0.008)
Freq. physical activity: occasional	0.000	0.002	-0.000	-0.000	0.000	0.005**
	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)
Freq. physical activity: infrequent	0.000	-0.004**	0.000	-0.004	0.000	-0.005**
	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)
Physical activity index: active	-0.000	-0.001	-0.000	-0.004*	-0.000	0.002

	(0.000)	(0.002)	(0.000)	(0.003)	(0.000)	(0.002)
Physical activity index: moderate	0.000	0.000	0.000	-0.001	-0.000	0.000
	(0.000)	(0.002)	(0.000)	(0.003)	(0.000)	(0.003)
Physical activity index: inactive	-0.000	0.002	-0.000	0.010*	-0.000	-0.007
	(0.000)	(0.004)	(0.000)	(0.006)	(0.000)	(0.006)
Type of smoker: daily	0.000	-0.001	0.000***	-0.000	0.001***	-0.002
	(0.000)	(0.002)	(0.000)	(0.003)	(0.000)	(0.003)
Type of smoker: occasionally	-0.000	-0.000	-0.000	-0.001	-0.000	0.001
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Type of smoker: not at all	0.000	0.008	0.000	0.016**	0.001**	-0.005
	(0.000)	(0.006)	(0.000)	(0.008)	(0.000)	(0.009)
Type of drinker: regular	0.001	0.008	0.000	0.022**	0.002***	-0.001
	(0.001)	(0.006)	(0.000)	(0.009)	(0.001)	(0.008)
Type of drinker: occasional	-0.000	-0.000	-0.000	-0.002	-0.000	0.002
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)
Type of drinker: former/never	0.001	-0.001	0.001**	-0.000	0.001***	-0.001
	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Sense of belonging to community: very strong	0.000	-0.000	0.000	-0.001	0.000	-0.000
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)
Sense of belonging to community: strong	0.001	0.003	0.001***	0.004	0.002***	0.000
	(0.001)	(0.003)	(0.000)	(0.004)	(0.000)	(0.005)
Sense of belonging to community: somewhat weak	-0.001	0.007**	-0.002***	0.009**	-0.001*	0.005
	(0.001)	(0.003)	(0.001)	(0.004)	(0.001)	(0.004)
Sense of belonging to community: very weak	0.001	-0.002*	0.001***	-0.003*	0.001***	-0.001
	(0.001)	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)
Cultural / racial origin: white	0.001	0.039**	0.001	0.060**	0.001	0.009
	(0.001)	(0.019)	(0.001)	(0.026)	(0.001)	(0.028)

Cultural / racial origin: black	0.000	-0.000	-0.000	-0.001	0.000	-0.001
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Cultural / racial origin: korean/filipino/japanese/chinese	-0.000	-0.001	0.001	-0.001*	-0.001	0.000
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Cultural / racial origin: south asian/south east asian	0.000	-0.000	-0.001	-0.001	0.002***	0.001
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Cultural / racial origin: arab/west asian	0.000	0.001	-0.000	0.002*	0.000	0.000
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Cultural / racial origin: multiple origin	-0.000	-0.001	-0.000	-0.001	0.000	-0.000
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Cultural / racial origin: other	-0.000	0.000	-0.000*	0.001	-0.000	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Unionization rate in the region	-0.006	0.655	-0.009	1.495	-0.007	-0.264
	(0.004)	(0.679)	(0.008)	(0.930)	(0.008)	(0.994)
Unemployment rate in the region	-0.002	-0.055	-0.002	-0.257*	-0.003*	0.188
	(0.002)	(0.112)	(0.002)	(0.154)	(0.002)	(0.162)
Year 2003	-0.000	-0.001	-0.000	-0.004***	-0.000	0.002
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Year 2005	0.000	-0.004***	0.000**	-0.004***	0.000	-0.003
	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)
Year 2007	0.000	-0.000	0.000	-0.005***	-0.000	0.005***
	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)
Year 2008	0.000	0.002	0.000	0.002	0.000	0.001
	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.003)
Year 2009	0.000	-0.001	0.000	0.001	0.000	-0.004
	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)
Year 2010	-0.000	-0.000	-0.000	-0.003*	0.000	0.003**

	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)
Year 2011	-0.000	0.003*	0.000	0.006**	-0.000	0.001
	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.003)
Year 2012	0.000	0.000	0.000	0.004	0.000	-0.004
	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)
Constant		-0.461		-1.114		0.200
		(0.586)		(0.798)		(0.860)
Total	**0.004**	**0.104*** **	**-0.021**	**0.123*** **	**0.028**	**0.087*** **
	(0.012)	**(0.012)**	**(0.015)**	**(0.015)**	**(0.018)**	**(0.019)**
Mean differential		**0.108*** **		**0.102*** **		**0.114*** **
		(0.005)		**(0.006)**		**(0.007)**
Observations	221797	221797	113276	113276	108521	108521

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Sample weights used in these regressions. The weights are normalized for each survey to add up to one.

Note! It has to be mentioned that the Oaxaca decomposition has an advantage over simply using a dummy variable for Québec to capture differences as it allows one to see the impact of each of the explanatory variables on the explained and the "unexplained" (unobserved) parts. Moreover, while the choice of the base category for dummy or categorical variables does not affect the results of the explained part of equation (6) because the total impact of a dummy control variable or a categorical control variable is the same no matter the reference category, it does affect the "unexplained" part since the coefficients used in Oaxaca decomposition change if the base categories are changed.

To avoid this problem, Jann and Zürich (2008) suggest having the impact of dummy variables (or categorical variables) as their "deviations from the grand mean" (Jann and Zürich, 2008 p. 462). Therefore, the coefficients are presented as deviations from the grand mean. I undertook the analysis with both the base categories and the deviations from the grand mean, and the results of the Oaxaca decomposition do not appear to be sensitive to this choice.