The part-time work puzzle: Could the relationship between self-reported health and part-time work solve the puzzle?

The relationship between self-reported health and part-time work

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Abstract

This paper tests if there is a relationship between self-reported health and part-time work. The empirical results are based on qualitative data of the LISS Panel (CentERdata Tilburg). Related literature of Becker and Akerlof formulated different hypothesis about the distribution of home work and market production. Booth and Van Ours (2008) tested these hypotheses with job-, work- and life satisfaction. They found a part-time work puzzle. Women with part-time jobs did not have a higher life satisfaction than full-time, so life satisfaction could not explain the choice of working part-time. The conclusion of this paper is twofold: for males, there is an ambiguous relationship between self-reported health and part-time work. For females, working part-time increases their health. Since females tend to be more alert with their health, the choice of the number of hours worked is influenced by its effect on her health. The results are an upper boundary of the real effect due to reverse positive causality.

Contents

Equality between men and women is one of the most important issues of the 21st century. One of the most known debates around this equality is the gender wage gap, resulting in that some women have a significant lower average salary than a male. This takes into account the disadvantages some women face in the labor market. For example, the European Commission established that the average gender pay gap in the European Union in 2014 was 16.7%. [1]

The example of the gender wage gap does not necessarily construct proof of discrimination of women, but it shows that women have a subordinate role to men when it comes to employment. Governments all around the world have policies concerning positive discrimination in employment. Swedish political parties experimented with a women quota of minimum 40% in political parties back in 1987 (Folke and Riche, 2016), which might have helped to Sweden's high representation of women in parliament.[2] The Dutch government promotes gender equality in the labor market (Gustafsson and Bruyn-Hunt, 1991) and all around the world countries propose similar policies.

Gender-inequality implies that human capital is lost, which is inefficient to society. Cassels et al. (2009) find that the Australian economy would grow by $93 billion, if the gender gap is entirely closed. Folke et al. (2016) found that in Swedish politics, a lower competition between political parties results in less women empowered, resulting in a loss of human capital. Gender-equality policies are thus necessary, since the loss in human capital cannot be solved by the private sector.

Even though some would argue these policies don't go far enough or are not effective at all (Kittay 1999, p. 3), an interesting question is why we observe that women are not equally participating in the labor force as men do. Several governments try to allow women to equally participate in the labor force, but for some reason this seems an unlikely event.

Using micro-economic incentives, the only case in which a female will participate in the labor foce, is when the combination of paid-work and housekeeping has more benefits for the family income, than the case in which the female solely provides housekeeping production (Gustafsson and Bruyn-Hunt, 1991). Does this mean that the standard gender roles are justified such that the current equilibrium of gender employment is optimal? Or should the government try to shift this family behavior so that more men provide housekeeping production to prevent the loss of human capital?

[1] http://ec.europa.eu/justice/gender-equality/files/gender_pay_gap/2016/gpg_eu_factsheet_2016_en.pdf
[2] https://sweden.se/society/gender-equality-in-sweden/

The question of why women tend to work in part-time is quite interesting with regards to how many women work part-time. The Netherlands is the country where the highest percentage of women work part-time. In 2008, 75% of the women with a job work part-time. [3] Men work more in part-time than before, but 90% of the middle-aged man (25-55 years old) has a full-time job. In the Netherlands, the conventional role distribution has a two-sided story.

The positive side of the story is that women can work part-time and are not forced to choose between no job and a full-time job. The negative view of the conventional role distribution is that part-time jobs imply wastage of resources and underutilization of investments in human capital, since many part-time working women are highly educated (Booth and Van Ours, 2013). This research focuses on the Netherlands, because of the high number of women working part-time.

2 Theoretical Framework

2.1 Relevant Literature

2.1.1 Theoretical literature

Becker (1965) was one of the first economists that analyzed this so-called discrimination economics between men and women. The aim of this type of economic research is not to explain gender differences ex post, as policies try to tackle, but to explain the differences in behavior of men and women ex ante.

Becker argued that a family could be analyzed as a unit, thus it was comparable with the decision rules of a firm. Two partners jointly decide about how they will divide their total time to certain activities, in this case home production and market work. The two partners follow the rules of cost-minimization, so that their total production or total family income is maximized (similar to a firm). Becker then formulated a gender-neutral hypothesis that two partners specialize in either market work or home production and there is no obvious reason why a female would specialize in home production.

It seems tempting to link Becker's work to the current role distribution of gender and to conclude that females have a lower value on the employment market than men, but Becker did not imply this with his findings. The main implications of the research for Becker was to point out the value of time (Grossman, 2015). Becker's hypothesis is gender neutral because gender is irrelevant to

[3] https://www.cbs.nl/nl-nl/nieuws/2009/30/nederland-is-europees-kampioen-deeltijdwerken

the distribution between home production and market work, families follow the rules of production maximization to yield maximum family utility with the constraint of time.

If a family would be a unit as Becker described, the two partners both would have a preference which work or which specialization they would choose. In this scenario, the specialization outcome is driven by a bargaining game. Following Becker's theory, the partner with the highest income would choose to work and the one with the lowest income would choose to provide for the home production. A person that works full-time has a higher probability to be promoted (and thus earn more income), while a person that works part-time has a lower probability to be promoted. Barret (1980) argues that this occurs due to the perception that part-time workers are regarded as employees without ambitions. Then there is a snowball effect: if more income is preferred, then the partner which is the most productive will work more (income effect). Second, the leisure time of the most productive partner will be more expensive, which makes him or her less likely to provide for the home production (substitution effect).

This effect changes the bargaining game. As Becker would predict, the most productive partner would choose for market work. The other partner is then 'forced' by the maximization of the family unit to choose for home production. The relative weights in the family utility change because of this. The most productive partner would prefer market work due to its higher productivity and the other partner would prefer home production, because these joint preferences lead to a maximization of the family utility.

If males would start with a positive difference in wage between men and women, the difference would be further increase by the bargaining game. The family unit signals that the male is more productive than the female and if gender does not influence the productivity, there would be an increased demand to males in the market because of the higher productivity. Then more females would be specializing in home production and the process repeats with less bargaining power for women.

In contrast with the gender-neutral hypothesis of Becker, Akerlof and Kranton (2000) formulated a gender identity hypothesis where gender did matter. The authors argued that gender specific utility influences the distribution of home production and market work between men and women. Social custom could be an important determinant for this gender specific utility. Men could gain more utility in full-time jobs than women. Women could gain more utility with working less hours if the male partner works full-time. Female partners then decide to work enough hours such that their jobs give them self-esteem, while complying with social custom and being able to care for their families and their homes. In this case the family utility and the individual utility would be maximized.

The gender identity hypothesis gives more insight in the role distribution that we observe between men and women nowadays and it is an extension of the gender-neutral hypothesis of Becker. The incentives of partnered couples are thus very different than those of an individual person, who might be concerned with income maximization primarily and home production secondary. The collaboration of two partners makes it possible to specialize in both income and home production and with gender-specific utility, the specializations of men and women in family units can be explained.

The lack of participation of women in the labor force implies that human capital is lost. In a world where solely men work and women are unemployed, the employees would be less diverse than in a world where there is no gender gap. The diversity of men and women can improve competition between employees (which raises their quality) and a female with different talents can do better at several situations than a male.

This means that many governments around the world believe that this behavior should be shifted towards behavior where women tend to participate in the labor force more often. An important question then arises: are women (and men) willing to change their current behavior with the family division of work and home production?

2.1.2 Empirical literature

Booth and Van Ours (2008) were two of the first researchers that linked happiness economics to the division of home production and market work. Booth et al. devoted three papers (2008,2009,2013) to the relationship between part-time work and partnered well-being, as measured by life satisfaction, working-hours satisfaction and job satisfaction. The type of research by Booth et al. is the first regarding the relationship between part-time work and perceived satisfaction.

Booth and Van Ours' three papers are relevant for this research because it takes the family unit decision making process about work in consideration and links this to self-perceived satisfaction, split into job hours-, work- and life satisfaction. Their findings indicate whether partnered women (and men) are willing to change their behavior, so this indication is relevant for this research.

In the first research paper of Booth et al. (2008), the authors use data of the British Household Panel Survey and restrict their sample to married or cohabiting couples. The second research (2009) is similar to the first, but allows for interdependence between partners and uses the Australian HILDA Survey. The third research (2013) examines whether part-time work could be an intermediate stage

developing to a greater proportion of women in full time jobs in the Netherlands, using a survey of CentERdata.

Booth and Van Ours (2008) pointed out a "part-time work puzzle". If women are more satisfied with combining market work and home production, then these women should have a higher life satisfaction. This was not the case. Additionally, women without children are more satisfied with a part-time job than women with children with a full-time job. These two findings oppose a part-time work puzzle.

The second research of Booth and Van Ours (2009) allow for interdependence of partners. The results show differences for men and women in the impact of part-time or full-time work on life satisfaction. Overall, both partners have the highest life satisfaction if the male has a full-time job. Female life satisfaction declines if she works full-time. For men, the partner's job is irrelevant for their life satisfaction. These findings make a case for the hypothesis of gender-identity utility of Akerlof, where social norms are most important for the distribution of market work and home production. Partners are more satisfied with their life (have a higher utility) if they meet the conventional role distribution.

In a later research, Booth and Van Ours (2013) examined whether women working part-time could be an intermediate stage to working full-time. Female life satisfaction is uncorrelated with working hours, indicating that women don't have strong incentives to work more hours. Male life satisfaction is strongly correlated with working hours, positively for himself and negatively for his partner. This indicates again that the conventional role distribution is preferred to a different distribution, either through the strong preferences of men or the weak preferences of women. These findings give more information about the incentives of partners, but still could not fully solve the part-time work puzzle.

The findings of Booth and Van Ours are interesting, because of the question regarding life satisfaction. Participants had to answer the question "how dissatisfied or satisfied are you with your life overall" at the end of the survey, so that the answers to the questions of job- and hours worked satisfaction could not affect the question about life satisfaction. The life satisfaction question consisted of several categories that the participant had to think about first, including health. The answers to this question could therefore be an indicator for this research.

The main findings in the three papers about life satisfaction were as follows

a) women have the highest life satisfaction when they are working part-time

b) women have a higher life satisfaction when the male partner is working full-time
c) men have the highest life satisfaction when they are working full-time
d) men have the highest life satisfaction when the female partner is working part-time

2.2 Main Question & Hypotheses

The part-time work puzzle imposes an interest phenomenon. This research examines whether the effect of working part-time has a significant influence on self-reported health. The main question of this research is as follows:

What is the relationship between self-reported health and part-time work?

Mancini (1981) found that the life satisfaction variable that is used by Booth et al. is significantly positively correlated with the locus of control of people. The locus of control is a personal psychology, where people can either believe they control (internal) everything in their life or believe that (external) faith determines what happens (Rotter et al, 1966). Life satisfaction is a variable that is a result of this locus.

In the questionnaire of Booth et al. (2008), life satisfaction consisted aspects of health, income, residence, partner, job overall, social life, the amount of leisure time and the way leisure time is spent. Following this definition of life satisfaction and the conclusion of Mancini (1981), health (and all the other aspects) are positively correlated with life satisfaction. Although respondents view the locus of control differently, all the categories of life satisfaction fall under the definition of the locus of control.

The two figures show how the three variables of interest are correlated with each other. Health is positively correlated with life satisfaction for both genders, but working part-time is differently correlated with life satisfaction for males and females. For males, working part-time induces a lower life satisfaction. For women, this induces a higher life satisfaction. Health and working part-time influence life satisfaction both directly. This research focuses on the relationship between working

part-time and health. The orange circle represents an expected correlation, to be discussed below the two figures.

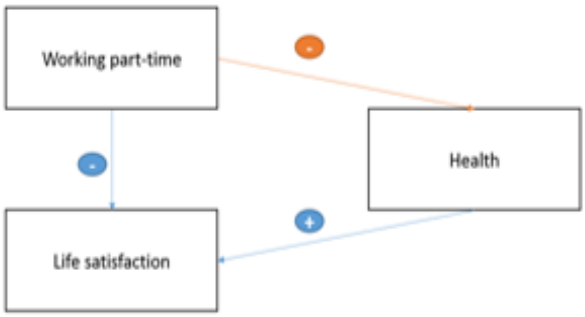

Figure 1: expected relationship health and work (male)

Figure 2: expected relationship health and work (female)

Regarding the distribution of working hours between men and women, one can observe that women tend to work less. Women could face more restrictions than men when choosing the number of working hours they want to work, but women tend to have a higher life satisfaction when they are working part-time. In the figure, health is represented as a channel to life satisfaction. Working part-time could increase or decrease a person's health and thus influence their life satisfaction even greater through this channel.

Verburgge (1989) examined that regarding self-reported health, women tend to report worse health than men. This could be due to men being more often employed. Men therefore feel more fulfilled and have less stress. However, men are more exposed to risk of smoking and alcohol, and this explains why men have higher mortality rates. If health would be a consideration in the family utility, then one would expect that males are better off when working fulltime and females part-time.

This biological reason is the main driver for my expectation of the correlations. The three papers of Booth and Van Ours described how partners are most satisfied with the conventional role distribution and that women don't have strong incentives to work more. If we assume that health is considered in some way when choosing whether to work part-time or full-time, the restriction of health is less apparent for males than for females (health as a negative effect). The psychological health of males increases when working full-time and for females when working part-time (health as a positive effect). I thus expect that health would be highest overall for males when they work full-time and for females when they work part-time.

If health would matter when choosing the number of working hours, this would be an extension of Becker's and Akerlof's theory. For example, a couple consisting of a man and a woman have to decide how they will divide their total time between market work and home production. The

man has a better health than the woman for every hour worked. If the man decides to work full time, this means that his work choice has a positive influence on his health. The man's health has a positive influence on his life satisfaction and gives the man more utility. The female can choose to work full-time as well, but could have a lower utility than her male and could have a different overall effect on her health than the male. If this is the case, the couple maximizes its utility when the male works full-time and are both individually and collectively best off. The self-reported health variable is then an additional criterion to family units.

This oversimplified example could be the first step towards an explanation of the gender distribution. It is why I propose the first hypothesis based on the expected correlation between health and working part-time.

Hypothesis 1: The influence of part-time work on health is positive for women and negative for men

To further analyze the correlation between health and working part-time, the second hypothesis examines whether relative changes in working hours and self-perceived health are correlated. If a respondent worked more hours and the respondent's health increased through working more (or less) hours, then this outlines the effect of working hours on health more accurately.

Hypothesis 2: The change in working hours compared to previous year can explain changes in a respondent's health

The oversimplified example of hypothesis one should have immediately raised some questions. First, if the woman is in bad health, would that not be an explanation of why she is working less than her male partner? Yes, health and income have a great deal of reverse causality. A higher income could lead to a higher health, but workers with better health are more likely to earn more wage than workers with a poor health. Benzeval et al. (2000) examined this relationship and found that a poor health is one of the major problems associated with low income. Furthermore, Boles et al. (2004) concluded that higher health risks are correlated with a greater productivity loss. Health could have binding restrictions for both genders and explain why the male or female chose to work part-time.

What is then the role of monetary incentives in this example? Ettner (1995) established that a higher income has a positive effect on health (physical and mental). Backlund et al. (1996) found that

countries with an egalitarian distribution of income are correlated with low mortality rates. Policies can overcome this inequality, but the policymakers should consider the potential indirect costs of lower working hours and a lower equilibrium wage for workers (Marshall, 1992).

There is a snowball effect: if a male is in good health, he could work more hours, earn more income and improve his health and then work even more hours. This could influence the decision of women to work less hours. To test whether this could be an explanation for the gender roles, the second hypothesis will test how reverse causality shapes the outcome of hypothesis one.

Hypothesis 3: Health has a positive effect on the amount of work hours for both sexes

2.3 Social and Scientific relevance

This research could provide an argument to why women tend to accumulate fewer working hours than men. Although this research does not make a case for old-fashioned gender roles, it could explain why men work fulltime and women part time with respect to the limitations of their health. The more binding limitations of female's health in part-time work prevents them from working more hours. The current policies of the government are useless if this is the case: women want to participate, but their health prevents this. To my knowledge, this would be the first research which examines the relationship between part-time work and self-reported health.

Secondly, this research could help with the explanation of the part-time work puzzle of Booth and Van Ours (2008). Health status could solve the puzzle by linking life satisfaction and part-time work. Women with children that work full-time might feel more satisfied, because they have no health constraints to care for their family by generating income. Also, Booth and Van Ours tested life satisfaction which indicates to which extent someone was satisfied with her or his life. This includes health. It is interesting to see if the results of Booth et al. are in line with this research.

3 Data

3.1 Dataset

The empirical results are based on the LISS Panel of CentERdata. The LISS panel is a representative private household survey in the Netherlands that used a probability-based recruitment method to create an internet panel (Scherpenzeel, 2011). The recruitment started in 2007 and consisted of around

10.000 households, including households that do not have access to internet. The organization lends a "SimPC" to these offline participants to ensure representativeness. In a paper of Leenheer et al. (2013), it was established that the panel had biases towards recruitment on age, income and education, thit was corrected in 2011. Although selection bias is always a great concern with surveys, the CentERdata organization is annually checking the representativeness of the sample, which increases the reliability of this panel. For this reason, this research makes use of the LISS data.

The data consists of wave 1 – wave 9 (2007 – 2016) and combines two different surveys. The first survey consisted of variables about participant's health and medical behavior and these were combined with variables of a second survey relating to work and income. Some descriptive statistics about the respondents were matched with the respondents by year. The dataset thus consists of work and health related variables, and descriptive statistics. A full overview of the variables, questions and answers in the survey can be found in the Appendix.

There are two main variables in the dataset: the average number of hours worked per week and the self-reported health status. The health variable is measured by ranking the alternatives on a cardinal scale. There were five options a respondent chooses from to indicate his or her health status: poor (1), moderate (2), good (3), very good (4), excellent (5). The best alternative has a value of 5 (excellent) and the worst has a value of 1, so the coefficients of the variables mean a direct increase or decrease of the health variable. The number of hours worked variable into five categories: 0 hours, 1 to 20 hours, 21 to 32 hours, 33 to 40 hours and 40+ hours.

Important to note is that from this point, the results will always be separated by gender. Women tend to work more in part-time and have a lower average health than man. Since these are the two main variables, a distinction between genders is inevitable.

3.2 Overview of the dataset

There are four figures in this section and two in the appendix that give insight into the distribution of the variables generated by the respondents. All figures are based on the frequency tables A2-A7 in the appendix. Figure 3 and figure 4 describe the general distribution of the two main variables. Figure 3 shows that the number of hours worked is vastly different for men and women. Most men work more than 33 hours per week (large part-time or full time job) and only one out of four men work less than 33 hours (unemployed or small part-time job). For females, the figure looks quite different. The majority works part-time in either small or large part-time jobs. Only a few women (5%) are unemployed and around 10% works full-time. Besides the different distribution of working hours, the

figure also shows that most women are employed. This confirms the note that women have a high work participation in the Netherlands.

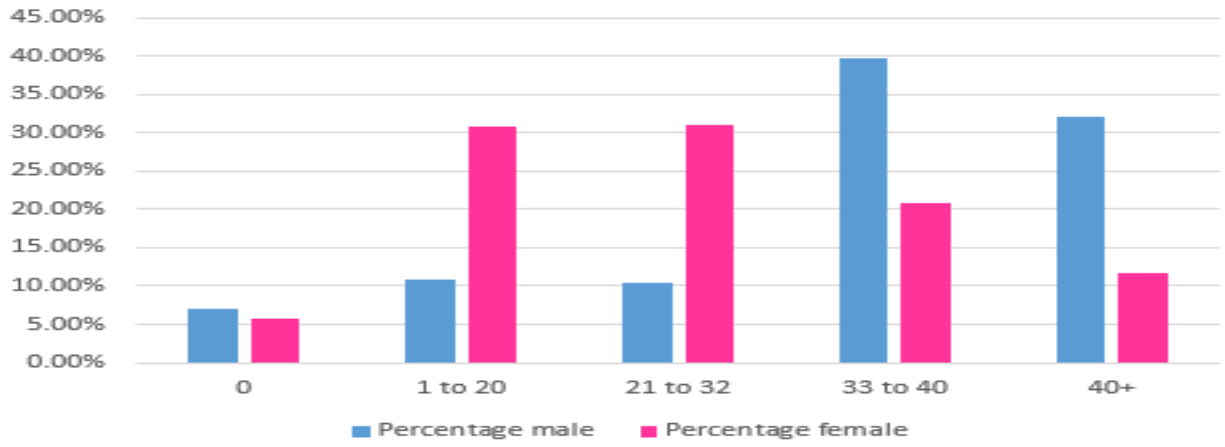

Figure 3: Distribution of working hours per gender

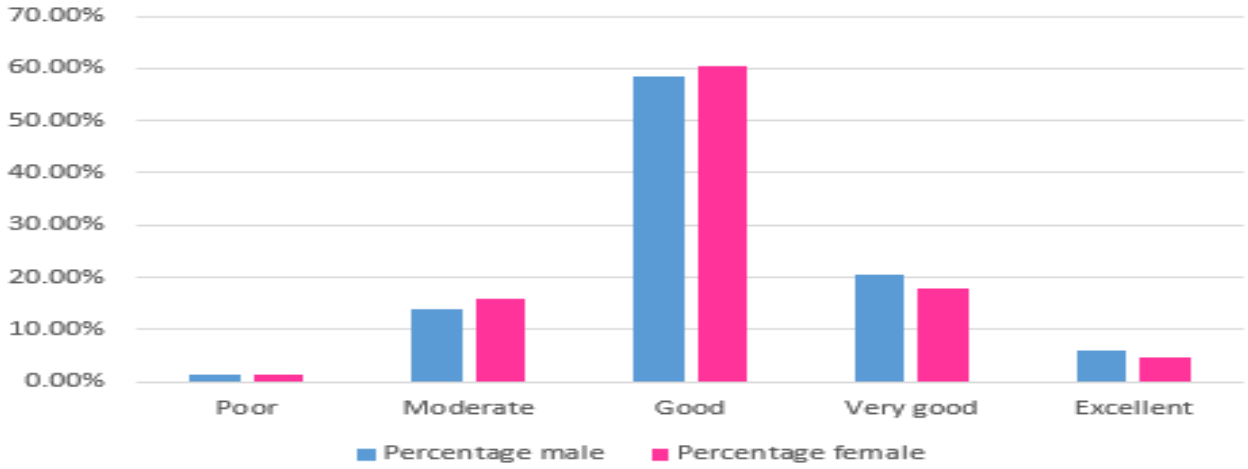

Figure 4: Distribution of health per gender

A downside of the variable number of working hours is that the uniform categories generate a right skewed distribution for female working hours and a left skewed distribution for male working hours. However, there are vast asymmetries between both genders. Generating the same categories for both genders in terms of working hours will automatically lead to skewness of the data. Moreover, the asymmetry can be exploited to generate explaining power in terms of health for both genders. The skewness of data is therefore not a big concern for the validity of this research.

The health variable shows a more even distribution over gender than the number of working hours. Verburgge (1989) examined that regarding self-reported health, women tend to report worse health than men. This figure shows that women have a majority in the poor, moderate and good health category. Men have a majority in the very good and excellent category. However, for both gender the

peak is at the median health category (good or 3). The data does not look skewed as well, so that the health variable is approximately normal distributed. This boosts the reliability of the self-reported health variable, generating results that are close to the real normal distribution of health in society that is on average normally distributed. The sample of respondents therefore have a representative health status to analyze and draw conclusions from.

Table A8 is a t-test with unequal variances to test the difference in mean between men and women. If the test is significant at a 5% level, this means that we can conclude that the mean of self-reported health is not the same for both genders. The test points out that men do have a significant average higher self-reported health, but the difference is small.

Figure 5, 6 & A1, A2 show the distribution of the possible combinations between health (5 categories) and working hours (5 categories). This generates 25 possible combinations and the frequency of these combinations is reported in table A4 and table A6, summarized in figure A1 and figure A2. Since there are 1335 more women than men in the sample, the idea how the data is distributed is more important than the actual frequencies. To directly compare men with women, table A4 and A6 have relative percentage frequency tables to be found in table A5 and A7. The percentages are conditional on the number of hours men or women work. For example, the top left cell in table A5 reads 0.78% poor health and 0 hours. This translates to: "out of the sample that work 0 hours per week, 0.78% of the males have a poor health". The percentages can be understood as conditional probabilities. This transformation makes the data directly comparable between men and women.

Figure A1 and figure A2 show that for each working-hours category, the relative order of frequency of health is the same. Knowing that men work more in fulltime and women in part-time, the frequencies of the type of health follow the pattern of the frequency of the number of hours worked. A relative frequency table would give more insight in the distribution.

Figure 5 and 6 illustrate the relative frequencies. For males, health is relative stable across the work categories. The moderate health category is the most variant of all, but doesn't change much. The figure implies that the working categories don't differ in health. For females, there is more variation across working-hours categories. The very good and excellent category are relatively the highest in the sample of women that work 1 to 20 hours per week. The relative percentage of women with poor health are most in the category 0 hours, whilst moderate health is rarely observed in this category. The moderate health is relatively frequently observed in the category 1-20 and then decreases for the higher hour categories. The very good category is relatively frequently observed in the 40+ hours as well. Figure 5 shows that for males, health has little variation over work hours. Figure 6

describes a mixed image. The categories 0, 1-20 and 40+ have high relative frequencies of good, very good and excellent health. Clearly, to distill out the precise effect of working hours on health, the regression model needs to examine the precise effect.

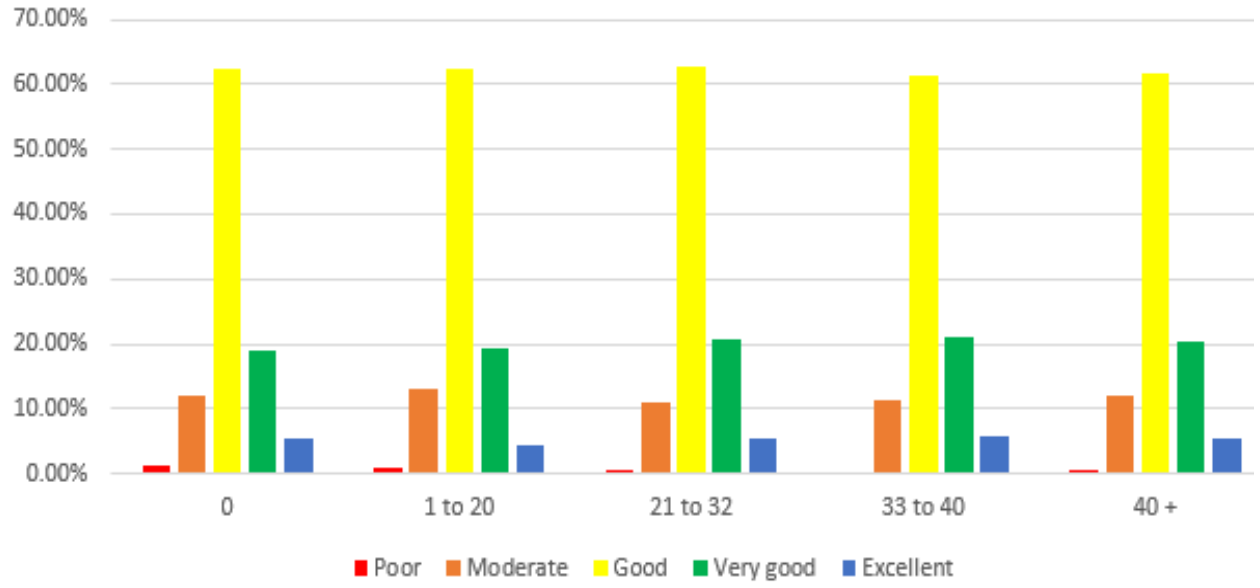

Figure 5: Relative shares of health in working categories (male)

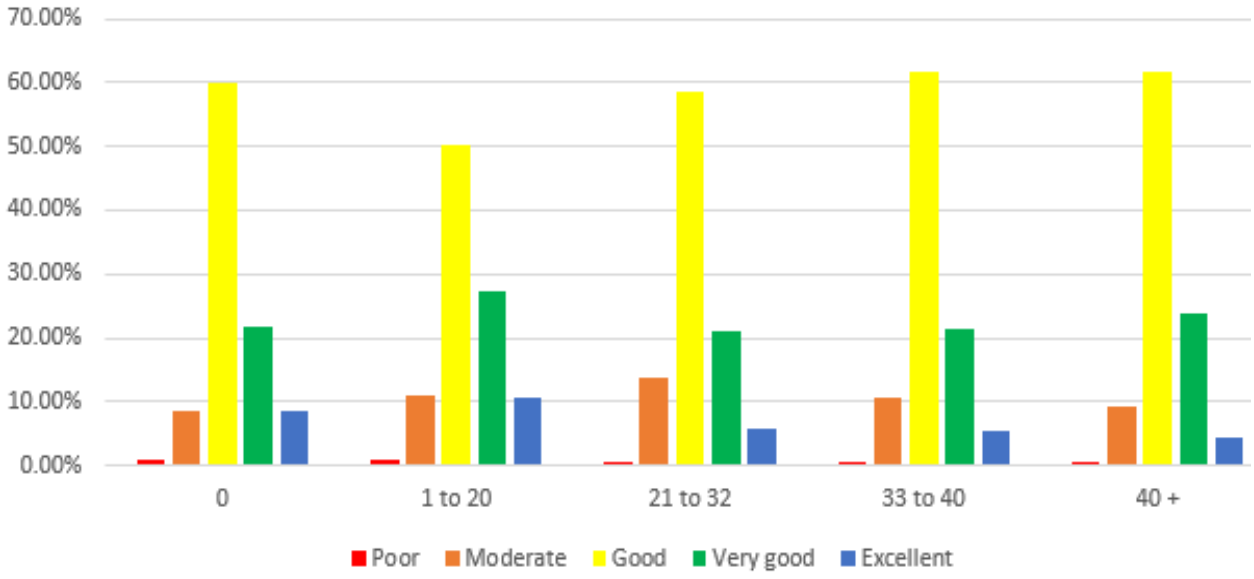

Figure 6: Relative shares of health in working categories (female)

4 Methodology

4.1 Combining multiple datasets

The LISS Panel used almost identical questions and answer options in the survey for the nine waves. The variables obtained for this research answer the same question throughout nine different surveys, meaning that the answers to these questions are directly comparable. The variables in this research are checked on presence in the nine waves and whether the questions and range of answer options were the same. Although the amount of questions increases with the number of waves, this is not of concern. The questions that were later added typically consisted of more detailed questions or questions that could not be asked for a certain period. For instance, questions about the "eigen risico" system in Dutch Healthcare or about the use of an electric cigarette.

Three different datasets were combined to one dataset for the empirical results. Two datasets stem from categorical surveys of the LISS Panel, namely Health and Work & Education. The Health survey focuses on the development of health in the panel, with detailed questions about diseases and behavior that could affect health. The Work & Education survey analyzes factors as income, work environment and hours worked. The third dataset is Descriptives and is more general than the former two. In this survey, the questions were typically about gender, age, marital status, children and housing.

A problem of the dataset was that not every participant is recruited at the very start of the panel. Some were recruited at wave one, but many participants were recruited later. To assure the correct matching of observations with the respondent, respondents have a unique identifier. The variables contain information about the year the survey was conducted. The dataset was then organized by respondent number and year of the survey, so that the observations could be matched with the corresponding participant and year. The categorical surveys Health and Work & Education could be merged into one dataset using this method.

An additional problem of the dataset was that the third database Descriptives could not be organized and merged using this method. The survey about descriptives was conducted more than annually, meaning that respondents have multiple observations a year rather than just one. Since the first two surveys were conducted annually, so that the descriptives statistics should be transformed to an annual survey. An additional identifier was then created that identified both respondent number and year. This means that if a respondent made the Descriptives survey four times in a year, the respondent would have four identical identifiers.

To assure a unique identifier, duplicate data was dropped from this dataset. Many observations as housing, gender and position in the household are constant throughout the year. The only variable that could be inaccurate was then age of the participant. This is not of a concern because the variable age was already in the other dataset. The three datasets have been matched by a unique identifier, so that the observations are correctly grouped and matched with the same respondent and corresponding year. Considering duplicate data and inaccuracy of variables, I believe that the method has been correctly applied to generate reliable results.

4.2 Main variables

The main interest variable health is measured by the question: "How would you describe your health, generally speaking?" This question could be answered on a range of poor to excellent. The relative range of answers is transformed to a scale of 1 to 5, in such a way that a higher score means that the participant is in a better health. The variable health improvement comes from the question: "Can you indicate whether your health is poorer or better, compared to last year?" Again, this question could be answered in a range of considerably poorer to considerably better, so it was transformed in the same way as the variable health.

4.2.1 Health related variables

Age is an important determinant for health status. Zweifel et al. (1999) found that there is a positive correlation between age and demand for healthcare. A greater demand for healthcare implies a worse health at the time of consumption of healthcare. Age will impact self-perceived health status by the worsening process of health over time.

Other important variables that affect a participant's health are high blood pressure, cholesterol and tobacco use. Having a high blood pressure and/or cholesterol reduces the quality of your health or exposes you to health-related risks.[45] Therefore these dummy variables are included to account for the reduced health quality of the participants that either have high blood pressure and/or cholesterol. Tobacco use causes several health problems (for instance cancer, heart diseases and lung diseases). Even occasional smoking causes damage to health and people who used to smoke have higher risks

[4] http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/LearnHowHBPHarmsYourHealth/Health-Threats-From-High-Blood-Pressure_UCM_002051_Article.jsp#.WT_gxOt96Uk

[5] http://www.heart.org/HEARTORG/Conditions/Cholesterol/AboutCholesterol/About-Cholesterol_UCM_001220_Article.jsp#.WT_h5ut96Uk

than non-smokers up to twenty years after quitting.[6] Therefore there are two control variables for smoking. The number of cigarettes variable captures the effect of the positive relationship between a higher tobacco use and increased health risks and measures how many cigarettes respondent did or does smoke. The still smoke variable captures the additional effect of not having quit smoking.

The above-mentioned variables affect physical health directly through increased health risks. These variables will explain a large portion of variation in the health status of respondents, but can't explain all variation. The variables that influence mental health are important as well, because mental health is correlated with hours worked through the locus of control. The remaining variables account for effects of environmental changes in a respondent's situation and are stronger correlated with mental health (stress, satisfaction) than the other variables. This could explain subjective feelings of a respondent that possibly influences the increased or decreased self-reported health.

Ettner (1995) established that a higher income has a positive effect on health (physical and mental). This is because a patient can afford more healthcare or has more resources to live a healthier lifestyle than someone who does not have the resources to adapt his or her lifestyle. The personal income variable accounts for this effect by a logarithmic function of income. This function has been transformed to a log function due to data outliers. To guarantee accurate coefficients, the logarithmic function converses the values and gives a more accurate image. Additionally, the effect of income on health would be best described by a log function, due to marginal diminishing effect of income.

Ross (1995) found that a higher education is associated with a better health. This is because of three reasons: higher educated have better working conditions than lower educated, the higher educated have a greater control over their life (psychical locus of control) and the higher educated are more aware of hazardous health risks such as smoking. This research includes a dummy variable for being higher educated. The definition of higher educated is deduced from the statistics of the CBS in the Netherlands with a HBO study (university of applied sciences) as a cutoff point. The dummy variable splits the participants in higher educated (HBO or higher educated) and lower educated.

Gove et al. (1977) find that having children affects the mental health of parents and even more for women that provide full-time care. However, woman that seek employment do have a better mental health. The number of children is included in the regression model to consider the effect of children on the need for market employment or home production and its possible effect on the health of men and women.

[6] https://www.healthypeople.gov/2020/leading-health-indicators/2020-lhi-topics/Tobacco

The variables are selected such that both physical and mental health indicators are included in the regression model. There are possible scenarios where an important variable is not included or could not be included. This threat will be discussed in paragraph 4.4.

4.2.2 Background variables

The background variables try to capture the effect of environmental changes that are not strongly or directly correlated with someone's health. Among these variables are whether respondent lives in an urban place of residence, having a partner and having a handicap. A handicap could explain why a male or female works less or does not work at all. Including this in the regression model allows for this effect, so that the coefficient of working hours is not overestimated.

4.2.3 Descriptives of the variables used

To gain some more insight in the data this research uses, table 2 reports the averages for the sample separated by gender. It also explains the meaning of the variables. Many variables report a similar average for both gender, except for age, number of cigarettes, health, total number of hours worked and gross income. The sample of men tend to be older, smoke more cigarettes, report a better health, work more hours and earn a higher gross income than their female counterparts.

Table 1: Descriptive statistics

		Male	Female
Personal characteristics			
Age	Respondent's age	47.09	45.36
Amountofchildren	Number of children	0.932	0.998
Education (dummy)	HBO education or higher	0.387	0.340
Partner (dummy)	Respondent has a partner	0.776	0.737
Urbancity (dummy)	Urban or very urban city	0.354	0.360
Health characteristics			
Blood pressure (dummy)	High blood pressure	0.156	0.145
Cholesterol (dummy)	Cholesterol	0.017	0.014
Amountofcigarettes	Number of cigarettes respondent did or does smoke	14.44	12.03
Handicap (dummy)	Psychical handicap	0.299	0.312
Overweight (dummy)	BMI > 30	0.369	0.388
Still smokes (dummy)	Respondent still smokes	0.340	0.340
Underweight (dummy)	BMI < 20	0.033	0.070
Health	Health score 1-5	3.162	3.119
Job characteristics			

Hours worked	Total hours of worked	35.6	26.12
Gross Income	Gross personal income (monthly)	2877.59	2449.09

Note: Data retrieved from CentERdata Tilburg.

4.3 The model

$$Y_{it} = X_{it} + Z_{it} + \gamma_t + F_{it} + \varepsilon_{it} \quad (1)$$

Y_{it} = individual health score γ_t = year dummies i = respondent number

X_{it} = categorical variable hours worked ε_{it} = individual error term t = year

Z_{it} = set of control variables

The two main variables are health score (Y) and the categorical variable of hours worked (X). To isolate the effect of X on Y, a set of control variables for health is included (Z). To overcome the problem of heterogeneity, year dummies and are added. All variables are observations for each respondent number (i) and corresponding year (t). Last, the model has an idiosyncratic error term.

4.4 Threats to internal validity

4.4.1 Sample selection bias

The LISS panel is a private household survey in the Netherlands that used a probability-based recruitment method to create an internet panel (Scherpenzeel, 2011). Probability based recruitment ensures that everyone in the population had an equal probability to be selected for this survey. Although the LISS panel is an internet survey, the organization lends a "SimPC" to offline participants to ensure representativeness. A correct recruited sample should have the same characteristics as the population of the Netherlands, so that the results of the sample are representative.

In a paper by Leenheer et al. (2013), it was established that the panel had biases towards recruitment on age, income and education, but that was corrected in 2011. The coefficients of the regression are only biased if respondents were selected on the dependent variable, Health. The paper does not mention health as a biased recruitment parameter. Additionally, the LISS panel examines its representativeness from time to time. Selection bias is not likely to play a role in the model.

4.4.2 Reverse causality

As mentioned before, reverse causality is a great threat to the findings of this research. Being in a

better health allows respondents to work more hours, so health would likely have a positive effect on the amount of worked hours. This means that the causal effect of working hours on health is overestimated. The third hypothesis will address this threat in more detail and how the results should be corrected concerning reverse causality.

4.4.3 Unobserved heterogeneity

A potential threat to this research could be that variables that do significantly affect the dependent variable are not included in the regression model. If being right-footed has a positive causal effect on health and this effect is not included, then the coefficients of the regression are overestimated.

Human beings are very different from each other. Important to notice is that the regression model uses self-perceived health as an indicator for health. Although self-perceived health is a good indicator for actual health, respondents could severely over- or underestimate their health by random events in their life. How a respondent feels about their health at the time of the survey could be influenced by the amount of stress he or she had that day. Another scenario is that a respondent feels dissatisfied with his or her lifestyle and realizes how unhealthy he or she had been. These individual shocks that significantly explain changes in self-perceived health cannot be included in the regression.

An advantage of using panel data is that the same people are tracked over time. Individual traits or random events can be differentiated by using panel data, because they are fixed over time (Stock, 2014). Averagely, the respondent is in the dataset for 3.3 years. Some observations would be exposed to random events, but the most observations cover a reliable time frame to draw conclusions. Individual unobserved heterogeneity will always influence the results, but with an average track time of 3.3 years and 2.000 observations this will likely not influence the results greatly. The year dummies in the regression model partially overcomes the heterogeneity, by allowing for time specific shocks.

4.4.4 Heteroskedasticity

Heteroskedasticity is of a concern when performing statistical tests on probabilities. It contests the assumption that error terms are uncorrelated and randomly distributed. If this assumption does not hold, variance and covariance are underestimated (Moore, 2011), leading to a higher probability that variables are statistically significant. To correct for heteroskedasticity, all regression models have robust standard errors.

4.4.5 Functional form misspecification

The effect of variables on the dependent variable are not always linear. The income variable is transformed to a logarithmic function to prevent functional form misspecification. Furthermore, many dummy variables for education, urban city and been over- or underweight are included to generate accuracy of coefficients.

5 Results

5.1 Hypothesis 1

Hypothesis 1 stated that working part-time was beneficial for the health of females and detrimental for males. This could explain why females tend to work more part-time than males. Table 2 formally tests this hypothesis.

The categorical variable hours worked has 0 hours as a baseline. This means that the coefficient 0.1484371 should be interpreted as an improvement of health with 0.1484371 compared to a person that has the exact same characteristics, expect that he or she works 0 hours. The coefficient thus isolates the effect of number of hours worked on self-reported health. The other variables are control variables based on literature. Note that health is a continuous variable that could take the value of 1 to 5, such that a positive coefficient means that the variable has a positive influence on health. Table 2 indicates that males are on averagely healthier if they work 1-20 hours and females if they work 21-32 hours. This is clearly contrary to the formulated hypothesis. It turns out that men tend to be unhealthier when they work more hours, and women tend to be healthier with a small or large part-time job. The result is rather surprising for males, but less for females. There are a few explanations possible for this little variation. First, men are less likely to change the number of hours worked (such that the categories have little variation) and the groups of men are systematically distributed (a low between group variation). Second, there can be big differences within the groups the groups of men. The males and their respective health might be evenly distributed across the groups, because health for them is not a restriction in choosing the number of working hours. Given that a man works more than 40+ hours, this could be a CEO with access to healthcare or a poor family head that works two jobs. Both have different self-reported health.

Table 2: The effect of hours worked on health, with 0 hours as the baseline

Health	**Male**	**Female**
Hours worked		
1-20	0.1484371**	0.1044041*
	(0.0737133)	(0.0637794)
21-32	0.0036575	0.1156082*
	(0.0579941)	(0.0617799)
33-40	0.0081816	0.0649284
	(0.0517392)	(0.06742)
40+	0.0372033	0.0709057
	(0.0530283)	(0.753826)
Age	-0.0059052***	-0.0010119
	(0.0018296)	(0.001697)
Blood pressure	-0.0516485	-0.0792048
	(0.0592173)	(0.0511915)
Cholesterol	-0.1447332**	-0.1478595***
	(0.0595266)	(0.0568114)
Cigarettes	-0.0068427***	-0.0030551
	(0.001223)	(0.0019963)
Education (≥ HBO)	0.0743375*	0.065388
	(0.0398569)	(0.0414538)
Handicap	-0.3754294***	-0.3416949***
	(0.0401994)	(0.0407418)
Overweight	-0.2307594***	-0.0570735
	(0.0441093)	(0.0432911)
Partner	0.0055784	0.0222685
	(0.0443226)	(0.0399518)
Personal income	0.0851487**	0.0513058*
	(0.0400006)	(0.0301943)
Still smokes	-0.0831881***	-0.1466338***
	(0.0307328)	(0.0321944)
Underweight	0.0965131	0.0576609
	(0.0853296)	(0.0559041)
Urbancity	0.000483	0.0364252
	(0.0401232)	(0.03803)
Constant	3.646197***	3.674705***
	(0.310857)	(0.2364106)
R-squared	0.1432	0.1434
Observations	2102	2190

Note: Data retrieved from CentERdata Tilburg. All standard errors are robust. Year dummies are included.
* Significant at 10% level ** Significant at 5% level *** Significant at 1% level

However, this is very unlikely to be the full explanation of why the results for males are surprising. Another explanation could be that being the main provider for the family is stressful for full-time working males, but this effect would be small and possibly offset by not complying with social norms. This is however speculating and cannot be tested with the current dataset.

The control variables in this model seem to be sound. Age, smoking, high blood pressure, cholesterol, being handicapped and having overweight all decrease the respondents' health for both genders. As expected, the higher educated (HBO or higher) have a better health than lower educated and having a higher income results in a better health. All these variables are in line with related literature. Only the variable underweight seems to be wrong and the variables partner and urban city are not significant, resulting in a low explanatory power for these variables.

The number of observations is quite reliable to draw conclusions from. The R-squared is however somewhat low. This was expected, since the threat of unobserved heterogeneity with survey respondents. The model consists of control variables that are based on related literature and are in line with their results. All things considered, I believe that the model can partly reject the hypothesis for males and accept the hypothesis for females, since the coefficients of the female model are in fact how the hypothesis expected.

5.2 Hypothesis 2

Since hypothesis 1 was rejected for males, hypothesis 2 could explain the relationship between hours worked and self-reported health by analyzing the changes in both variables. To do this, the model of the first hypothesis is used again. The variables personal income, urban city and partner are now measured as a change relative to previous year. The change in BMI is replaced for the variables over- and underweight to account for changes in weight. The other variables are fixed, because they have no or little variation between years. The dependent variable health is now measured as a continuous variable on a range of -4 to 4. Table A9 shows the frequencies of how many times each change occurred.

Table 3 and table 4 demonstrate the same principle as figure 5 and figure 6. The percentages below each frequency is the conditional probability keeping the color fixed and the other color variable. The blue color means that the probability is conditional on the change in health and the red color conditional on the working hours. Looking at the blue color percentages, these percentages don't indicate vast differences between changes in health, while keeping working more hours fixed for males.

For females, a relative high percentage of women that had a worse health worked more hours. The 7% difference is quite interesting. The red color percentages have no differences between the categories and are rather symmetric. The differences should be tested by a regression to find precise effects.

Table 3: Frequency and relative table of change in health and work hours (male)

Male		**Change in health**			
		Positive	Constant	Negative	Total
More hours?	Yes	3663 [79.72%] [29.49%]	5146 [77.21%] [41.43%]	3612 [81.92%] [29.08%]	12421
	No	932 [20.28%] [27.84%]	1519 [22.79%] [45.37%]	897 [18.08%] [26.79%]	3348
Total		4595	6665	4409	15669

Table 4: Frequency and relative table of change in health and work hours (female)

		Change in health			
		Positive	Constant	Negative	Total
More hours?	Yes	3310 [78.77%] [22.10%]	6332 [80.39%] [42.28%]	5334 [85.04%] [35.62%]	14976
	No	892 [21.23%] [26.43%]	1545 [19.61%] [45.78%]	938 [14.96%] [27.79%]	3375
Total		4202	7877	6272	18351

Table 5 tests these differences by a regression model. The change in health has a weak relationship with working more hours for males, but has a strong relationship for females. The variation in women working hours is an explanation for the change in health of women, but for men with little variation it is not. The model itself is weak in explanation power. The R-squared is very low for both models and has only half of the observations of model 1. The model is therefore somewhat unreliable to explain the variation in changes of health. However, for females the result seems to be robust and therefore reliable. Although this might not be the best model used in this research, hypothesis 2 is rejected for males but accepted for females. The change in workhours compared the year before is thus an indicator of the change in health the year after for females. Table A11 examines the reverse

relationship between hours worked and change in health, but this is not of a concern for this hypothesis.

Table 5: The effect of more hours worked on the change in health

Changeinhealth	**Male**	**Female**
More hours worked	0.0102549	0.3457219**
	(0.128445)	(0.1483186)
Age	-0.0078023	-0.0036012
	(0.004848)	(0.0046422)
Blood pressure	-0.1872989	-0.1128018
	(0.1606947)	(0.1477652)
∆BMI	0.000089	0.0012271
	(0.00888)	(0.003038)
Cholesterol	0.1004742	-0.0052218
	(0.1666987)	(0.1881312)
Cigarettes	-0.0087264	-0.0001147
	(0.006293)	(0.0068558)
Education (≥ HBO)	0.058568	0.004468
	(0.1269931)	(0.1317607)
Handicap	-0.0655452	-0.139482
	(0.1112074)	(0.1235588)
∆Partner	-0.0111975	-0.1453702
	(0.0903883)	(0.0993259)
∆Personal income	-0.1061989	-0.0642991
	(0.0766103)	(0.0580751)
Still smokes	-0.1667259	-0.0562082
	(0.1299698)	(0.121949)
∆Urbancity	0.0055617	0.0097562
	(0.0815768)	(0.082509)
Constant	0.9508073**	0.2351068
	(0.4264922)	(0.367386)
R-squared	0.0229	0.0168
Observations	994	876

Note: Data retrieved from CentERdata Tilburg. All standard errors are robust. Year dummies are included.
* Significant at 10% level ** Significant at 5% level *** Significant at 1% level

5.3 Hypothesis 3

The third hypothesis was directed to the problem of reverse causality. With basic logic, one could establish that the number of hours worked does not only influence the health variable, but the reverse relationship is applicable as well. Being handicapped results in a lower number of hours a person can

work. A burn-out (a mental health problem) results in less hours worked too. To results of the reverse causality test are displayed in table 6.

Table 2 had various control variables that were used to explain an individual's health (cigarettes, blood pressure, cholesterol, overweight). These variables are not present in table 3, since they do not have a causal relationship with the number of hours worked. The variables only influence the number of hours worked through the variable health. Additionally, the number of children variable is added to the model. This is because the number of children could explain why women tend to work less (to provide for home production) and why men tend to work more (to provide family income).

The base for the health variable is poor health. The coefficients measure how a change in health compared to a poor health affect the number of hours worked. If there are two individuals with the exact same characteristics, expect that one has a poor health and one has a moderate health, the coefficient describes how they would differ in hours worked. .

Table 6: The effect of health on hours worked, with poor health as the baseline

Hours worked	**Male**	**Female**
Health		
Moderate	2.77079*	0.7650827
	(1.61623)	(1.509601)
Good	3.497671**	1.362183
	(1.590372)	(1.495065)
Very Good	3.262702**	1.760552
	(1.613477)	(1.508158)
Excellent	2.081775	1.834386
	(1.687882)	(1.576414)
Age	0.2258723***	0.1273675
	(0.143004)	(0.0867328)
Amount of children	-0.4153998**	-1.586096***
	(0.0143004)	(0.0115685)
Education (≥ HBO)	3.73529***	6.162255***
	(0.3984746)	(0.3216455)
Partner	0.9645277**	-2.247456***
	(0.4285111)	(0.3472022)
Urbancity	-0.2203041	0.4875008
	(0.3931485)	(0.311573)
Constant	23.25307***	21.24208***
	(1.778936)	(1.616407)
R-squared	0.3240	0.4106

Observations	14260	15589

Note: Data retrieved from CentERdata Tilburg. All standard errors are robust and in brackets. Year dummies are included. * Significant at 10% level ** Significant at 5% level *** Significant at 1% level

Starting with the male model, the health variable is significant for 3 out of 4 categories. The variable seems to have explanatory power for males. A good health results in the biggest gain in hours, followed by very good, moderate and then excellent. The female model follows a more logical order (excellent, very good, good, moderate), but the coefficients are not significant in their model. Table 3 opposes a mixed picture for the hypothesis again. Changes in health for males seem to have a lot of explanatory power to explain the number of hours worked, but has an illogical order. The female model has a logical order, but lacks explanatory power.

The control variables seem to make sense. The number of children usually decreases the number of hours worked for both sexes, but for females this is more on average. A higher education leads to more hours worked, because of job security. The partner variable shows that males tend to work more if they have a partner, whilst women work less. This confirms the idea of the gender roles. The urban city variable cannot contribute to the explanation of hours worked.

The hypothesis stated that a better health would report in more hours worked. This is true for both males and females. Although the male model has an illogical order of the variables and the female model is not significant, I believe that the hypothesis should be accepted because the model points out that there is in fact a positive reverse relation between self-reported health and hours worked. Table A10 uses a dummy variable for good health (very good or excellent health) and this model confirms the hypothesis once more. The effect of working hours on health is thus an upper boundary of the real effect, because of a positive reverse causality.

6 Discussion

This research meets most of the requirements of internal validity. The internal issues discussed in the methodology part are all met, except for the reverse causality. Hypothesis three indicates that the results of hypothesis one and two are overestimated, due to a positive reverse causality of health and hours worked. The results of hypothesis one and two could therefore be understood as an upper boundary of the real effect.

The relationship between self-reported health and part-time work is ambiguous for men. In hypothesis 1, men were healthiest if they worked 1-20 hours. The more males worked, the relatively unhealthier they became. One would expect that hypothesis 2 would confirm this relationship, but the

change in health could not be explained by the change in hours. This could be because of little variation in working hours for males. However, this argument can't explain the distribution of figure 7. The result of hypothesis one seems to be robust. Another explanation might be that men working more hours self-select on worsening health. This could not be concluded from figure 7, but it could be that the causal effect of hours worked is underestimated because of males with worse health that have to work many hours to provide for their family.

The relationship between self-reported health and part-time work is as expected for females. Females tend to be healthier if they work 1-20 or 21-32 hours per week. All hours per worked category variables are positive compared to being unemployed, confirming the notion of Probl (1976). The female coefficients are overestimated because of hypothesis 3, but the models of hypothesis 1 and hypothesis 2 indicate that the relationship between part-time work and self-reported health is positive. The variation of hours worked for women significantly influences the women's health, resulting in an argument why women tend to work more part-time.

A flaw of this research is that the working hours choice is not literally included in a model. The model is based on the idea of revealed preferences, meaning that if a male or female works less and his or her health declined last year, this is interpreted as a causal mechanism. There could be more reasons for the two declines (so called random events). The use of panel data partially overcomes this problem, but not fully. The correlation coefficients found in the model could not actually represent the real effect of hours worked on health, because a male or female doesn't take his or her health into consideration when choosing the number of hours worked.

7 Conclusion

	Male	Female
Hypothesis 1: The influence of part-time work on health is positive for women and negative for men	X	✓
Hypothesis 2: The change in working hours compared to previous year can explain changes in a respondent's health	X	✓
Hypothesis 3: Health has a positive effect on the amount of work hours for both sexes	✓	✓

The main question of this research was: "What is the relationship between self-reported health and part-time work?". The hypothesis helped with identifying causal effects of the two main variables and

the magnitude of the coefficients. Considering the results and accepting/rejecting the hypothesis, the overall conclusion is that this paper could not find a relationship between part-time work and self-reported health for males, but it did for females. The combination of hypothesis one and two could explain variation in health for females, but not for men. The causal effect of the female model is an upper boundary due to the findings in hypothesis three.

This conclusion has several policy implications. First, it should be considered that the gender neutral and gender identity hypothesis can be extended with the health. The number of hours worked influences the health of the family unit differently and can explain some variation between man and women. The females get additional utility when working part-time because their choice of work resulted in a better health. Second, governments should note that the number of working hours has more impact on a female's health than on a male's. The female participation therefore faces an extra restriction compared to the male's, besides social norms. Considering tackling gender differences, health policy has a role too because of the unequal health distribution between males and females.

Possible further research could focus on the exact relationship between health and the number of working hours. The change in health and change in working hours could at times be random, but at times a person deliberately works less to improve his or her health. Analyzing this category could yield more insight into the relationship between health and number of hours worked. Another possible future research is a field experiment, where subjects should give preferences about combinations of health and number of hours worked. This could isolate the subject considerations an agent has considering health when choosing the optimal number of working hours.

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Appendix

Table A1: All the variables, survey questions and answer options

Variable	Question Survey	Answer options
Actuallyworked	How many hours per week do (did) you actually work on average in your (last) job?	Integer
Age	What is your age?	Integer
Agecat	Age category according to CBS	1 14 years or younger 2 15-24 3 25-34 4 35-44 5 45-54 6 55-64 7 65+
Agehousholdhead	What is the age of the household head?	Integer
Alcohol	Now think of all the sorts of drink that exist. How often did you have a drink containing alcohol over the last 12 months?	1 Almost every day 2 Five or Six days per week 3 Three or four days per week 4 Once or twice a week 5 Once or twice a month 6 Once every two months 7 Once or twice a year 8 Not at all over the last 12 months
Amount_of_Cigarettes	How many cigarettes did/do you smoke?	Integer
Bloodpressure	Do you have high blood pressure?	1 yes 2 no
Children	Do you have children and/or grandchildren?	0 no 1 yes
Cholesterol	Do you have cholesterol?	1 yes 2 no
Contracthours	How many hours per week are (were) you employed in your (last) job, according to your employment contract?	Integer
Civilstatus	Civil status of participant	1 Married 2 Separated 3 Divorced 4 Widow or widower 5 Never been married
Domesticsituation	Domestic situation of the household head	1 Single 2 (Un)married co-habitation, without child(ren) 3 (Un)married co-habitation, with child(ren) 4 Single, with child(ren) 5 Other
Educationcat	Level of education in CBS (Statistics Netherlands) categories	1 Primary school 2 VMBO 3 HAVO/VWO 4 MBO 5 HBO

		6 WO
Ever_Smoked	Have you ever smoked?	1 yes 2 no
Gender	What is your gender?	Male / Female
Grossincomecategory	Personal gross monthly income in categories	0 No income 1 <500 EUR 2 501-1000 EUR 3 1001-1500 EUR 4 1501-2000 EUR 5 2001-2500 EUR 6 2501-3000 EUR 7 3001-3500 EUR 8 3501-4000 EUR 9 4001-4500 EUR 10 4501-5000 EUR 11 5001-7500 EUR 12 >7500 EUR
Handicap	Do you suffer from any kind of long-standing disease, affliction or handicap, or do you suffer from the consequences of an accident?	1 yes 2 no
Health	How would you describe your health, generally speaking?	1 Poor 2 Moderate 3 Good 4 Very Good 5 Excellent
Health_Improve	Can you indicate whether your health is poorer or better, compared to last year?	1 Considerably poorer 2 Somewhat poorer 3 The same 4 Somewhat better 5 Considerably better
Height	How tall are you in cm?	Integer
Highestdiploma	Highest level of education with diploma	1 Primary school 2 VMBO 3 HAVO/VWO 4 MBO 5 HBO 6 WO 7 Other 8 Not yet completed any education 9 Not yet started any education
Highesteducation	Highest level of education irrespective of diploma	1 Primary school 2 VMBO 3 HAVO/VWO 4 MBO 5 HBO 6 WO 7 Other 8 Not yet completed any education 9 Not yet started any education
Hourswanted	How many hours per week in total would you like to work?	Integer

Netincomecategory	Personal net monthly income in categories	0 No income 1 <500 EUR 2 501-1000 EUR 3 1001-1500 EUR 4 1501-2000 EUR 5 2001-2500 EUR 6 2501-3000 EUR 7 3001-3500 EUR 8 3501-4000 EUR 9 4001-4500 EUR 10 4501-5000 EUR 11 5001-7500 EUR 12 >7500 EUR
Numberhh	Number of household members	Integer
Numberkids	Number of living-at-home children in the household, children of the household head or his/her partner	Integer
Occupation	Primary occupation	1 Paid employment 2 Work or assists in family business 3 Autonomous professional, freelancer of self-employed 4 Job seeker following job loss 5 First time job-seeker 6 Exempted from job seeking following job loss 7 Attends school or is studying 8 Takes care of the housekeeping 9 Is pensioner [voluntary] 10 Has (partial) work disability 11 Performs unpaid work while retaining unemployment benefit 12 Performs voluntary work 13 Does something else 14 Is too young to have an occupation
Partner	The household head lives together with a partner (wedded or unwedded)	1 yes 2 no
Still_smokes	Do you smoke now?	1 yes 2 no
Typedwelling	Type of dwelling that the household inhabits	1 Self-owned 2 Rental 3 Sub-rented 4 Cost free
Urban	Urban character of place of residence	1 Extremely urban 2 Very urban 3 Moderately urban 4 Slightly urban 5 Not urban
Yearofbirth	What is your year of birth	Integer

Table A2: Frequency table of amount of hours worked separated by gender

	Male	Percentage	Female	Percentage
0	1169	6.94%	1084	5.80%
1-20	1843	10.94%	5738	30.72%
21-32	1744	10.35%	5781	30.95%
33-40	6668	39.7%	3891	20.83%
40+	5404	32.08%	2186	11.7%

Table A3: Frequency table of health category separated by gender

	Male	Percentage	Female	Percentage
Poor	282	1.25%	335	1.29%
Moderate	3104	13.8%	4117	15.87%
Good	13126	58.37%	15732	60.63%
Very good	5639	20.63%	4597	17.72%
Excellent	1335	5.94%	1165	4.49%

Table A4: Frequency table of health and working-hours categories (male)

Male	Poor	Moderate	Good	Very good	Excellent	Total
0	8	89	615	223	88	1023
1-20	12	160	737	401	153	1463
21-32	10	208	890	320	88	1516
33-40	25	612	3505	1224	312	5678
40+	18	420	2760	1072	200	4570
Total	73	1489	8507	3240	941	14250

Table A5: Frequency percentage table of health and working-hours categories (male)

Male	Poor	Moderate	Good	Very good	Excellent	Total
0	0.78%	8.70%	60.12%	21.80%	8.60%	100%
1-20	0.82%	10.94%	50.38%	27.41%	10.46%	100%
21-32	0.66%	13.72%	58.71%	21.11%	5.80%	100%
33-40	0.44%	10.78%	61.73%	21.56%	5.49%	100%
40+	0.40%	9.40%	61.74%	23.98%	4.47%	100%

Table A6: Frequency table of health and working-hours categories (female)

Female	Poor	Moderate	Good	Very good	Excellent	Total
0	10	113	582	176	50	931
1-20	40	623	2998	921	217	4799
21-32	27	528	3007	988	254	4804
33-40	10	358	1957	671	186	3192
40+	11	221	1150	378	99	1859
Total	108	1843	9694	3134	806	15585

Table A7: Frequency percentage table of health and working-hours categories (female)

Female	Poor	Moderate	Good	Very good	Excellent	Total
0	1.07%	12.14%	62.51%	18.90%	5.37%	100%
1-20	0.83%	12.98%	62.47%	19.19%	4.52%	100%
21-32	0.56%	10.99%	62.59%	20.57%	5.29%	100%
33-40	0.31%	11.22%	61.31%	21.02%	5.83%	100%
40+	0.59%	11.89%	61.86%	20.33%	5.33%	100%

Table A8: T-test with unequal variances to test difference in mean between men and women

Health	Mean	Standard Error	95% CI	Observations
Male	3.161923	0.0051905	3.152 – 3.172	22486
Female	3.119363	0.0046471	3.074 – 3.092	25946
Difference	0.079444	0.0069668		
P (mean Male – mean Female) = 0.0000		P (difference < 0) = 1.0000		

Table A9: The effect of health on hours worked, with a dummy for health

Hours worked	**Male**	**Female**
Good Health	0.1887029	0.8710769***
	(0.2511973)	(0.1945025)
Age	0.2407846***	0.1247641
	(0.0130792)	(0.0106372)
Amount of children	-0.5527645***	-1.650138***
	(0.1629149)	(0.1234183)
Education (≥ HBO)	3.706021***	5.871362***
	(0.3703775)	(0.3084278)
Partner	0.924601**	-2.019944***
	(0.4019319)	(0.3161217)
Urbancity	-0.141001	0.3307679
	(0.3649162)	(0.2892342)
Constant	26.01931***	22.42726***
	(0.7479965)	(0.6120104)
R-squared	0.3290	0.4095
Observations	16860	18687

Note: Data retrieved from CentERdata Tilburg. All standard errors are robust. Year dummies are included.
* Significant at 10% level ** Significant at 5% level *** Significant at 1% level

Table A10: Frequency table of changes of health and worked hours

What was the change in health compared to last year?	Did respondent work more compared to last year?					
	No	**Percentage**	**Yes**	**Percentage**	**Total**	**Percentage of total**
-4	93	26.20%	262	73.80%	355	1.04%
-3	827	21.77%	2972	78.23%	3799	11.17%
-2	236	16.03%	1236	83.94%	1472	4.33%
-1	679	16.34%	3476	83.66%	4155	12.21%
0	2964	20.52%	11478	79.48%	14442	42.45%
+1	685	16.34%	3507	83.66%	4192	12.32%
+2	217	14.84%	1245	85.16%	1462	4.30%
+3	836	21.99%	2966	78.01%	3802	11.18%
+4	86	25.22%	255	74.78%	341	1.00%
Total	**6623**	**19.47%**	**27397**	**80.53%**	**34020**	**100%**

Note: Data retrieved from CentERdata Tilburg.

Table A11: Effect of health improvement (>0) on hours worked

ΔHours worked	**Male**	**Female**
Health improved	0.1694411	0.2150323
	(0.6061297)	(0.53311204)
Age	0.2662452***	0.1138588***
	(0.0230591)	(0.0202955)
Amount of children	-0.0782354	-1.62737***
	(0.2843189)	(0.2509319)
Education (≥ HBO)	2.228127***	6.063429***
	(0.6254056)	(0.5395226)
Partner	0.4487642	-1.468418**
	(0.7550613)	(0.6187816)
Urbancity	-0.6960371	1.197354**
	(0.6858071)	(0.5779175)
Constant	-9.722958***	-3.298281**
	(1.464361)	(1.322264)
R-squared	0.0525	0.0931
Observations	6157	6491

Note: Data retrieved from CentERdata Tilburg. All standard errors are robust. Year dummies are included.
* Significant at 10% level ** Significant at 5% level *** Significant at 1% level

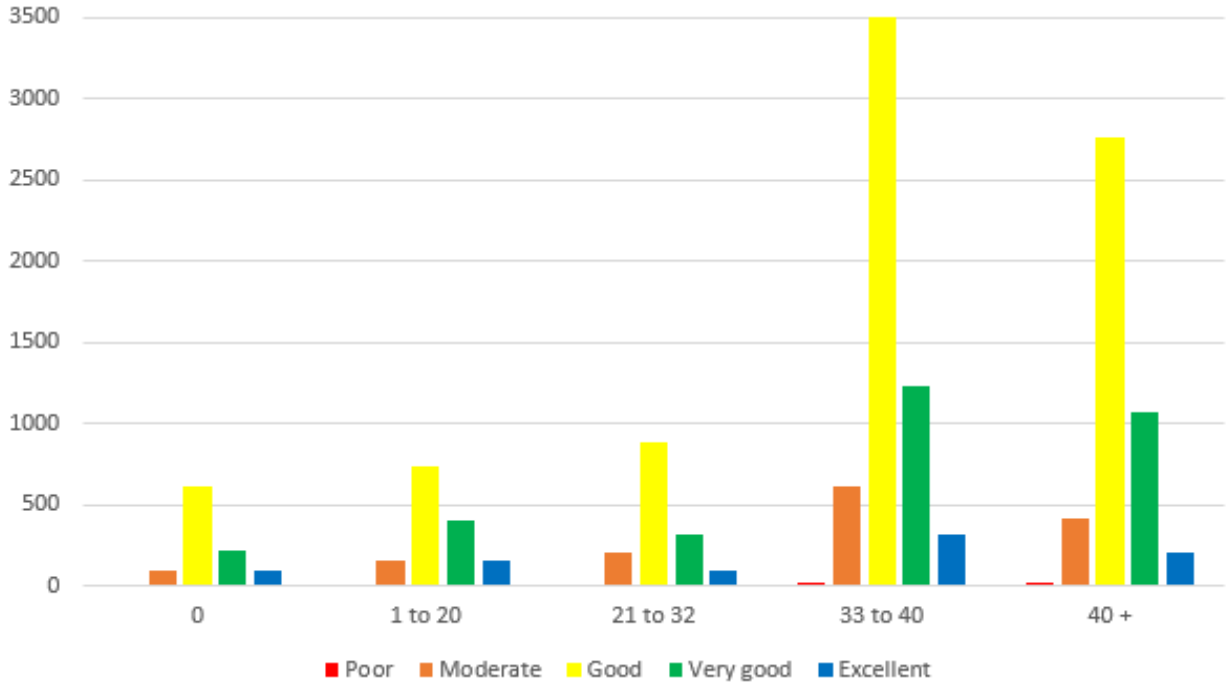

Figure A1: Health categorized for working hours (male)

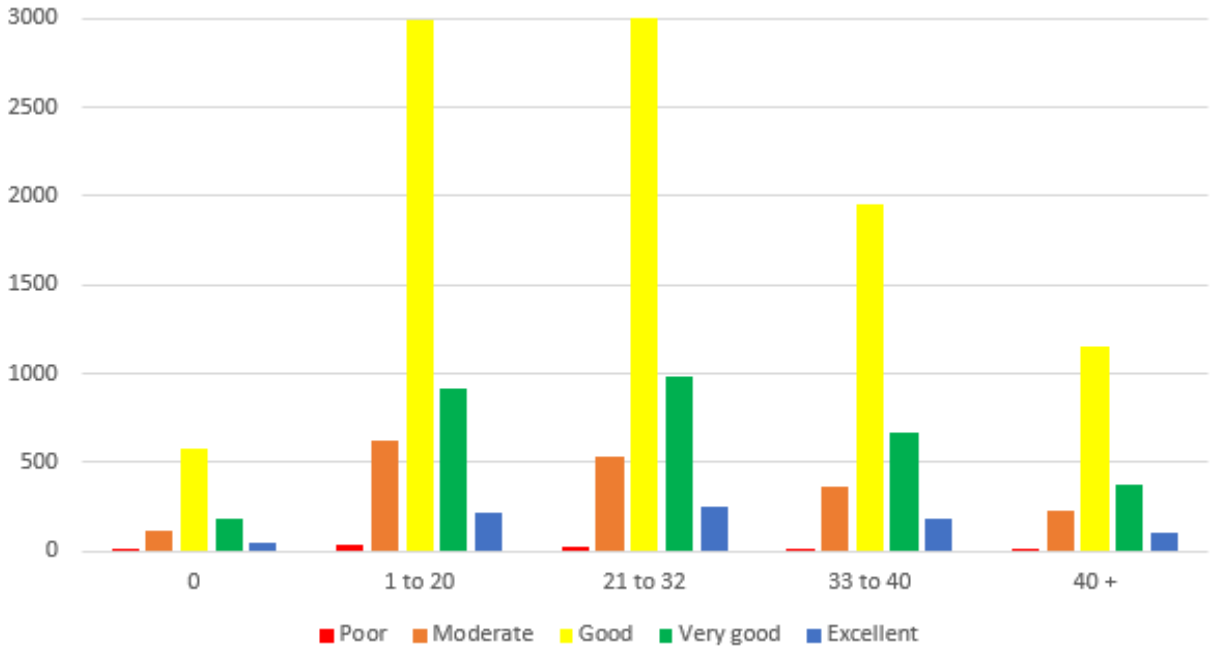

Figure A2: Health categorized for working hours (female)