

ERASMUS UNIVERSITY ROTTERDAM  
Erasmus School of Economics  
Master Thesis Behavioural Economics

## The Effect of Working Hours on Subjective Well-Being

Name student: Nick de Zeeuw  
Student ID number: 387317

Supervisor: Wang, T.  
Second assessor: Granic, G.

Date final version: 11 August 2018

### **Abstract**

This paper investigates the potential relationship between individual average working hours per week and individual subjective well-being (SWB). This relationship has only been suggested within the economics of happiness, but never fully explored, even though its potential is arguably important within the field. Using a Dutch household survey, this paper finds evidence for the existence of an individual optimum at which individual subjective well-being is maximized with regards to the individual working hours. The end result is a justification of controlling for working hours for research based on subjective well-being. Next to that, the suggestion is made that policy should take into account the possible effects of deviating from such optima given certain workforce characteristics. As recommendation, these results suggest that further investigation of the driving factors of these optima could be valuable for policy makers.

## **1 Introduction**

'Economics of Happiness' is one of the hot research topics of the 21<sup>st</sup> century and has been making significant progress in the last two decades (Mackerron, 2012). In short, the economics of happiness provides a slightly different view towards what people want in life and is often compared to the concept of utility. Instead of 'utility', the core concept used is 'subjective well-being' (SWB). Ever since the concept received an increase in research attention, various researchers have set their teeth in empirical datasets to uncover what makes an individual feel happy. Due to its novelty, the economics of happiness is a still developing concept with more research being conducted as we speak. Although the most straightforward factors have been generally investigated as to what their effects are on subjective happiness (income, gender, health, etc.), much remains to be fully uncovered (Dolan, Peasgood, & White, 2008).

One of the more significant factors that do not point in one clear direction is the amount of working hours individuals prefer, or makes them 'most happy'. In general, the possible relationship between working hours and SWB lacks sufficient research. Although some researches incorporate hours worked by individuals in different analyses, the emphasis of these analyses never lies with working hours. Next to the gap in current literature, the potential relationship at hand fits right into today's business world. A recent article about an Australian firm describes how a manager put his employees into an interesting experiment; working five hours a day instead of the regular eight, without any cuts in salary (Clark, 2018). For this particular case, productivity went slightly up, the amount of sick days decreased and employee satisfaction went up. This case is not unique and suggests that it could be preferable for certain firms to adjust the hours that their employees work. This raises the question whether business performance can be increased by adjusting employee working hours. Although it is unlikely that the mentioned case is applicable to every industry and firm, it does suggest that there is room for improvement for some.

Using data from the Dutch LISS panel (Longitudinal Internet Studies for the Social sciences), this paper conducts an analysis with the emphasis on working hours and the its possible effect on SWB, thereby aiming to answer the research question: "Does an individual's amount of working hours affect his/her subjective well-being?". Suggestions of a causal relationship will be furthered discussed if applicable.

The paper continues as follows. In section 2, a literature review will be constructed, providing information on the economics of happiness and the determinants of SWB, with the focus on determinants relating to working hours. Section 3 reviews the data, including descriptive statistics and the methodology. Section 4 consists of the results of the analysis as constructed in the methodology. Section 5 will discuss the findings and will end with some concluding remarks.

## **2 Literature review**

### **2.1 Economics of Happiness**

New research fields open up research opportunities, but also bring along challenging factors that are not as much of a problem in more developed fields. In this case, the literature is far from complete and contains gaps on important factors. It is therefore highly likely that, on hindsight, there will be variables absent in the analysis that should have been there. This is the case for both this paper and any existing literature. As for what is known, this section will provide an overview on the economics of happiness including discussions about what is known and what is less straight forward or unknown.

Economics of happiness can be described as economists attempt to theorize human emotions and feelings. The concept of utility has been proven unable to do so and the merging of economics and psychology into behavioural economics is intended to explain why. Happiness as an alternative for utility is one of the ideas shaped in recent decennia in order to provide more insight on human decision making. Whereas utility is extracted using individual preferences between different options, happiness measurements do so by obtaining subjective measurements of happiness as reported by the individual. Using factors like happiness and life satisfaction generally allows economists to obtain a different angle on the question why people make certain decisions (Frey & Stutzer, 2002).

Policy-wise, happiness can be used as a tool in order to measure policy change impact and successfulness (Frey & Stutzer, 2012; Frey, 2008; Layard, 2006). On the other hand, whether happiness can be used to justify policy changes is fairly undecided and poses an ongoing debate. Happiness is without much doubt not what politicians should aim for at all times. Next to that, some have argued that it is not the job of the government to increase population happiness (Johns & Ormerod, 2007). From a business perspective, the implications tend to go towards the relationship between employee happiness and performance. Just as increasing payment for higher performance can have a desirable effect on business performance (to some extent), increasing worker well-being can have desirable effects (Wright & Cropanzano, 2000). Since employers can influence the working hours of their employees, the existence of the relationship in question should attract interest.

As for measurements, one of the core concepts of the economics of happiness is that the happiness/satisfaction measurement is done subjectively. SWB is measured as how the subject evaluates his/her own well-being. Researchers should not try to evaluate subjects and construct a measurement that relies on the researcher's personal judgement. Instead, what the individual reports him/herself is of interest. In the same sense, there exists no general scale and researchers are free to design their own. The most commonly used scales include categorical scales varying from completely unsatisfied to completely satisfied, to completely disagree to completely agree. The majority includes seven to ten points, but five-point scales are used as well.

Before continuing, an important distinction must be made. Some authors tend to use the terms 'subjective well-being', 'happiness' and 'life satisfaction' in the same sense. This can confuse uninformed readers about what certain effects are saying about

happiness. Papers that use the term 'SWB', but have contradicting claims, could simply be talking about completely different aspects of SWB without explicitly mentioning this. In general, happiness is focused on the present and represents how an individual feels at the moment. Life satisfaction, on the other hand, is focused on an individual's life thus far (Ng, 2015). Past events that barely have any effect on someone's current happiness, can still have a major impact on a person's satisfaction with his life so far. It is therefore worth stating that this paper's main focus lies with the happiness aspect of SWB, e.g. how happy an individual currently feels. The exact question asked to the subjects is: "On the whole, how happy would you say you are?". Subjects answer on an eleven-point scale where '0' represents 'completely unhappy' and '10' represents 'completely happy'. Life satisfaction will still be discussed where relevant within the literature review, but will not be part of the analyses. Some also make the distinction that SWB is something entirely different on its own, but differences in definition are small and the distinction is most often not made.

## **2.2 What makes us happy?**

Since this paper investigates the potential relationship between SWB and working hours, the only related literature that will be discussed thoroughly, is the literature that in any way thinkable relates to working hours. For example, religious people tend to show higher average levels of happiness and life satisfaction (Clark & Lelkes, 2005; Hayo, 2004; Helliwell, 2003), but there exists no evidence that being religious affects work load or vice versa. The most straightforward factors are unsurprisingly also the most researched ones. Effects of income, gender, health and age have generally been explored. Other effects show less strong results and continue to pose a challenge for researchers. Some show small to no significant effects, while others show contradictions in findings between researches. These include factors like education and ethnicity.

As for the factors of interest, their importance lies with their plausible relationship with the number of hours an individual works and the effect on the individual's SWB. Including a control for income is necessary for this reason. The amount of hours an individual works is without any doubt directly related to how much this individual earns in income. The size of this income can influence an individual's SWB, which is then absorbed by the hours worked if left uncontrolled for. A factor like gender can influence this relationship in another sense. Men and women can have different preferences for working hours and can report different levels of SWB in general. Again, taking this plausible effect into account is vital to this research.

The discussion below relies heavily on the literature research of Dolan et al. (2008). Topics will therefore be discussed briefly, since going into detail is rendered unnecessary by previous and relevant literature to date. The vast majority of literature uses household surveys, which consists of panel data, in order to uncover any potential relationships. The difference between researches mainly consists of different countries and survey richness in terms of survey questions. Some use cross-sectional data, but this

is mostly done when it is unlikely (or impossible) that there is any form of reversed causality. For example, studies purely focused on gender differences are not prone to such a bias, due to the fact that gender cannot be influenced. As for causal effects; due to the extensive use of panel data, most related papers are able to find results strongly suggesting causal relationships, but very few are confident enough to actually claim this. Again, the novelty of the research type makes it tough to be sure when much remains to be researched.

### **2.2.1 Working Hours**

As mentioned before, the effect of working hours on SWB is rather vague. Different researches point towards different directions, while very few show any significant effects (Dolan et al., 2008). For example, Angrave and Charlwood (2015) find no direct effect of the amount of working hours on SWB, but do find decreases in SWB for people who work significantly more or less than they would prefer to. Others find increases in SWB when working hours increase, but up until a certain point after which an increase in working hours starts to decrease SWB (Meier & Stutzer, 2008; Luttmer, 2005). This suggests the possibility that there is an optimal amount of working hours, for which when deviated from, results in a decrease in SWB.

As Dolan et al. (2008) mentioned, not only is there insufficient research aimed at the amount of hours people work, factors that could influence this potential effect are unaccounted for. If a certain optimum would exist, it would be unlikely that the optimum holds for every individual.

### **2.2.2 Income**

At first, income has shown to be contradicting. This is best described by the well-known 'Easterlin paradox'; for most countries the GDP has risen throughout the last century, but overall well-being has remained constant during the same period, inducing that income does not affect happiness. This provides a reason to assume that money does in fact not buy happiness (Easterlin, 1973). Some have attempted to find explanations for the paradox and have come up with arguably strong answers. The main findings basically suggest that it is not absolute income that matters. Upon investigation, people tend to care a lot more about relative income, both in gaining/losing income and as relative to others. Within the National Survey of Families and Households (NSFH), individuals appear to attach value to the differences in income within their social environment (Luttmer, 2005). Although the effect is not fully established as for what its causes are, the result is highly suggestive towards the existence of a relative income effect. Others have taken this issue in a different direction. Clark et al. (2008) explain the paradox theoretically by introducing factors of relative income and adaption to income changes. A research conducted with a household survey from China was able to further confirm the suggestion of the existence of a relative income effect (among others). Taking into account previous income and happiness levels, as well as potential future values, the results are directly in line with any previous suggestions (Knight et al., 2009).

Compared to a marginal decreasing utility of money, the same appears to hold when substituting utility for SWB.

### **2.2.3 Gender**

Gender differences are generally small when looking at current happiness. Most potential effects disappear, once individual factors are controlled for. On the other hand, interaction effects that include gender do tend to show some significant differences, where women tend to be slightly more happy on average than men (Schmotkin, 1990). In some papers, distinctions have been made for certain groups, concerning the workload some people take on. For example, women were found to prefer part-time work over fulltime more often than men (Gasg et al., 2010).

### **2.2.4 Health**

Potentially the most agreed on happiness influencer is the individual health state, both mentally and physically. The vast majority of literature shows positive effects of increasing health on happiness (e.g. Post, 2005; Abdel-Khalek, 2006). Effects of changes in health are most distinctively found in panel datasets where the focus lies with severe changes to health like heart attacks (Shields & Price, 2005). Next to that, the average effect sizes give reason to think that mental health is one of (if not) the most influential determinants for individual happiness levels.

### **2.2.5 Age**

Changes of happiness in age are often depicted with a U-shaped relationship (Ferrer-i-Carbonell & Gowdy, 2007). Ironically, the opposite tends to hold for life satisfaction, which follows a reversed U-shaped relationship (Schmotkin, 1990). The effect has received a lot of attention in research and the main take-away point from all literature is basically that there are so many factors that change with age, that it is challenging to determine the actual age effect (Easterlin, 2006; Mroczek & Kolarz, 1998). In the same sense, it is likely that preferences for the amount of working hours differ with age, which could be one such factor.

### **2.2.6 Commute**

The majority of employed people have some amount of time they spend commuting, which obviously differs per individual and job. More interesting is the commuting paradox as explained and tested by Stutzer & Frey (2008). Using data from the German Socio-economic Panel Study (GSOEP), a significant negative effect of commuting is found across both cross-sectional and individual fixed effects models. Standard economics argues that commuting is part of the job 'package' when considering different jobs. Therefore, commuting is set off against the benefits of every other aspect and should be equalized in terms of satisfaction. However, their analysis shows that people with longer commuting time show significant lower levels of SWB.

### **2.2.7 Employment**

Unemployment (involuntarily) greatly reduces SWB. Even when taking into account factors like the large drop in income from becoming unemployed, being involuntarily unemployed still significantly reduces SWB (Clark & Oswald, 1994). Although their analysis is unable to back up any claims of causality, the cross-sectional results are strong and independent of the loss in income. Causal claims are made plausible with longitudinal studies, for example by Jackson et al. (1983), who track young adults in their early adult years. During their transition into the labor market, young adults that are struggling to find a job experience a significant increase in stress levels, lowering their SWB levels. This increase is almost directly undone once they enroll into employment.

Self-employment is trickier to deal with, due to endogeneity issues; happier, more confident people are more likely to (successfully) become self-employed. Correlation wise, being self-employed goes together with higher levels of SWB, but a causal effect is hardly identified (Blanchflower & Oswald, 1998). Alesina et al. (1994) argue that self-employment does in fact increase SWB, but that this effect, at least within their analysis, is exclusively to the rich and successful.

### **2.2.8 Personal relationships**

Being in a relationship has shown to significantly increase SWB in general. Married people in general show the highest SWB compared to any other form of relationship or the lack of such relationships (Helliwell, 2003). What is more interesting is that people who have long-lasting relationships are happier than people who more frequently have shorter relationships (Blanchflower & Oswald, 2004a). All kinds of relationship endings basically lower SWB, where separation and widowhood deal the most damage to individual happiness. Being married or engaging in a relationship in general does not necessarily have an influence on the amount of hours worked. On the other hand, one can imagine that moving from a one-person income household to a two-person income household can incentivize some to stop working or decrease their workload.

### **2.2.9 Children**

Having children attributes to higher levels of life satisfaction, but not directly to happiness (Haller & Hadler, 2006). This is arguably caused by confounding factors that change at the time of having children. Expenses increase, sleep decreases and, most importantly for this paper, working hours could decrease since an infant child requires time. As described by Dolan et al. (2008), the effect of having children on happiness depends on the circumstances. On average, having a child boosts both happiness and life satisfaction, but since having a child brings along many changes at once, the sign and magnitude of the effects on happiness differ. Environmental factors that have shown to be of influence here include mainly differences in relationship status (duration of the relationship, married, divorced, widowed, etc.) and income status (e.g. poor or rich) Any effects disappear slowly as the child ages and have no distinctive effect on happiness anymore once the child moves out.

## **2.3 What might make us happy?**

Some factors are in a grey area; they might influence (or be influenced) by working hours and could affect SWB. The problem is that for now the effect of these factors has been far less established compared to the factors discussed before. Next to that, whether they actually have a direct effect on SWB (or working hours) is not entirely clear. Nevertheless, it is still worth briefly discussing the factors that could prove to be important in future research.

### **2.3.1 Education**

Effects of 'highest achieved education level' on current happiness are tough to uncover using fixed effects models, due to the low variance in education levels, once subjects leave school for work. The absence of data on adults going back into schooling is a key issue here. Besides this, cross-sectional research suggests that happiness is affected by schooling (Blanchflower & Oswald, 2004b). Although results show varying answers as to what the optimal level is concerning happiness, the literature clearly shows a preference for at least 'moderate' levels of schooling compared to no/little schooling, as to what increases SWB.

### **2.3.2 Ethnicity**

Other than significant differences between white people and African-Americans in the U.S. in terms of SWB (Thoits & Hewitt, 2001), differences based on ethnicity are largely unexplored. Differences in ethnicity can also be stripped down to cultural and individual factors, after which not much remains to be explained by actual ethnicity, which complicates research on the matter even further. Mind that employing a fixed effects estimator can control for any possible effects of ethnicity, which poses less of an issue in any further analysis.

### **2.3.3 Volunteering**

People who volunteer often report higher levels of well-being. A study conducted on survey data in Germany from right before and after the Berlin wall fell was able to distinguish an effect of volunteering, using the fall of the wall as an exogenous shock. This shock indirectly rendered some people in East Germany unable to perform volunteer work (Meier & Stutzer, 2008). Although a causal claim is made that volunteering increase SWB, some possibilities are left unexplained. Other studies conducted on the matter report possible reverse causation. On two identified levels, people self- select and are selected into volunteer work. Happier people are more likely to apply for volunteer work and are also more likely to get selected into volunteer work, as organizations select volunteers based on their levels of enthusiasm and motivation.

### **2.3.4 Exercise**



Especially older people have appeared to benefit from exercise with regards to physical and mental well-being. For now, not much else is known due to the lack of larger datasets used for this particular effect. Although suggested, whether exercise has a definitive positive effect on SWB remains to be tested. As with volunteering, exercising functions as a way of filling time, which could therefore affect working hours.

## **2.4 Omitted variable Bias**

Given the potential omitted variable bias, distinguishing a causal relationship is hard, if not impossible. The possibility exists that a plausible causal relationship will be found, but due to the novelty of the topic, this claim cannot be made. There are simply too many question marks around some potentially important factors. On top of that, it is likely that factors of importance exist that have not even been touched by researchers yet. Any relationship that is found in the analysis can only be suggestive and would require further development within the research field in order to increase the likeliness of a causal effect. However, in order to eventually accomplish this, steps must be taken. Any result should provide arguably valuable information for any researchers aiming to continue the expansion of the economics of happiness.

## **3. Data & Method**

The used data is obtained from the LISS Panel. The panel is based on a true probability sample of households drawn from the population register by statistics Netherlands and it consists of 4500 households with 7000 individuals completing surveys throughout every year. The sample consists of a few more nationalities other than Dutch, but this is a very small group. Participation is completely voluntarily, meaning that people can drop out or join in at any time they want, creating an unbalanced panel. The Panel contains a lot of different single wave studies, but the used studies are the longitudinal studies that are conducted annually for roughly the same individuals each year since 2008. Studies are split by topic (income, health, personality, etc.) and are presented at different points throughout the year. Every study contains the same questions every year, allowing researchers to investigate the changes that occur within households through time. Combining these studies, results in a dataset containing over 10,000 individuals, over 100,000 observations and thousands of available variables. Note that not all will be included in the analyses for reasons to be explained.

As for the data in general, the set consists of a voluntary survey, which is not completed every year for every individual. Some people drop out after a few years and new people join during its total run time. Others are absent in one year, but return in the next. Since every answer is self-reported, validity is an issue that is only partly correctable. Apart from the questions based on opinions, emotions and feelings, information on income, working hours, commute, etc. can easily be misreported or rounded, which biases the data. Although certain false observations can be removed (e.g.

people reporting income of a billion euros), invalid values are bound to remain in the data to some extent.

Secondly, one study unit (Health) has not been conducted in 2014, leaving a gap. Age and gender are included in this study, but these can be filled in using past (and future) values. Subjective health on the other hand may pose an issue. However, participants are asked every year whether their health improved/worsened compared to last year. Using the answer to this question in 2015, an estimation can be made about individuals' subjective health in 2014. Thirdly, with respect to the previous point, subjects are generally inconsistent and unable to replicate their own answers. Some reported to have experienced a great improvement in their health over the last year, but report the exact same value of subjective health in both years. This could be due to a change in health within one year that is left unrecorded due to the annual gathering of data. Next to that, a subject may feel like their health improved a little, but not to an extent that they feel their health went up a point on the subjective health scale. Fourthly, some questions are only asked during the first participation of a subject. Every year thereafter, these questions won't appear again. This is the case for questions concerning children, nationality and birth years. These gaps are easily filled by copying the answers into all other years, but it poses a small issue for subjects that, for example, lost a child which is left unrecorded.

Regarding the available data and the actual used data, there will be a cut in both individuals and observations, as not every one of these are of use. In short, only people participating in the labor force are included. The analysis will not include individuals that do not have or want to work as their prior occupation in their life at specific moments in time. This includes people that have not fully entered the workforce yet (students), retirees, the disabled and people that simply don't want or need to work. The last group consists of people that for example have a working partner or chooses to be unemployed.

**Table 1: Descriptive statistics**

<i>Age</i>	<i>All</i>	<i>16-33</i>	<i>34-42</i>	<i>44-49</i>	<i>50-56</i>	<i>57+</i>
<i>Average SWB</i> (Scale of 1-10)	7.64	7.68	7.62	7.65	7.64	7.64
<i>Average working hours</i> (Per week)	33.59	33.85	34.34	34.78	34.65	31.63
<i>Average income</i> (Gross, Yearly)	€ 37023	€ 24893	€ 34382	€ 40269	€ 41412	€ 43583
<i>Average Commute</i> (In minutes)	27	27	28	26	27	27
<i>Average Health</i> (Scale of 1-5)	3.24	3.47	3.28	3.23	3.13	3.11

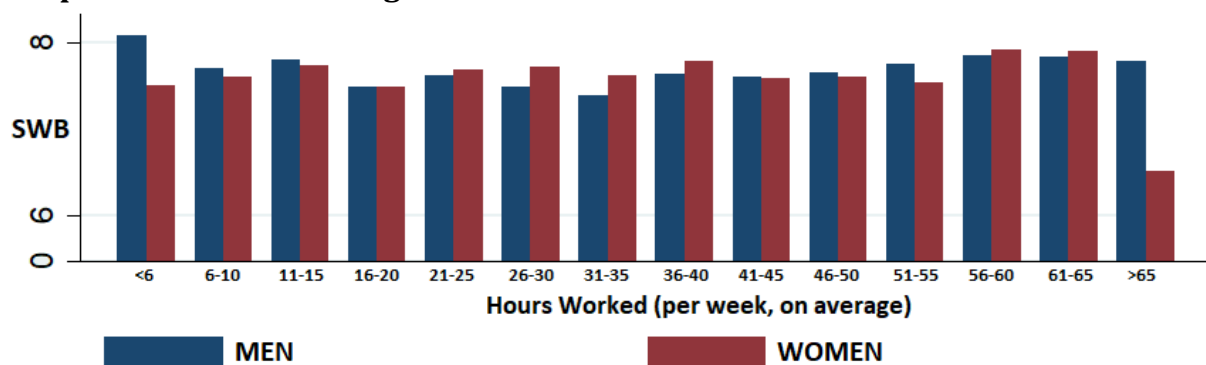
<i>Women</i>	0.48	0.53	0.50	0.46	0.45	0.44
<i>Has Partner</i>	0.24	0.52	0.28	0.16	0.15	0.11
<i>Is Married</i>	0.59	0.23	0.56	0.69	0.71	0.72
<i>Has Children</i>	0.66	0.16	0.63	0.77	0.82	0.86

*Notes: Age groups are constructed such that every group represents roughly 20% of the sample. Married people are not included in the group that has a partner.*

On first sight, the descriptive statistics (table 1) do not provide any presumptions. Average SWB ratings are almost constant and all other factors are mostly as expected. For example, one would expect more people to have children/be married/have a partner when aging. Income is expected to rise with age, whereas health is expected to decline. As nothing seems out of the ordinary, any pre-thoughts about a potential relationship between hours worked and SWB are vague or non-existent.

'Graph 1' provides a more detailed image on the potential effect at hand. Again, the average SWB rating appears rather constant. What is interesting is the relatively large decrease in SWB for women who work over 65 hours a week on average, which could be explained by the small sample of women working over 65 hours. The same holds for the small sample of men working less than 6 hours per week. Besides these small outliers, the graph itself does not give any evidence in favor of a relationship between SWB and individual working hours.

**Graph 1: SWB and working hours**



An OLS model including individual fixed effects and year fixed effects will be used to identify the effect of working hours on individuals SWB. One of the main advantages of using a fixed effects model in this particular case is that it accounts for certain potential aspects that are either hard to account for or even impossible. Specifications as gender, education (prior to working) and nationality can be left out of the regression, without harming the results. Especially education poses a challenge if needed within the regression specification, since there are over twenty specified levels, without a clear order within the dataset. Even just ranking every level into a low-mid-high scale would not suffice, as interpretation would completely rely on a subjective scale. Next to that,

the literature is not quite sure yet about the relationship between education and SWB. It is worth noting that changes within these factors are still possible (although very unlikely for factors as gender). Year dummies will be included, partly due to the time period the data originates from (2008-2015); the years after the financial crisis. Although most effect of the crisis should be captured by variables like income, a partially unexplainable effect can still remain.

Judging from the scale of the SWB variable, an ordered logistic regression is normally preferred over standard OLS. However, ordered logistic regressions cannot be executed using a fixed effects estimator, which is a vital estimator considering the data at hand. For this reason, various related literature also prefers standard OLS, even though the SWB scales are rarely on an interval scale. Next to that, the interpretation possibilities of an ordered logistic regression are limited.

In recent years, various researchers have come up with possible solutions to the shortcomings of such ordered logit models. Although fairly new and to some extent incomplete (in terms of tested validity), the proposed solutions are generally successful in capturing individual fixed effects. Although the interpretation limitation remains, conducting such an analysis can function as verification of the results obtained from standard OLS. The main results will therefore be compared to the outcome of a fixed effects ordered logit model using the 'Blow-up and cluster' (BUC) estimator (Beatschmann et al., 2015).

The regression specification can be written as:

$$SWB_{it} = \alpha + \beta * HW_{it} + \rho * HW_{it}^2 + \theta_{it} + \gamma_t + \delta_i + \epsilon_{it}$$

Where  $SWB_{it}$  is the subjective well-being of individual  $i$  in year  $t$ ,  $\alpha$  a constant,  $\beta$  the linear effect of working hours on the individuals subjective well-being,  $\rho$  the quadratic effect of working hours on the individuals subjective well-being,,  $HW_{it}$  the average amount of working hours per week of individual  $i$  in year  $t$ ,  $\theta_{it}$  a set of control variables, which includes a squared term for age and dummies for variables like health and marriage,  $\gamma_t$  the year fixed effects,  $\delta_i$  the individual fixed effects and  $\epsilon_{it}$  the robust standard errors, clustered at the individual level. The control variables will include age, income, health, commute, a partner dummy, a marriage dummy and a recent child dummy(if the child is less than three years old). The addition of every single control variable is based on their relationship with SWB found in previous literature and their (plausible) relationship with the amount of working hours of an individual.

The analysis will be split into two additional regressions; one for men only and the other for women only. The reasoning for this is that women generally have different amounts of working hours and labor force participation ratings. One concern may be that there is an exceptional difference between the outcome for men and women, but any of these should be captured by the fixed effects estimators. Any existing difference will therefore not interfere with the main regression. However, splitting the main

regression by gender could provide some insights on the plausible existence of such differences in preferences, as described in the literature review.

#### 4. Results

**Table 2: Main Regressions**

<b>Variable</b>	<b>All</b>	<b>Men</b>	<b>Women</b>
<i>Hours Worked</i>	.01559*** (.00565)	.02376*** (.00824)	.01615* (.00855)
<i>Hours Worked</i> <sup>2</sup>	-.00021*** (.00007)	-.00028*** (.00010)	-.00031** (.00014)
<b>Individual Characteristics</b>			
<i>Age</i>	-.07920** (.03674)	-.14804*** (.04575)	.00001 (.03764)
<i>Age</i> <sup>2</sup>	.00068*** (.00026)	.00108*** (.00035)	.00059 (.00036)
<i>log income</i>	.00079 (.01844)	.00446 (.02551)	.00007 (.02688)
<i>commute</i>	-.00099 (.00110)	-.00011 (.00137)	-.00245 (.00177)
<b>Health</b>			
<i>moderate</i>	.45049* (.26844)	.22673 (.30767)	.58243 (.37583)
<i>good</i>	.66023** (.27083)	.40288 (.30931)	.82851** (.37988)
<i>very good</i>	.72860*** (.27131)	.45052 (.30986)	.92317** (.38060)
<i>excellent</i>	.76526*** (.27768)	.50453 (.32011)	.93710** (.38993)
<b>Relationship status dummies</b>			
<i>Partner</i>	.32432*** (.07514)	.39966*** (.09858)	.25000** (.11012)
<i>Married</i>	.38226*** (.12690)	.42698*** (.14901)	.35655* (.20689)
<i>Recent Child</i>	-.05048 (.05577)	-.01273 (.07384)	-.09880 (.08589)
<i>Constant</i>	8.5783*** (1.1538)	10.684*** (1.2585)	5.4378*** (1.1738)
<b>Year Dummies</b>	Yes	Yes	Yes
<b>Individual Fixed Effects</b>	Yes	Yes	Yes
<b>Number of Observations</b>	9,997	5,225	4,772
<b>Number of Individuals</b>	3,485	1,742	1,744

*Notes: t-statistics are in parentheses. Dependent variable: 'Subjective Well-Being'. \*\*\* indicates significant at the 0.01 level, \*\* at the 0.05 level and \* at the 0.1 level. All regressions include robust standard errors (clustered for individuals). For the variable Health, health level 'poor' is included in the constant.*

The results in table 2 clearly show a reversed U-shape, as was expected. This suggests that there is in fact an optimal amount of working hours per week for an individual. Deviating from this optimum would lower the individual's SWB. On average, subjects show to experience a .016 point increase in their SWB ratings for every additional hour worked, but experience a loss of .00021 times the total hours squared. This leads to an optimum of 36.5 working hours per week on average within the used sample. An individual who works at this optimum reports a SWB rating that is .285 point higher than the same individual if he/she would work zero hours a week.

Next to working hours, the variables concerning age, health and having a partner or being married all have an effect in line with related researches. As for income and commute, the insignificant coefficients are possibly explained by the low variance within subjects. In order for commute to drastically change, people would have to switch jobs frequently. The same holds for income, although income is more likely to change within one job compared to commute. Having an infant child does not appear to influence SWB, which is not surprising due to the situational dependence of the effect. This could also be caused by a number of factors that change at the same time, where there are bound to be changes in factors unaccounted for. Since the emphasis lies with working hours, this should not be a problem within this model.

As for the differences between men and women, some interesting differences occur. Looking only at women, it appears that age does not have any significant effect on SWB at all. However, upon further investigation it appears that women have experienced a constant drop in SWB over time, when controlling for all other non-time dependent factors. Since the analysis includes year dummies, the model is unable to distinguish between the age effects and the year effects, causing the year dummies to be more significant compared to men, while at the same time suggesting no effects of age on SWB for women. An alternative explanation would be that women are not as influenced by age as is the case for men in terms of SWB. Furthermore, men tend to be less influenced by their personal subjective health, whereas women show more significant differences. In the same sense, women tend to be less influenced by their personal relationship compared to men, both in size and significance. Looking at working hours, men show a more significant and higher preference compared to women. The optimum of men lies at 42.43 hours of work per week, while the optimum for women lies at 26.05 hours per week.

As mentioned before, using standard OLS, while the dependent variable's scale is an ordinal scale, is technically incorrect. Using ordered logistic regressions is preferred, but does not allow the inclusion of a fixed effects estimator. As proposed by Beetschmann et al. (2015), this shortcoming can be tackled by using a 'Blow-up and

cluster' estimator, which, as far as tested, is generally successful in capturing individual fixed effects within ordered logistic regressions.

However, a few changes had to be made in order to run the BUC regression. The BUC estimator is unable to take into account any categorical variables. Therefore, variables for subjective health and year had to be changed to continuous variables instead. This lowers the validity of the results concerning these variables, but should interfere with the variables of interest to the extent that the model as a whole would be invalid. As for the outcomes: the results in table 3 show very little and few differences compared to the main model. This would suggest that the choice for a fixed effects OLS regression is justified, both by previous literature and the BUC estimator. One difference that is left unexplained is the change in the married dummy for women.

**Table 3: Fixed effects ordered logistic regression using a blow-up and cluster estimator**

<b>Variable</b>	<b>All</b>	<b>Men</b>	<b>Women</b>
<i>Hours Worked</i>	.05634*** (.01850)	.07925*** (.02455)	.05832** (.02898)
<i>Hours Worked</i> <sup>2</sup>	-.00081*** (.00027)	-.00099*** (.00034)	-.00111** (.00049)
<b>Individual Characteristics</b>			
<i>Age</i>	-.23975** (.11200)	-.44997*** (.14550)	-.02435 (.12565)
<i>Age</i> <sup>2</sup>	.00189** (.00081)	.00325*** (.00110)	.00165 (.00115)
<i>Log Income</i>	-.00675 (.05221)	.00506 (.07284)	-.01818 (.07456)
<i>commute</i>	-.00272 (.00341)	.00046 (.00421)	-.00916 (.00567)
<b>Health</b>			
<i>Subjective Health</i>	.36933*** (.06882)	.28350*** (.09217)	.48186*** (.10167)
<b>Relationship status dummies</b>			
<i>Partner</i>	.83044*** (.21056)	1.1523*** (.29763)	.55930** (.28398)
<i>Married</i>	.80997*** (.29830)	.98065*** (.34079)	.75489 (.48882)
<i>Recent Child</i>	-.11972 (.17643)	-.01680 (.23197)	-.24273 (.26400)
<b>Year</b>			
<i>Year</i>	.00029 (.04774)	.06030 (.04972)	-.17148** (.08012)
<b>Individual Fixed Effects</b>	Yes	Yes	Yes

<b>Number of Observations</b>	9,987	5,210	4,770
-------------------------------	-------	-------	-------

*Notes: t-statistics are in parentheses. Dependent variable: 'Subjective Well-Being'. \*\*\* indicates significant at the 0.01 level, \*\* at the 0.05 level and \* at the 0.1 level.*

Although the partner dummy is still significant, the married dummy loses its significance in the BUC model.

There exists a possibility that the results are prone to reverse-causality. As with volunteering (as explained in the literature review), it could be the case that happiness also influences an individual's preference for working hours. In that case, people that experience an increase in their SWB rating, start to work more or less hours (depending on their position on the curve). However, this can only be the case if the hours an individual works are fully determinable by the individual. This is arguably unlikely to be the case for the majority, since that would imply that everyone would be working their preferred amount of hours. Next to that, one can imagine how employers would not be pleased by employees changing their hours whenever they like.

There exists the possibility to test this to a certain extent. The survey contains questions regarding an individual's preference for his/her amount of working hours per week and also whether the individual is satisfied with his working hours (on a scale of 0-10). Another question involves an individual's preferred amount of hours per week. Both these questions shed light on whether individuals are to some extent able to determine their individual working hours per week.

As for the first, the average rating is '7.61' with a standard deviation of '1.61' which is very close to the average of the SWB rating. Since it is unlikely that every individual is completely happy, such a rating would suggest that there exists a group in the sample that is not completely satisfied with their working hours. The difference in preferred working hours compared to actual working hours shows the same; 35.28% report to be working the hours they prefer and 40.10% are at least five hours apart from their personal preference. Therefore, it is unlikely that there is any form of reverse causality within the results.

## **5. Discussion & Concluding remarks**

As for the main results, they appear to be in line with the small suggestions made by other researchers, as mentioned in the literature review. The difference is that this paper focusses on the relationship in question, instead of only controlling for the possible effect. The result of that focus is that an arguably stronger view has been obtained on the relationship between individual working hours and SWB. The results suggest that there is indeed an optimal amount of working hours for an individual.

As was shown by the differences between men and women, the optimum is not the same for every individual. It would be ignorant to assume that this difference is the only difference that exists. The differences are quite likely to differ between many different groups, which have not been investigated within this paper. Although further research would be required to investigate the exact optima, it is arguably safe to say that



groups will generally differ. For groups, one could think of the type of firm (e.g. public or private) and work (e.g. manual or non-manual), but also about what type of people mainly do certain jobs. For example, having a specific workforce consisting mainly of men around the age of 20 could require a completely different performance maximization strategy than a group mainly consisting of women around the age of 50. This is also the main takeaway point for in terms of policy. As mentioned in the introduction, some firms could benefit from lowering the workload on their employees without cutting salaries and even experience an increase in worker performance. However, it would be wrong to think that this would apply to any firm, which is in line with the differences in optima.

Research wise, this paper has shown that the workload of an individual is to at least some extent of influence, when estimating one's SWB. It should therefore be taken into account when conducting research within the economics of happiness. Various researchers have already taken this into account in previous researches. This paper has increased the justification of doing so and encourages taking it into account.

Whether the relationship found is a causal one, remains to be fully uncovered. Although it is suggestive, concrete evidence is was not found. This is due to the incompleteness of the research branch and the used data, which leaves much to be desired.

First off, as mentioned, survey data is the tool most available to tackle questions within this field. Whether it is the best tool remains to be found. Secondly, the analysis could be prone to several biases related to the survey. Of all the available individuals and observations, only a small portion fit the requirements for this research. This portion could differ in characteristics from individuals that did not meet the requirements. For example, people that are less often unemployed are more likely to be taken into account, due to their increased chances of having a job at more points in time during the survey. Thirdly, as displayed in table\*, the used sample is dominated by people aged 30-55. Although this should not influence the validity of the results too much, the underrepresentation of young-adults and seniors could give a bended image of reality. Fourthly, the largest shortcoming of this paper is the timing of the survey. Since the entire survey consists of thousands of questions, the surveys are split by category and presented to subjects at different points during each year. This means that the question about how happy a person feels could be months apart from the question concerning their income. This also indicates that some questions could be presented only a month apart, but be assigned one entire year apart. The size of the sample is most likely the reason that this problem did not prevent the analysis from finding correlation between variables. Fifthly, the reader should take into account that the survey is presented in the Netherlands, thereby partly restricting the results to the Netherlands. In the end, the results must be read with these limitations in mind in order to prevent assigning too much power to the results.

As a final note for future research, a few recommendations can be made, mainly concerning the data. As for this particular relationship, a more accurate and well-executed survey would increase validity. Although expensive, conducting the survey

monthly would already bring along a major improvement. This could be accomplished by conducting a smaller survey, thereby eliminating one of the drawbacks of the 'Liss Panel'. Although the Liss panel is rich in terms of data, it also renders the panel very general due to its low completion rate as a likely result of its size. Next to that, this paper's sample consisted of 3,485 individuals and 9,997 observations. Compared to related papers, this is a relatively small sample. Considering that the sample spans over eight years, the sample is fairly unbalanced and thus far from ideal. Gaining a more balanced sample with fewer gaps and a larger group of individuals would already result in an improvement in terms of general validity.

## References

- Abdel-Khalek, A. M. (2006). Happiness, health, and religiosity: Significant relations. *Mental Health, Religion & Culture*, 9(1), 85-97.
- Angrave, D., & Charlwood, A. (2015). What is the relationship between long working hours, over-employment, under-employment and the subjective well-being of workers? Longitudinal evidence from the UK. *Human Relations*, 68(9), 1491-1515.
- Baetschmann, G., Staub, K. E., & Winkelmann, R. (2015). Consistent estimation of the fixed effects ordered logit model. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 178(3), 685-703.
- Blanchflower, D. G., & Oswald, A. J. (1998). What makes an entrepreneur?. *Journal of labor Economics*, 16(1), 26-60.
- Blanchflower, D. G., & Oswald, A. J. (2004a). Money, sex and happiness: An empirical study. *The Scandinavian Journal of Economics*, 106(3), 393-415.
- Blanchflower, D. G., & Oswald, A. J. (2004b). Well-being over time in Britain and the USA. *Journal of public economics*, 88(7-8), 1359-1386.
- Clark, A. E., Frijters, P., & Shields, M. A. (2008). Relative income, happiness, and utility: An explanation for the Easterlin paradox and other puzzles. *Journal of Economic literature*, 46(1), 95-144.
- Clark, A. & Felton, O. (2005). Deliver us from evil: Religion as insurance. PSE, Paris.
- Clark, A. E., & Oswald, A. J. (1994). Unhappiness and unemployment. *The Economic Journal*, 104(424), 648-659.
- Clark, P. (2018, May 6). The case for a five-hour working day. Retrieved August 1, 2018, from *Financial Times*: <https://www.ft.com/content/63f07438-4e12-11e8-9471-a083af05aea7>
- Dolan, P., Peasgood, T., & White, M. (2008). Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *Journal of economic psychology*, 29(1), 94-122.
- Easterlin, R. A. (1973). Does money buy happiness?. *The public interest*, (30), 3.
- Easterlin, R. A. (2006). Life cycle happiness and its sources: Intersections of psychology, economics, and demography. *Journal of Economic Psychology*, 27(4), 463-482.

- Ferrer-i-Carbonell, A., & Gowdy, J. M. (2007). Environmental degradation and happiness. *Ecological economics*, 60(3), 509-516
- Frey, B. S. (2008). *Happiness: A revolution in economics*. MIT press.
- Frey, B. S., & Stutzer, A. (2002). The economics of happiness. *World economics*, 3(1), 1-17.
- Frey, B. S., & Stutzer, A. (2012). The use of happiness research for public policy. *Social choice and welfare*, 38(4), 659-674.
- Gash, V., Mertens, A., & Romeu Gordo, L. (2010). Women between part-time and full-time work: The influence of changing hours of work on happiness and life-satisfaction.
- Haller, M., & Hadler, M. (2006). How social relations and structures can produce happiness and unhappiness: An international comparative analysis. *Social indicators research*, 75(2), 169-216.
- Hayo, B. (2004). Happiness in Eastern Europe. Mimeo, Philipps University Marburg, Number 12/2004.
- Helliwell, J. F. (2003). How's life? Combining individual and national variables to explain subjective well-being. *Economic modelling*, 20(2), 331-360.
- Jackson, P. R., Stafford, E. M., Banks, M. H., & Warr, P. B. (1983). Unemployment and psychological distress in young people: The moderating role of employment commitment. *Journal of applied psychology*, 68(3), 525.
- Johns, H., & Ormerod, P. (2007). Happiness, economics and public policy.
- Kohler, H. P., Behrman, J. R., & Skytthe, A. (2005). Partner+ children= happiness? The effects of partnerships and fertility on well-being. *Population and development review*, 31(3), 407-445.
- Knight, J., Lina, S. O. N. G., & Gunatilaka, R. (2009). Subjective well-being and its determinants in rural China. *China economic review*, 20(4), 635-649.
- Layard, R. (2006). Happiness and public policy: A challenge to the profession. *The Economic Journal*, 116(510).
- Luttmer, E. F. (2005). Neighbors as negatives: Relative earnings and well-being. *The Quarterly journal of economics*, 120(3), 963-1002.
- MacKerron, G. (2012). Happiness economics from 35 000 feet. *Journal of Economic Surveys*, 26(4), 705-735.
- Meier, S., & Stutzer, A. (2008). Is volunteering rewarding in itself?. *Economica*, 75(297), 39-59.
- Mroczek, D. K., & Kolarz, C. M. (1998). The effect of age on positive and negative affect: a developmental perspective on happiness. *Journal of personality and social psychology*, 75(5), 1333.
- Ng, Y. K. (2015). Happiness, Life Satisfaction, or Subjective Well-being? A Measurement and Moral Philosophical Perspective. *Nanyang Technological University*.
- Post, S. G. (2005). Altruism, happiness, and health: It's good to be good. *International journal of behavioral medicine*, 12(2), 66-77.
- Shields, M. A., & Price, S. W. (2005). Exploring the economic and social determinants of psychological well-being and perceived social support in England. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 168(3), 513-537.

- Shmotkin, D. (1990). Subjective well-being as a function of age and gender: A multivariate look for differentiated trends. *Social indicators research*, 23(3), 201-230.
- Stier, H., & Lewin-Epstein, N. (2003). Time to work: A comparative analysis of preferences for working hours. *Work and Occupations*, 30(3), 302-326.
- Stutzer, A., & Frey, B. S. (2008). Stress that doesn't pay: The commuting paradox. *The Scandinavian Journal of Economics*, 110(2), 339-366.
- Thoits, P. A., & Hewitt, L. N. (2001). Volunteer work and well-being. *Journal of health and social behavior*, 115-131.
- Wright, T. A., & Cropanzano, R. (2000). Psychological well-being and job satisfaction as predictors of job performance. *Journal of occupational health psychology*, 5(1), 84.