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The gender pay gap and the mental well-being of women

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Abstract

This paper is about a study on the existence of an association between a gender wage gap and the mental health of women in Germany. SOEP data are used of the years 1992 and 1994-2009 to find out whether a gender wage gap correlates with the perceived health of women in Germany, looking at mental health specifically. It is found that a difference in earnings between men and women is indeed associated with the perceived (mental) health of women, *ceteris paribus*. This association is positive for women if the gender pay gap is positive, and negative otherwise. This would mean that a gender wage gap whereby men earn more than women, keeping everything else constant, could negatively impact the mental health of women. This addresses another issue as to why the gender wage gap should be minimized, in addition to inequality in labour rewards.

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1. Introduction

Germany is trying to combat the gender wage gap by introducing a new law (Financial Times, 2018). This law, the remuneration transparency law, allows employees to compare their wage with wages of co-workers. There is one rule regarding this new right, and that is that an employee is not allowed to compare its wage with only one co-worker, but it has to be compared with a group of at least 6 people. This law is not applicable to all workplaces but refers to workplaces with more than 200 employees. One may ask if Germany needs such a law. According to Eurostat (n.d.a), Germany had the third largest gender wage gap in 2016, just below that of Estonia and the Czech Republic. In 2017 the unadjusted wage gap between males and females amounts to 21% in Germany (Destatis, 2018, German version of the CBS). In the years 2014-2016 the wage gap is fairly stable, with an unadjusted wage gap of around 22% (Destatis, 2017a). This percentage represents the unadjusted wage gap, which means that the difference between the mean gross hourly earnings of men and women is taken and then expressed as a percentage of the mean gross hourly earnings of men (Eurostat, n.d.b). Destatis (2017b) gives several reasons for this wage gap. One reason being that men and women tend to work in different sectors and practice different professions. Other reasons are that fewer men work part-time than women do and the existence of inequality in job requirements. When taking these reasons into account, one gets the adjusted wage gap instead of the unadjusted wage gap (Destatis, 2017b). While the unadjusted wage gap is at 22%, the adjusted wage gap is just at 6% for Germany in 2014. The difference in income between men and women gets smaller when eliminating any differences in job characteristics, but does not disappear completely, which is also found for other European countries and the United States (Blau & Kahn, 2016; European Commission Eurostat, 2017).

Recently, a study is conducted by Platt, Prins, Bates & Keyes (2016) on the possible effect of wage inequality on women's mental health in the United States. The research is mainly focused on the presence of a major depressive disorder (MDD) and/or a generalized anxiety disorder (GAD). Results of this research show that the chance of getting MDD or GAD is significantly higher for women who earn less than men. For this analysis, women are matched to men according to a couple of characteristics that reflect productivity. Another finding is that these chances are smaller when women earn more than men. Although new findings emerged because of this research, it is not clear yet if the results would hold for another country, such

as Germany. Also, not a lot of research has been done yet on the effects of the gender pay gap on mental health in general. The research question of this thesis therefore is:

“What is the effect of a wage gap on the mental health of women in Germany?”

A possible negative effect of wage inequality on the mental health of women would mean that wage inequality causes multiple disadvantages. A wage gap does not only lead to inequality in the rewards of labour, but it also leads to inequality in outcomes on a social level. Research has also shown that poor mental health does not only affect those dealing with the mental health issues, but that effects can spill over to others (Bould, Koupil, Dalman, DeStavola, Lewis & Magnusson, 2015). Bould et al. (2015) discover that daughters of parents with a mental illness have a higher chance of getting an eating disorder. Personality disorder, bipolar affective disorders, anxiety and depression are the mental illnesses that are specifically mentioned. This is not the only study about the impact of parents' mental health; also Van Loon, Van de Ven, Van Doesum, Witteman and Hosman (2014) carry out a research regarding this subject. They find that adolescents more often not live with both of their parents, when their parents are dealing with a mental health problem. Other findings are that having an ill parent could cause more clashes within the family and less coherence. When an adolescent has a parent with a mental problem, the adolescent is more likely to have internalizing problems and externalizing problems. The externalizing problems are the result of an indirect effect of less supervision by parents with a mental illness. Besides this all, they also find that parents are more likely unemployed when one of the parents is mental ill and that communication within the family is less.

Overall, it is clear that the consequences of a gender wage gap may reach much further than just inequality in income. It is therefore important to emphasize the importance of equal wages, by finding out if a correlation between wage inequality and women having mental health problems exists.

In this study an association is found between the existence of a gender pay gap and good mental health among women in Germany. Associations are also found for high health satisfaction and good health. It appears that positive gender wage gaps correlate positively with these health indicators, while negative gender wage gaps correlate negatively with the health indicators. This implies that in case of a negative gender wage gap, the possibility exists that there arises

not only a gap in wages between men and women, but a gap in terms of (mental) health too, as it also appears to be that women and men are different in how a depression endures (Bracke, 2000). Therefore, the gender wage gap is a topic that must be looked into.

This thesis is structured as follows. A summary of existent literature about this subject is given in chapter 2. The hypotheses are also presented in chapter 2. A description of the data is given in chapter 3 and the methodology is explained in chapter 4. The results can be found in chapter 5, followed by the discussion in chapter 6, and finally the conclusion in chapter 7.

2. Theoretical framework

2.1 Definition of gender wage gap

Before discussing the gender wage gap in more depth, it is important to explain what is meant by the gender wage gap in this thesis. The gender wage gap is defined as the situation whereby men have the same occupation as women and work in the same industry as women, but in which men earn more after controlling for age, education, tenure and the number of hours worked per week. Productivity is then also assumed to be the same. What is also taken account of in this thesis as one of employees' characteristics, is the marital status. Marital status is included in case this influences the perception of the employer on a woman's, perhaps declining, productivity in the future, and therefore the wages of women. The difference in pay that is left is therefore considered to exist because of discrimination. The definition of the gender wage gap in the literature described in the theoretical framework could be different from the one used in this thesis however.

2.2 Gender wage gap in historical perspective

In 1990 Germany is reunited again, after being separated in the German Democratic Republic and the Federal Republic of Germany for about 40 years (Rosenfeld, Trappe, & Gornick, 2004). Hunt (2002) researches as to how the labour difference in gender in East Germany evolved after the financial reunification with West Germany until 1994. Hunt (2002) finds that the gender pay gap decreases in East Germany with 10 percentage points after the reunification. An important factor contributing to this is the fact that a lot of low-skilled workers have left

the labour market. Most of these are women, who had to leave the labour market because low-skilled employees are not as much wanted anymore. It appears that both age and the length of holding a job are not the reasons for the smaller pay gap. However, it is still unclear what caused a large part of the wage convergence. Krueger and Pischke (1992) look at the differences and similarities between East Germany and West Germany regarding the labour market around 1990. They find the gender pay gap to be around 25% in both East Germany and West Germany. Education between East Germany and West Germany is also compared. It is found that one additional year of education increases earnings by 7.7%. This number is the same for both East Germany and West Germany. It appears to be that experience played a bigger role in West Germany than it did in East Germany, with a difference of 2% in year one. Gang & Yun (2001) look at the development of the gender pay gap in East Germany for the period 1990 to 1997. They find that the wage gap fluctuates during those years, with a gap of 17.2% in 1990, 23% in 1993, 3.6% in 1995 and 5.2% in 1997. Gang & Yun (2001) also use the Blinder-Oaxaca decomposition to study the gender pay gap. They find the gender pay gap to be about 6 log-points in 1997. They nonetheless also discover that, while controlling for different attributes, discrimination has increased to about 20 log-points by the end of the time period. Discrimination is not constantly increasing over those 7 years; the first 2 years it is actually declining. Lauer (2000) looks at the gender pay gap in West Germany for the period 1984 to 1997. She does not take into account all employees; only those who work full-time in the private sector are included in the sample. Lauer (2000) specifically studies the role that human capital has on the size of the gender pay gap. In this study a form of a decomposition method is used as well. Results show that the wage difference is about 45% in the period 1984-1987 and about 36% in the period 1994-1997. This 45% gender pay gap is explained by variables that represent education for 16.4%. In the period 1994-1997 those variables explain 29.4% of the gender pay gap. In the first period, 0.026 ln-% of the gender pay gap is explained by variables that represent experience. In the second period this is 0.027 ln-%. Variables that represent occupation explain 0.038 ln-% of the difference in wage in period 1, and 0.023 ln-% in period 2. For the period 2006-2016 the unadjusted gender wage gap fluctuates around the 7% in East Germany, and around the 24% in West Germany (Destatis, n.d.). One could therefore conclude that the big difference in the gender wage gap between East and West Germany has remained persistent throughout the years.

2.3 Causes of the gender wage gap

The gender wage gap appears to still be present in modern Germany. An important question regarding this subject is then why wage inequality between men and women exists. A lot of explanations are given in existing literature. As seen in Lauer (2000) in the previous section, education is said to have been an important determinant of the gender pay gap. One of the reasons for this is that women enjoyed lower education. Another reason is that men tended to acquire different degrees, meaning that they acquired those with a higher outcome. A last reason given is that even if men and women have the same degrees, men still manage to get more out of their degrees. This was more the case in 1994-1997 than it was in the period 1984-1987. Bobbitt-Zeher (2007) studies the impact of education on the gender wage gap by using the National Educational Longitudinal Survey data of 1988 and by performing two regressions. She finds that there are significant differences in what major men and women choose in college and in high school. When using an estimated generalized least-squares regression, she finds that 38.8% of the gender pay gap is explained by being a woman, race, socioeconomic status of the family of origin and the percentage female of college major. Also a regression decomposition is used. One of the results of this decomposition method is that 14% of the gender pay difference is because of the percentage female of college major. Another interesting result found by Bobbit-Zeher (2007) is that men seem to do better on math and science tests, when using standardized tests as a form of measurement. By using the decomposition method, she also finds that the standardized tests account for 5% of the gender pay gap. Blau & Kahn (2016) investigate the gender pay gap in the United States for the period 1980-2010. By using the Oaxaca-Blinder decomposition method, they find that education explains 2.6% of the gender pay gap in 1980 and -5.9% of the gap in 2010, when using all the other variables mentioned in this paper as control variables. This change in how education contributes to the gender pay gap is due to women becoming higher educated. The control variables are: experience, region, race, unionization, industry and occupation variables. Another reason for the gender pay gap given in the paper of Lauer (2000) is occupation. Women are found to choose jobs that pay worse than men. Less women practice professions for which they have been trained, which also leads to lower earnings. Interestingly, when women do adhere to what they have been trained for, they earn more than when men do so. Women are also paid less than men when the number of women practicing a certain job is high. Still, women choose these jobs as they are meaningful there. Blau & Kahn (2016) find that occupation explains 10.7% of the gender pay gap in 1980 and 32.9% of the gender pay gap in 2010. One of their

other findings is that the difference in jobs decreased in the period 1981-2011 for men and women. This means that the difference in earnings becomes larger during those years. Also Bobbit-Zeher (2007) comes across some findings regarding occupation. About half of the gender pay gap could be explained by work variables, which includes occupation. She also finds that there are differences in the jobs that men and women have. There is a significant difference in having a job in the public sector, with less men working in that sector. Lauer (2000) finds that, besides education and occupation, also experience plays a role in explaining the gender wage gap in Germany. The reason for this is simply that women tend to gather less experience than men do. If men and women would have the same amount of experience, women are likely to be paid more than men do. In the study of Blau & Kahn (2016) it is found that the difference in work experience, only full-time experience, between men and women is 6.8 years in 1981 and decreases to 1.4 years in 2011. When taking account of all the other variables used in the decomposition, experience is the cause of 21.1% of the gender pay gap in 1980 and 14.1% in 2010.

There are a couple of determinants not elaborated on yet. One other determinant of the difference in earnings could be the motherhood (Blau & Kahn, 2016). There are different reasons for this. A possibility is that women get less training which can only be used at a certain company, because it is expected that they will eventually leave the firm. The reason for quitting a job would be motherhood. Weeden, Cha & Bucca (2016) compare parents with childless people in the labour market. The data they use are the May data for the period 1969-2014 and the Merged Outgoing Rotation Groups data for the period 1979-2014. Methods that are used are OLS, the JMP decomposition method¹ and bivariate trend analysis. One of the things that is found is that the number of men working has decreased, while the number of women working has increased. This is related to paid work. Another result is that there is a larger gap for parents in terms of working long hours, with long hours being more than or equal to 50 hours (Weeden et al., 2016). The same applies to working part-time. Another result is that the wage gap, which is negative, between those who worked part-time and those who worked full-time is consistent between 1984 and about 2005. It decreases after that time period. At the start of the 2000s, working long hours becomes a premium, while it had not been since at least 1984. The difference in earnings decreases for both parents and non-parents in the period 1984-2014 by about 0.20 log points (Weeden et al., 2016). For parents this gap is explained by unobserved

¹ This method assumes that without discrimination, characteristics and its correlations with wages for two groups are the same (Weeden, Cha & Bucca, 2016).

factors for about 83%, while this percentage is about 75% for others. The authors find that differences in the long hours worked enlarge the gender pay gap. Differences in working part-time however, reduce the gender pay gap. Differences in the adjusted earnings per hour for part-time jobs do not change the gender pay gap that much. This result relates to the period 1984-2014. Other results show that mothers tend to earn less, and fathers tend to earn more than their counterparts in terms of gender (Weeden et al., 2016). This gap declines for women and increases for men. Again, this relates to the period 1984-2014. Mothers decrease their part-time work, while men without children tend to increase it. Both positively influence the wages of parents. Overall, the results show that there are indeed differences between being a parent and not being a parent.

Albanesi & Olivetti (2009) have conducted a study about the differences between men and women when it comes to the labour market in combination with spending time at the house. They also look at performance pay. Besides assembling a model, they also perform empirical research. For this, they use two datasets. The first one is Integrated Public Use Microsample of the 2000 Census. In their sample, they only take into account those who work in sales, management and production. They use 16 industries and only take into consideration those who work 30 or more hours each week. Moreover, the sample consists of those that are white only and has more restrictions not mentioned here. They find the difference in wages to be smaller for those that have never been married than for those that are married. Married women have been found to have the highest wages compared to men when they work in the production job category. For those that are not married, production yields the biggest difference in wages. Albanesi & Olivetti (2009) also use the Michigan Panel Study of Income Dynamics to retrieve their data from. These data cover the years in the late 1990s. The sample that is used resembles the sample of the Census data. Because of a different dataset, they are not able to make differences in married and unmarried individuals and still get a representative sample. They find that the smaller the difference in wages is between men and women, the smaller the difference is in the share of performance pay between men and women. They find that the biggest gender pay differences are found in sales and management in some industries. At the same time the gap in the share of performance pay is largest there. They also find that 6% of the gap in wages can be explained by a gap between men and women in performance earnings. This refers to sales and lower management. This number is 21% for banking & finance, and 10% for management. They also find the wage gap to not have something to do with the number of women performing a certain job. Albanesi & Olivetti (2009) also did some research

regarding the differences within marriage. They find that the smaller the difference between men and women is when it comes to spending time at home, the larger the wage gap is. Another finding is that the smaller the gap in spending time at home is, the larger the gap is in performance earnings. This is significant in case these men and women have children, only at a one percent level.

Another factor explaining the gender wage gap could be bargaining (Small, Gelfand, Babcock & Gettman, 2007). Small et al. (2007) study the way in which men and women are willing to negotiate in different settings. They find a significant difference in requesting for a higher payoff, with men more willing to request. They also find that women tend to find bargaining more frightening than asking. In the study of Blau & Kahn (2016) it is also found that unionization accounted for 6.2% of the gender pay gap in 1980 and -1.3% of the gender pay gap in 2010. This shows the fact that over the years men were less likely to be affiliated with a union. The conclusion therefore is that unions do not seem to be explaining the gender pay gap anymore.

After controlling for all these potentially important factors, the lasting existence of wage inequality is typically explained by discrimination (Blau & Kahn, 2016). This is inequality that remains after controlling for characteristics, such as productivity. Blau & Kahn (2016) themselves still found differences in pay, after taking into account several possible causes. They find this gap to be larger in 1980 than in 2010. They also find, by using a decomposition method, the remaining gap to have decreased much less at the 90th percentile compared to the 10th and 50th percentiles. The remaining gap is also smaller at the other two percentiles than it is at the 90th percentile near 2010. A reason for this could be that women face a glass ceiling when they belong to that part of the distribution, i.e. at the 90th percentile.

What can be concluded about the gender pay gap, is that it is difficult to point out the exact reasons of why the wage gap is as it is. One needs to take account of multiple determinants, and it is difficult sometimes to distinguish those determinants from one another. In response to the literature just described about gender differences in earnings, the following hypothesis is set up:

Hypothesis 1: There exists a gender wage gap where women are paid differently than men.

2.4 Gender and mental health

Several studies can also be found on the differences in mental health between men and women. It appears to be the case that in general women deal more often with certain anxiety disorders, like social phobia, than men do (Afifi, 2007). This is also visible when looking at Eurostat (2017) data. It appears that the number of men visiting a psychologist, psychotherapist or psychiatrist in 2014 is 4.2% in the European Union. For women, this number is 6.3%. In West Germany this is 7.7% for men and 11% for women, respectively. This pattern is found for most other European countries as well (Eurostat, 2015). When it comes to antidepressants, there also seems to be a gender difference (National Health and Nutrition Examination Survey, 2011-2014, as described in Pratt, Brody & Gu, 2017). The number of men that use antidepressants in a certain month in the United States in the years 2011-2014 is 8.6%, while this is 16.5% for women.

Bracke (2000) studies gender differences in how a depression endures. It follows from the analysis that there is a big difference between men and women when it comes to this subject, with more lasting consequences for women. For men, education would have a negative effect on the persistence of a depression, while this is not the case for women. Having a job would have a smaller negative effect for women than it would for men. What would play an important role for women is marital status, being divorced for example would have a positive effect on how a depression lasts. The last two findings are without controlling for the degree of depression. One may ask if the gap in mental health between men and women could be reduced. According to the World Health Organization (2016) equal wages belong to one of the things that could decrease the difference in mental health between men and women. This shows that the gender pay gap has a negative impact on the mental health of women.

Overall, it is quite difficult to point out what it is that is causing differences in mental health problems between men and women. It could be that these differences exist because of economic factors, but it could also be that these differences have other causes.

The relationship between the gender pay gap and the gender gap in mental health has remained largely unstudied. What has been researched before, is the effect of discrimination on the mental health of women. A study is conducted about the effects of sexism on certain (mental) health problems of women (Landrine, Klonoff, Gibbs, Manning & Lund, 1995). Landrine et al. (1995) control for types of stress that women have in general. This paper mainly looks at the presence of mental health issues regarding anxiety, depression and the premenstrual

syndrome. To define sexism, Landrine et al. (1995) use the Schedule of Sexist Events (SSE), which also considers inequality at work (Klonoff & Landrine, 1995). It appears that sexism does explain part of the health issues that women have (Landrine et al., 1995). The result however, depends on the status that women have. The influence of discrimination may vary in symptoms, in populations and in the way this influence is calculated.

If it is assumed that the current gender pay gap exists because of discrimination, as discussed in Blau & Kahn (2016), and while considering the findings of Landrine et al. (1995), the following hypothesis can be formulated:

Hypothesis 2: There exists a negative correlation between the gender wage gap and a woman's mental health.

3. Data

3.1 Dataset and variables

The data used for this thesis are from the German Socio-Economic Panel (SOEP). The specific dataset that is used is an assembled dataset abstracted from the SOEP-core dataset, v26. The data are panel data and the assembled dataset consists of information concerning German households, specifically information about the members within (SOEP, n.d.). The variables within the dataset are related to the employment and health of individuals, but there are also some general variables available. The years that are covered in this dataset are the years 1984-2009.

There are three indicators for health included in the sample and used as dependent variables. These variables are life satisfaction, health satisfaction and health. Life satisfaction is assumed to represent the mental health of an individual in this study. Respondents got the opportunity to rate their life satisfaction from 0 to 10, with 0 indicating that life satisfaction is low and 10 indicating that life satisfaction is high. Respondents could also rate their health satisfaction. The options are "not satisfied", "Satisfied", or one of the numbers 2 to 10, with 2 indicating low satisfaction and 10 indicating high satisfaction. Finally, the variable health is also included, which shows how well an individual estimates his or her health. It takes the numerical values 1 to 5, with 1 being "Very good", 2 being "Good", 3 being "Satisfactory", 4 being "Poor" and 5 being "Bad". However, dummy variables are created for these health indicators. The reason for this is that the variables are categorical, while linear regressions are performed. One dummy variable is "contentwithlife", which is equal to 1 when life satisfaction is rated as 7 or higher,

i.e. life satisfaction is high, and equal to 0 otherwise. Another dummy variable is “contentwithhealth”, which is 1 when health satisfaction is rated as 7 or higher, and 0 otherwise. The option “Satisfied” is thus not taken into account, as “Satisfied” cannot be quantified. The last dummy variable for health is “goodhealth”, and is 1 when health is rated with the number 2 or lower, which indicates good health.

Some of the control variables describe general information, other control variables are about the job an individual has. One control variable is the sex of an individual. Age is also included, which takes the numerical values of 168 until 1224. Age is defined in months. Other information taken is the marital status of an individual. Marital status is divided into five categories: married, married but separated, single, divorced and widowed. Also the number of kids that live in a household is included as a control variable. The number of kids ranges from 0 to 10. Year is also taken into account, and after filtering the data the years that are left are 1992 and 1994 to 2009².

There are two control variables for education. One variable for education indicates the lower educational attainment and contains the categories: No educational degree, lower secondary school, intermediate secondary school and upper secondary school degree (Grabka, 2017). The other variable for education indicates the vocational attainment and contains the following categories: No vocational degree, vocational degree and university/technical college. The variable industry is added as an independent variable. There are 63 varying industries in this sample. Examples of industries are the post and telecommunications industry and the air transport industry. Occupation is also included as control variable, and contains the categories blue collar employees, white collar employees, the self-employed and civil servants. An independent variable is added for the number of hours an individual works in one week, which ranges from 0 to 80 hours. Tenure is the length of time an individual has worked within a firm, which is shown in years. The control variable income represents the real net labour income in 2009 euros per month.

The original SOEP dataset is filtered before it is used for this study. First off, all individuals that are self-employed are removed from the dataset. This is done to ensure that they cannot influence their own earnings by starting their own business. Furthermore, individuals for which the job status was either “Unemployed” or “Not Employed” are then removed from the sample. Besides that, individuals that are in the military or doing community service at the time of the

² 1993 is missing because the variable health is not available for that year in the dataset.

questionnaire are also deleted from the sample. The same is done for those who are following vocational training. Individuals that are in the military are removed from the sample, because their job is more likely to influence their mental health and physical health, which is not representative for the whole population. Those doing community service are removed, because they are not paid for their work. Finally, individuals following vocational training are removed, because this might influence their income. Training is also not comparable to a job. Individuals younger than 25 and older than 65 are also excluded from the dataset. The assumption that is made is that individuals are particularly active in the labour market when they are between the ages of 25 and 65. The final sample thus consists of those between the age of 25 and 65 who are employed, and do not work for themselves.

Other small modifications have been made. The income variable is transformed into a log income variable, which is done to get a normal distribution. Also, a new variable is created, which is the square of age. Lastly, observations are removed for which there are missing values for one of the dependent and independent variables. The final sample consists of 128,604 observations, of which 69,975 are men and 58,629 are women.

3.2 Descriptive statistics

Table 1: Sample means			
Variable	Total sample	Men	Women
Sex	1.5 (0.5)	1 (0)	2 (0)
Age (in months)	511 (119)	512 (121)	509 (116)
Age² (in months)	274,789 (123,538)	276,588 (126,666)	272,641 (119,663)
Marital status	2 (1)	2 (1)	2 (1)
Number of kids	1 (1)	1 (1)	1 (1)
Year	2002 (5)	2001 (5)	2002 (5)
Life satisfaction	7 (2)	7 (2)	7 (2)
Health satisfaction	7 (2)	7 (2)	7 (2)
Health	2 (1)	2 (1)	2 (1)
Lower educational attainment	2 (1)	2 (1)	2 (1)
Vocational attainment	1 (1)	1 (1)	1 (1)
Industry	57 (24)	51 (23)	64 (22)
Occupation	2 (1)	2 (1)	2 (1)
Hours (weekly)	39 (12)	44 (9)	33 (12)
Tenure (in years)	11 (10)	12 (10)	10 (9)
Log of net real income (monthly, in 2009 euros)	7.185 (0.642)	7.473 (0.483)	6.842 (0.640)
Net real income (monthly, in 2009 euros)	1582 (973)	1969 (1024)	1121 (660)
Observations	128,604	69,975	58,629
<i>Notes to table: Numbers are based on a SOEP v26 data sample (2010), which consists of men and women between the ages of 25 and 65. Individuals in the sample are paid employees.</i>			

Table 1 shows sample means of variables used in this study. For easy interpretation, the variable net real earnings is also added to the table. The mean age and mean number of kids are about the same for both sexes. The means of life satisfaction, health satisfaction, health and both types of education are also the same for both men and women. There is quite a difference between the mean number of hours work per week, with men working an average of 44 hours and women working an average of 33 hours. The difference in mean length of time that someone has worked within a firm is about 2 years, with men indicating a longer tenure. The mean net real earnings of men is 1969 euros, while the mean earnings of women is 1121 euros. More detailed information on each of the sample variables can be found in Appendix Tables A1-A3. The sample means found for this sample do not seem to be strikingly different from sample means found in other papers. The log of income is 7.09 and 7.75 for women in the study of Hunt (2002), which are measured in two years, while that of men is 7.42 and 7.96 respectively. In the same study, tenure is also comparable, with averages of 12 and 9 years for women and 13 and 8 years for men. The mean number of kids is also 1 in the paper of Platt et al. (2016) as it is in this study. The hours worked per week however are found to be higher for women in the paper of Hunt (2002). There it is measured that women work an average of 40.3 hours per week in 1990, and 40.1 in 1994. This is higher than the average in Table 1.

Table 2: Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Log of income (monthly, in 2009 euros)	1.000														
2. Life satisfaction	0.103	1.000													
3. Health satisfaction	0.042	0.481	1.000												
4. Health	-0.055	-0.399	-0.729	1.000											
5. Sex	-0.489	-0.014	-0.020	0.035	1.000										
6. Age (in months)	0.102	-0.027	-0.189	0.237	-0.012	1.000									
7. Marital Status	-0.015	-0.061	0.025	-0.039	0.071	-0.179	1.000								
8. Number of kids	-0.006	0.019	0.061	-0.067	-0.075	-0.234	-0.272	1.000							
9. Hours worked (weekly)	0.663	-0.032	-0.004	-0.022	-0.454	-0.030	0.074	-0.089	1.000						
10. Industry	-0.090	0.026	0.005	-0.000	-0.279	0.039	0.039	-0.045	-0.144	1.000					
11. Occupation	0.273	0.115	0.049	-0.052	0.106	0.090	0.014	-0.061	0.040	0.381	1.000				
12. Lower educational attainment	0.228	0.061	0.078	-0.109	0.034	-0.103	0.047	-0.000	0.099	0.218	0.412	1.000			
13. Vocational attainment	0.321	0.067	0.047	-0.065	-0.035	0.100	-0.040	0.002	0.176	0.169	0.369	0.518	1.000		
14. Tenure (in years)	0.296	0.052	-0.078	0.111	-0.112	0.516	-0.120	-0.147	0.074	-0.022	0.211	-0.070	0.042	1.000	
15. Year	0.030	0.018	-0.002	0.019	0.050	0.138	0.054	-0.074	-0.038	0.093	0.104	0.158	0.076	0.078	1.000

Notes to table: Numbers are based on a SOEP v26 data sample (2010), which consists of men and women between the ages of 25 and 65. Individuals in the sample are paid employees.

Table 2³ shows the correlations between the different variables in the sample. A large positive correlation is found between vocational attainment and lower educational attainment, which is reasonable as one's vocational attainment depends on one's previous education. Other high, positive correlations can be found between tenure and age, and between lower educational attainment and occupation. Both correlations are not surprising. A big negative correlation is

³ Net real income and age² are not presented in Table 2, as they are not much different from the log of net real income and age.

found between sex and the log of net real income. Sex also seems to negatively correlate with hours worked per week.

3.3 Differences in gender, unconditional on characteristics

In the Appendix, one can find some figures that show the differences between men and women in the sample that are paid employees. Figure 1 shows the difference in life satisfaction. What one can see is that overall there is not much difference in life satisfaction between men and women. This would indicate that the mental health status of men is about the same as the mental health status of women. Women are slightly in the majority at the right end and the left end of the distribution, while men are only in the majority for ratings of 6 to 8, which imply reasonably good to good health. Also in terms of health satisfaction the results are about the same for both males and females (Figure 2). More women choose a grade of 5 or lower, and more men choose a grade of 6 or higher, meaning that more women are not satisfied with their health, and more men than women are satisfied with their health. In Figure 3 one can see that also when it comes to health, no big differences are found. Slightly less men said their health to be satisfactory, poor or bad than women. More men said their health to be good or very good compared to women. The difference is small however. For the monthly log of net real income, Figure 4, the interval is divided into 5 quantiles. This time one can see quite a large difference between men and women, with men being in the majority in the higher part of the distribution, and women being in the majority in the lower part of the distribution. This indicates that men still tend to earn more than women do, without accounting for any of the reasons talked about in the theoretical framework. Lastly, in Figure 5 the differences are shown in terms of hours worked. The distribution of hours is also divided into quantiles, and as one can see yields about the same result as there was with the log of income. Men seem to work more hours than women do, which could already be a reason for the higher earnings found in Figure 4. The graphs show that women are more likely to work part-time, leading to a lower income compared to men.

Figures 6-8 in the Appendix show boxplots for the different health indicators grouped by gender and by the log of real income in quantiles. In Figure 6, which shows the boxplots for life satisfaction, one can see that there is quite a difference in life satisfaction between men and women within the first income quantile. Men seem to more often rate their life satisfaction with a lower rate in the first income quantile. In the second and third income quantiles, no

differences in gender are found. In the fourth quantile it is found that women tend to rate their life satisfaction higher than men do. One can also see that in the fifth quantile the life satisfaction ratings are higher compared to the other, lower quantiles for both men and women. There are quite some outliers overall. In Figure 7 one can find the boxplots for health satisfaction. No big differences are found between men and women. Once again, it seems as if health is rated higher when income is higher as well. There is some difference in gender in the largest income quantile, with the median of health satisfaction being higher for women than for men. Figure 8 shows the boxplots for health. No differences are found in health between men and women in all the income quantiles. This is the same result as is found in Figure 3.

4. Methodology

The analysis is executed in a couple of steps. The first step is performing an OLS regression, which measures the effect of different independent variables on the log of the real net wage in case an individual is a male. The regression estimates the log of net real income for men, controlling for multiple variables. The regression has the following form:

$$(1) Y_{it} = \alpha_0 + \beta X_{it} + \varepsilon_{it} \text{ if male}$$

Y_{it} stands for the log of real net income. The independent variables that are used are: year, hours, industry, occupation, tenure, both variables for education, age, the square of age and marital status. The independent variables are indicated by X_{it} . ε_{it} is the error term.

After the first step, a predict function is used to estimate what the wage should have been if the individual would have been a female instead of a male, using the returns to observables for males. All the returns of the independent variables used in the first regression are thus kept the same. Furthermore, a new variable is introduced, $wagedif$, which measures the difference between what a woman actually earns and what she is supposed to earn according to the predicted function based on the returns for males. In other words; if there exists a gender pay gap which disadvantages women, this value will be negative. If however, women are advantaged compared to men, $wagedif$ will be positive. After the variable for the wage difference is made, it is counted how many of those wage gaps are positive for women and how many of those wage gaps are negative for women. This is done in order to find an answer to the first hypothesis. The next step includes performing three other OLS regressions. They have the following form:

$$(2) Y_{it} = \gamma_0 + \gamma_1 * \ln rnylinc_{it} + \delta X_{it} + \varepsilon_{it} \text{ if female}$$

Y_{it} stands for the dummies for life satisfaction, health satisfaction and health respectively. γ_1 is the coefficient of interest. $\ln rnylinc$ stands for the log of real net earnings per month. X_{it} in regression (2) includes the control variables, which are: year, hours worked per week, age, square of age, marital status, number of kids, both types of education, industry and occupation. The regression form also includes an error term, which is ε_{it} . With these regressions it is tested what the influence is of all the independent variables on the health indicators.

Then again three other regressions are performed, which have the following form:

$$(3) Y_{it} = \zeta_0 + \zeta_1 * \text{plnrnylinc}_{it} + \zeta_2 * \text{wagedif}_{it} + \eta X_{it} + \varepsilon_{it} \text{ if female}$$

The difference between regression (3) and regression (2) is that the log of the real net earnings is replaced by a variable for the predicted log of real net earnings and a variable for the gender pay gap. The coefficients of interest in these regressions are both ζ_1 and ζ_2 . X_{it} includes the same control variables as were used in regression form (2). An error term, ε_{it} , is again included. Y_{it} stands for the dummies of the health indicators.

Finally, the sensitivity of the wage gap on the health indicators is checked by introducing a dummy variable for a positive pay gap as well as a dummy variable for a negative pay gap. These gaps are then included as control variables in three new regressions, with as dependent variable one of the health indicators. Other control variables are: the predicted log of income, year, hours worked per week, age, square of age, marital status, number of kids, both variables of education, industry and occupation.

5. Results

5.1 Existence of gender pay gaps

The first hypothesis formulated for this study is as follows:

Hypothesis 1: There exists a gender wage gap where women are paid differently than men.

To test this hypothesis, it is counted how many times the variable wage difference is positive and how many times the variable wage difference is negative. The variable wage difference

indicates the difference between the log of real net earnings and the predicted log of real net earnings for women. The predicted earnings are based on the earnings of men with the same characteristics. It is found that of a total of 58,629 women, 9662 women experience a positive wage gap and 48,967 women experience a negative wage gap. This is similar to about 84% of the women in the sample earning less than they are supposed, as there is controlled for differences in multiple characteristics between men and women. The first hypothesis cannot be rejected. It is found that gender wage gaps exist, they can be either positive or negative. The majority of the pay gaps however, are negative for women, after controlling for differences in various characteristics. Also, in the study of Platt et al. (2016) both positive and negative wage gaps exist, although with slightly different percentages. About 67% of the gender wage gaps is found to be negative for women, when looking at those dealing with a Major Depressive Disorder, after controlling for differences in certain characteristics. For the Generalized Anxiety Disorder this number is approximately 63%.

5.2 Estimations

The second hypothesis is as follows:

Hypothesis 2: There exists a negative correlation between the gender wage gap and a woman's mental health.

To test the second hypothesis a regression is first performed to estimate the log net earnings of men in the sample. These results can be found in Appendix Table A4. Furthermore, regressions are performed to find correlations between the health indicators and multiple independent variables, of which the results are shown in Table 3⁴. For the first model of life satisfaction, i.e. mental health, multiple associations are found (see "content with life", column 1). A positive correlation is found between the coefficient of interest, the log of net real income, and mental health. Positive correlations are found between all types of employees and being content with one's life. A negative correlation is found between hours worked per week and having a good mental health. Furthermore, a negative association is found between the number of children in a household and mental health. For all types of educational variables positive correlations are found, except for lower secondary school, for which no correlation is found. For the variable

⁴ The year and industry variables are not presented in Table 3 but are included in the regressions performed.

age a negative association is found, while a positive one is found for the square of age. Being married but living separately is negatively associated with indicating one's life as "good". The same goes for being single, divorced and widowed. The second model of mental health does not show that much of a difference compared to the first model of mental health. In the second model both the predicted log of income and the existence of a gender wage gap are positively correlated with having a good mental health (see "content with life", column 2). While a correlation for having a vocational degree is found in the first model (see "content with life", column 1), in the second model this is not the case anymore (see "content with life", column 2). These results are somewhat in accordance with the results of Platt et al. (2016). In that study, women are found to have a higher likelihood of getting Major Depressive Disorder or Generalized Anxiety Disorder in the case of a negative gender wage gap. A positive gender wage gap for women is found to negatively impact the likelihood of getting a Generalized Anxiety Disorder. No significant gender differences are found for Major Depressive Disorder in case of a positive gender wage gap.

The results are slightly different for health satisfaction. In the first model for good health, the log of net real income is positively associated with rating one's health as "good" (see "content with health", column 1). Negative correlations are found for the hours worked per week, age, being married, but separated and being single. Positive correlations are found for the variables white collar employees, civil servants, the number of children in a household, all the variables for education and for the square of age. In the second model, wage difference positively correlates with health satisfaction (see "content with health", column 2). The same correlations are found for variables in the second model of health satisfaction, as are found for the variables in the first model of health satisfaction.

Looking at the first model of good health, the log of net real earnings, which is the coefficient of interest in this case, is found to positively correlate with a good health rating (see "good health", column 1). The number of hours worked per week however, correlates negatively with having a good health. Both age and the square of age are also negatively associated with a good health rating. This is understandable, as older age usually comes with worse health outcomes. Being married but separated is found to have a negative association with good health. Both white collar employees and civil servants are found to positively associate with good health. All educational variables are positively correlated to good health, except for the variable "No educational degree", for which no correlation is found (see "good health", column 1). Positive correlation is also found for being widowed. In the second model of health, wage difference

positively correlates with good health (see “good health”, column 2). The other outcomes of this second model are nearly the same as in the first model, except for the variable square of age, for which now no association is found. Also, being single is now negatively associated with a good health rating, while it is not in the first model of good health (see “good health”, column 2).

Table 3: Gender wage gap and the (mental) health of women

	<u>Content with life</u>		<u>Content with health</u>		<u>Good health</u>	
	(1)	(2)	(1)	(2)	(1)	(2)
Log of net real income (monthly, in 2009 euros)	.091*** (.005)		.039*** (.005)		.039*** (.005)	
Predicted log of income (monthly, in 2009 euros)		.226*** (.024)		.015 (.025)		-.022 (.026)
Wage difference (monthly, in 2009 euros)		.085*** (.005)		.040*** (.005)		.042*** (.005)
Hours worked (weekly)	-.005*** (.000)	-.008*** (.000)	-.003*** (.000)	-.003*** (.000)	-.003*** (.000)	-.002*** (.000)
White collar employees	.084*** (.006)	.051*** (.008)	.071*** (.006)	.076*** (.008)	.064*** (.006)	.079*** (.008)
Civil servants	.154*** (.010)	.086*** (.015)	.102*** (.011)	.114*** (.017)	.075*** (.011)	.107*** (.017)
Number of children	-.005* (.003)	-.004* (.003)	.007*** (.003)	.007*** (.003)	.005* (.003)	.005* (.003)
No educational degree	.036*** (.012)	.038*** (.012)	.028** (.013)	.028** (.013)	.011 (.013)	.010 (.013)
Lower secondary school	.005 (.012)	.015 (.012)	.047*** (.013)	.045*** (.013)	.048*** (.013)	.044*** (.013)
Intermediate secondary school	.041*** (.013)	.039*** (.013)	.058*** (.013)	.059*** (.013)	.038*** (.013)	.039*** (.013)
No vocational degree	.026*** (.007)	.020*** (.007)	.024*** (.007)	.025*** (.007)	.029*** (.007)	.032*** (.007)
Vocational degree	.020** (.009)	-.008 (.010)	.056*** (.009)	.060*** (.010)	.084*** (.009)	.096*** (.010)
Age (in months)	-.002*** (.000)	-.002*** (.000)	-.001*** (.000)	-.001*** (.000)	-.001*** (.000)	-.001*** (.000)
Age ² (in months)	.000*** (.000)	.000*** (.000)	.000*** (.000)	.000*** (.000)	-.000** (.000)	-.000 (.000)
Married, but separated	-.130*** (.013)	-.117*** (.013)	-.030** (.013)	-.032** (.013)	-.029** (.013)	-.035*** (.013)
Single	-.059*** (.006)	-.030*** (.008)	-.014** (.006)	-.019** (.008)	-.010 (.007)	-.023*** (.009)
Divorced	-.074*** (.007)	-.055*** (.007)	.003 (.007)	.000 (.008)	.006 (.007)	-.002 (.008)
Widowed	-.078*** (.013)	-.063*** (.013)	.006 (.013)	.003 (.013)	.034** (.013)	.027** (.013)
Constant term	.619*** (.050)	-.096 (.133)	.872*** (.052)	.997*** (.141)	.865*** (.053)	1.190*** (.143)
Observations	58,629	58,629	58,629	58,629	58,629	58,629
R-squared	.042	.043	.044	.044	.063	.063

Notes to table: Output linear regressions. Numbers are based on a SOEP v26 data sample (2010), which consists of men and women between the ages of 25 and 65. Individuals in the sample are paid employees.

**** p<0.01, **p<0.05, *p<0.10*

5.3 Sensitivity

To measure sensitivity, regressions are performed that include variables for a positive gender pay gap and a negative gender pay gap. The results of these regression can be found in Table 4⁵. Both gaps seem to correlate with good life satisfaction ratings, good health satisfaction ratings and good health ratings. A positive gap is positively correlated with the health indicators, while a negative gap is negatively correlated with the health indicators. A positive pay gap is found to be slightly more positively associated with the health indicators, than a negative pay gap is associated negatively with the health indicators. The overall conclusion is that a positive gender pay gap does not appear to be significantly different from a negative gender pay gap.

	<u>Content with life</u>	<u>Content with health</u>	<u>Good health</u>
Predicted log of net real income (monthly, in 2009 euros)	.231*** (.024)	.020 (.025)	-.017 (.026)
Positive pay gap (monthly, in 2009 euros)	.232*** (.019)	.162*** (.022)	.169*** (.023)
Negative pay gap (monthly, in 2009 euros)	-.066*** (.006)	-.024*** (.006)	-.026*** (.006)
Constant term	-.143 (.133)	.958*** (.141)	1.149*** (.144)
Observations	58,629	58,629	58,629
R-squared	.043	.044	.063

Notes to table: Output linear regressions of the sensitivity analysis. Numbers are based on a SOEP v26 data sample (2010), which consists of men and women between the ages of 25 and 65. Individuals in the sample are paid employees.

**** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$*

As is seen in the results, a significant correlation is found between the existence of wage differences between men and women and women having a good mental health. This correlation is negative for a negative gender pay gap. Therefore, the second hypothesis, which states that

⁵ The other independent variables are not presented in Table 4 but are included in the regression performed.

there is a negative correlation between the gender wage gap and a woman's mental health, is not rejected. The existence of a positive gender wage gap however, is associated with having a good mental health. Associations are also found for the gender pay gap and health satisfaction, and for the gender wage gap and having good health. Both health indicators are positively associated with a gender wage gap in case of a positive wage gap, and negatively associated with a gender wage gap in case of a negative wage gap. From the sensitivity analysis one can conclude that there is no significant difference in associations between a positive gender wage gap and a negative gender wage gap.

6. Discussion

Despite finding some significant results, a couple of caveats should be taken account of when interpreting the results. Firstly, the regressions that are performed for the health variables all have an R-squared of below the 10%. This indicates that the models explain very little of what initiates changes in health status. That the models do not have a higher R-squared is reasonable, as account is only taken of job variables and some variables that contain general information about observations. Other important indicators for (mental) health are left out of this study such as whether an individual smokes, drinks, is in a good marriage or relationship and much more. Another very important factor that is not included in the regressions is whether an observation is actually dealing with an illness.

Endogeneity could also be an issue. This caveat is somewhat related to what is mentioned about the R-squared. It could be that the model suffers from omitted variable bias. Because of the exclusion of many variables, it is possible that one of the independent variables used in the models is correlated with the error term besides being correlated with the dependent variable. This would mean that the effects that are found now are biased. It is likely that there is an upward bias and that the correlation found between a gender wage gap and mental health is overrated. A physical illness for example, could negatively influence both mental health and the hours that someone works per week. That is why the findings of this study can only be perceived as correlations, and not as causal effects.

Another endogeneity issue is the possibility of reversed causality. What is studied now is whether there exists a correlation between gender wage gaps and mental health, letting mental health be the dependent variable in the regressions. However, it could also be the case that in reality, the gender wage gap should be seen as the dependent variable and mental health as one

of the independent variables. As is spoken of Chapter 2.4, differences seem to exist between men and women regarding mental health, with women having worse mental health outcomes. It could be that because of these dissimilarities in mental health, some women already start off with worse mental health compared to men. These mental health problems could influence women's productivity, leading to lower wages compared to men. The assumption made in this study however, is that the productivity of the men and women that are compared is the same.

Another assumption made in this study is that when a gender wage gap exists, women are fully informed about this. However, it is very likely that women do not know that their male counterparts are earning more for the same job than they themselves do. This would mean that a correlation of the gender wage gap with (mental) health is measured in this study, which would only exist if women are really aware of the gender pay gap.

The final caveat of this study has to do with the sample. The data used for this research are not very recent. This does not necessarily need to be a problem, but the numbers could change a little when using more recent data. A reason for this could for example be that wage inequality has become much more of a public topic, making women nowadays more informed about the gender pay gap. This higher awareness could influence the way women feel about this gap, i.e. it might stimulate more negative feelings.

7. Conclusion

The research question of this study is as follows:

“What is the effect of a wage gap on the mental health of women in Germany?”

The results of this study show that a wage gap is correlated with the mental health of women in Germany. A positive wage gap is positively correlated with the mental health of women, and in the same way a negative wage gap is negatively correlated with the mental health of women. No significant differences are found between positive and negative wage gaps. The same associations are found for the health satisfaction and the health status of women in Germany. This means that a gender wage gap might not only lead to wage inequality but could also lead to (mental) health problems for women. This is an important reason to

advocate for equal wages, provided that characteristics, including productivity, between men and women are the same.

However, this conclusion is still quite general. An idea for future research would therefore be to include more specific data on certain health issues. It would be interesting to know what the effect is of a gender pay gap on different mental health illnesses. Also, more recent data can be used, and the population sample could be from another part in the world, to see whether this conclusion is externally valid.

Although one cannot speak of causal effects based on the results of this analysis, thought can be given to policy implications. An important factor of combating the gender wage gap is transitivity. One solution could be to make it possible for both men and women to compare their own wages to those of others, keeping in mind that both should have the same characteristics. This is somewhat the same idea as the one discussed in the article of the Financial Times (2018). Another idea would be to introduce an independent institution that keeps an eye on unnecessary wage differences. This could be difficult however, as for comparing individuals a lot of information is needed.

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Appendix

Table A1: Descriptive statistics men and women					
Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum
Sex	128,604	1.5	0.5	1	2
Age (in months)	128,604	511	119	300	780
Age² (in months)	128,604	274,789	123,538	90,000	608,400
Marital status	128,604	2	1	1	5
Number of kids	128,604	1	1	0	10
Year	128,604	2002	5	1992	2003
Life satisfaction	128,604	7	2	0	10
Health satisfaction	128,604	7	2	0	10
Health	128,604	2	1	1	5
Lower educational attainment	128,604	2	1	0	3
Vocational attainment	128,604	1	1	0	2
Industry	128,604	57	24	1	100
Occupation	128,604	2	1	1	4
Hours (weekly)	128,604	39	12	0	80
Tenure (in years)	128,604	11	10	0	51
Log of net real income (monthly, in 2009 euros)	128,604	7.185	0.642	1.386	10.064
Net real income (monthly, in 2009 euros)	128,604	1582	973	4	23,490
<i>Notes to table: Numbers are based on a SOEP data sample, which consists of men and women between the ages of 25 and 65. Individuals in the sample are paid employees.</i>					

Table A2: Descriptive statistics men

Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum
Sex	69,975	1	0	1	1
Age (in months)	69,975	512	121	300	780
Age² (in months)	69,975	276,588	126,666	90,000	608,400
Marital status	69,975	2	1	1	5
Number of kids	69,975	1	1	0	10
Year	69,975	2001	5	1992	2009
Life satisfaction	69,975	7	2	0	10
Health satisfaction	69,975	7	2	0	10
Health	69,975	2	1	1	5
Lower educational attainment	69,975	2	1	0	3
Vocational attainment	69,975	1	1	0	2
Industry	69,975	51	23	1	100
Occupation	69,975	2	1	1	4
Hours (weekly)	69,975	44	9	0	80
Tenure (in years)	69,975	12	10	0	51
Log of net real income (monthly, in 2009 euros)	69,975	7.473	0.483	2.571	10.064
Net real income (monthly, in 2009 euros)	69,975	1969	1024	13	23,490

Notes to table: Numbers are based on a SOEP v26 data sample (2010), which consists of men and women between the ages of 25 and 65. Individuals in the sample are paid employees.

Table A3: Descriptive statistics women					
Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum
Sex	58,629	2	0	2	2
Age (in months)	58,629	509	116	300	780
Age² (in months)	58,629	272,641	119,663	90.000	608,400
Marital status	58,629	2	1	1	5
Number of kids	58,629	1	1	0	6
Year	58,629	2002	5	1992	2009
Life satisfaction	58,629	7	2	0	10
Health satisfaction	58,629	7	2	0	10
Health	58,629	2	1	1	5
Lower educational attainment	58,629	2	1	0	3
Vocational attainment	58,629	1	1	0	2
Industry	58,629	64	22	1	100
Occupation	58,629	2	1	1	4
Hours (weekly)	58,629	33	12	0	80
Tenure (in years)	58,629	10	9	0	47
Log of net real income (monthly, in 2009 euros)	58,629	6.842	0.640	1.386	9.836
Net real income (monthly, in 2009 euros)	58,629	1121	660	4	18,692
<i>Notes to table: Numbers are based on a SOEP v26 data sample (2010), which consists of men and women between the ages of 25 and 65. Individuals in the sample are paid employees.</i>					

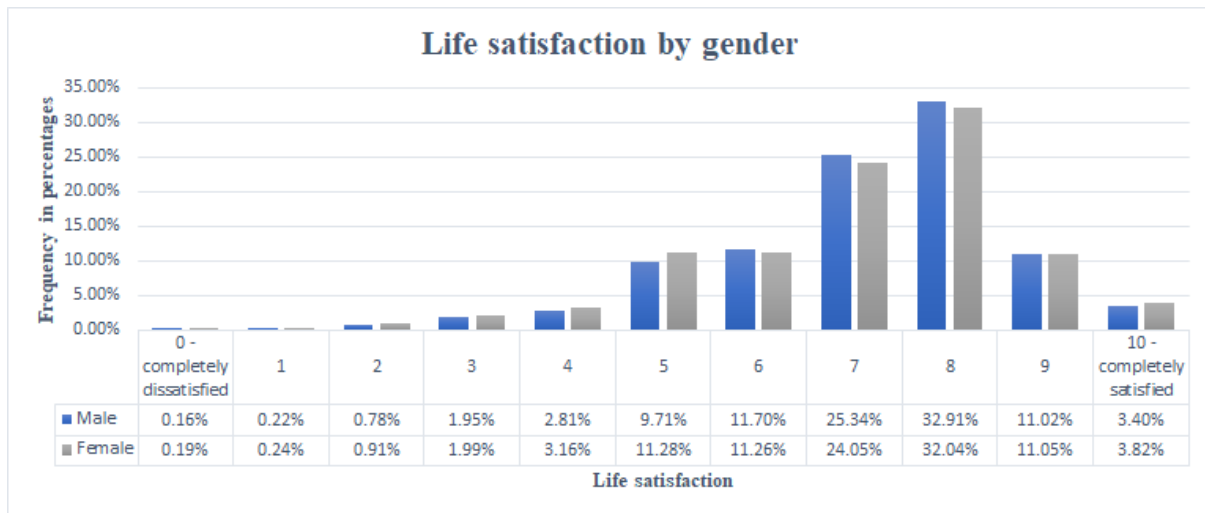


Figure 1: Life satisfaction by gender, based on SOEP v26 data sample (2010).

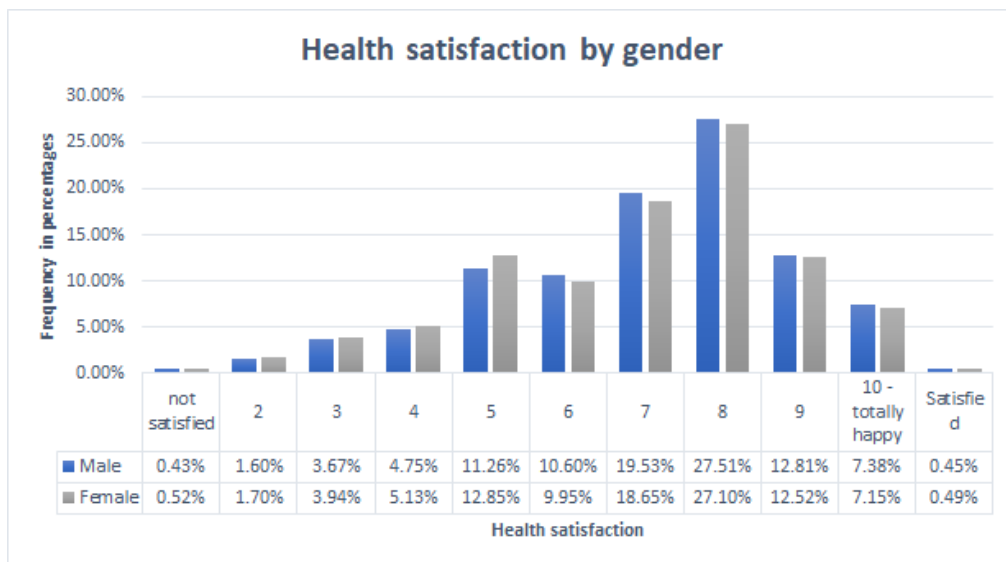


Figure 2: Health satisfaction by gender, based on SOEP v26 data sample (2010).

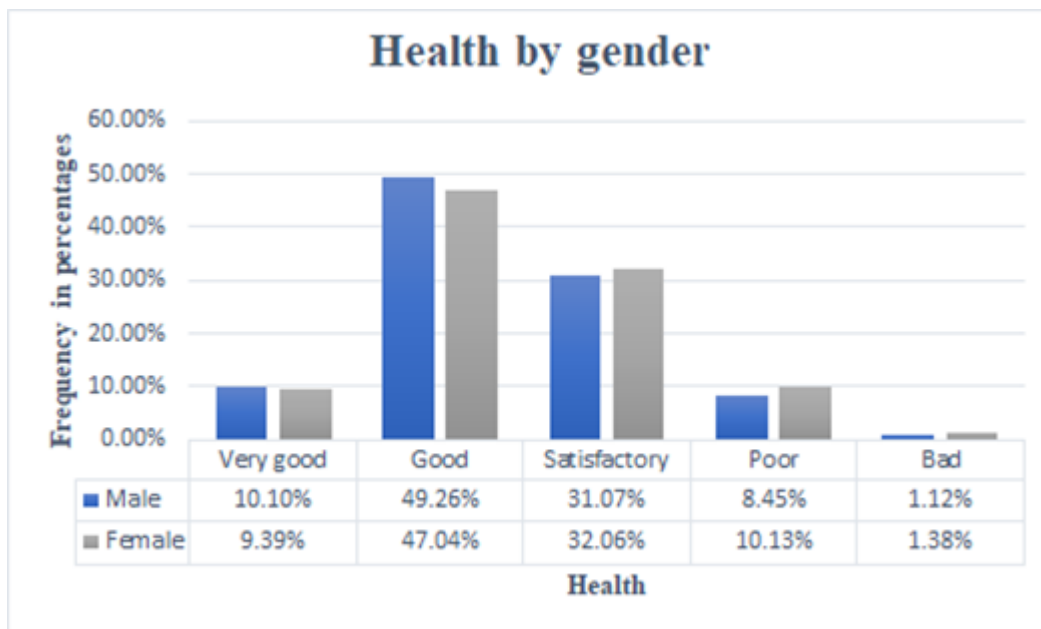


Figure 3: Health by gender, based on SOEP v26 data sample (2010).

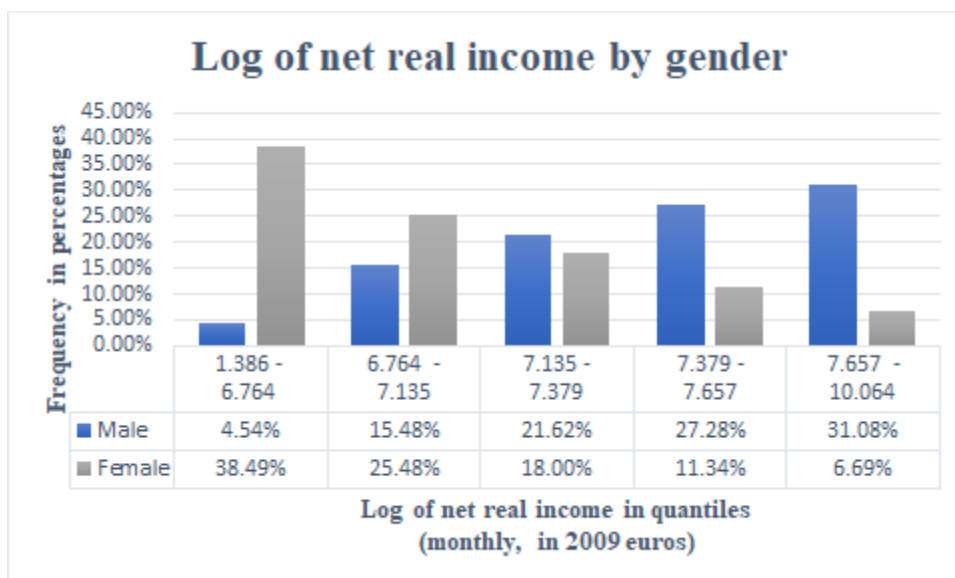


Figure 4: Log of net real income by gender (monthly, in 2009 euros), based on SOEP v26 data sample (2010).

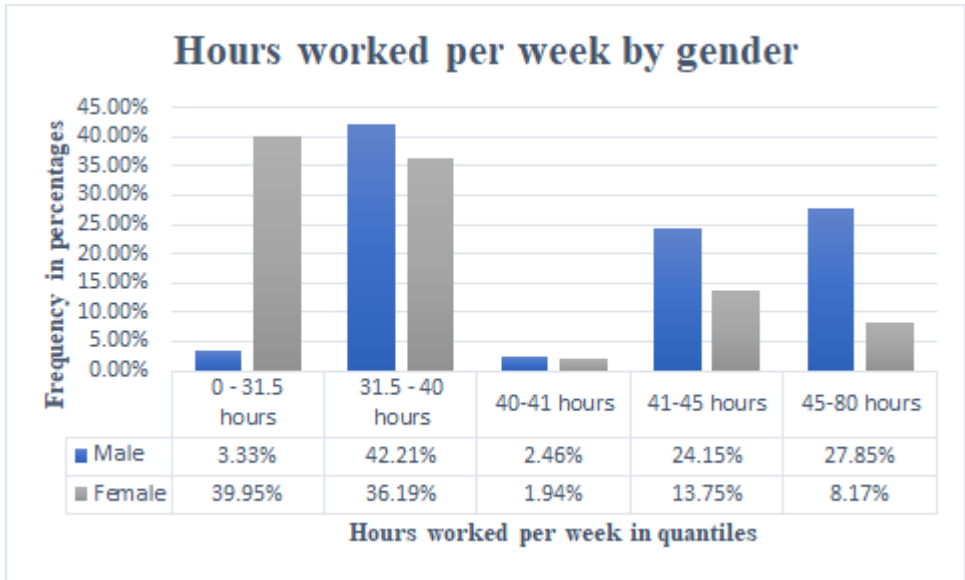


Figure 5: Hours worked per week by gender, based on SOEP v26 data sample (2010).

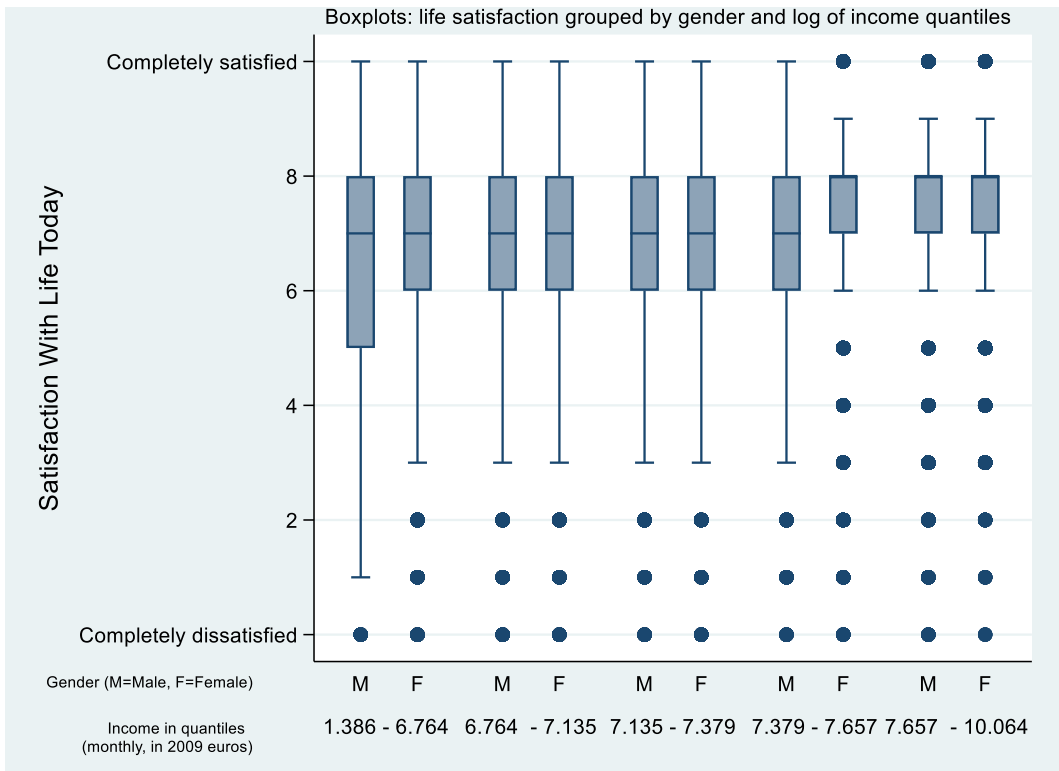


Figure 6: Boxplots of life satisfaction grouped by gender and by log of income quantiles, based on SOEP v26 data sample (2010).

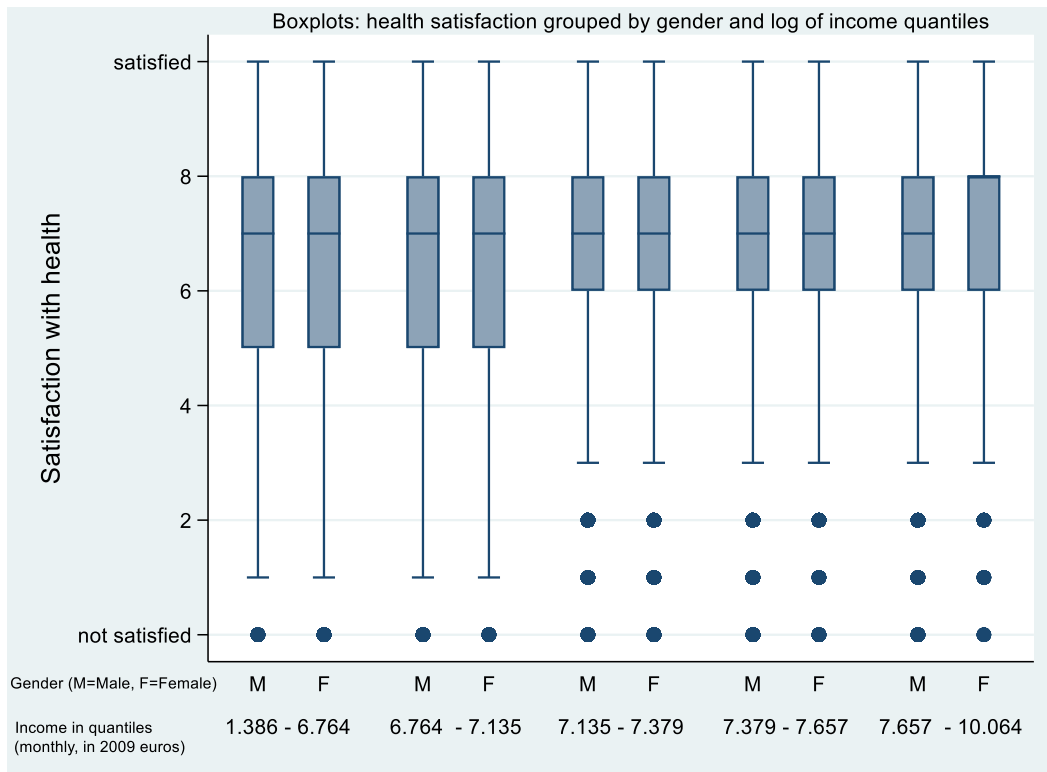


Figure 7: Boxplots of health satisfaction grouped by gender and by log of income quantiles, based on SOEP v26 data sample (2010).

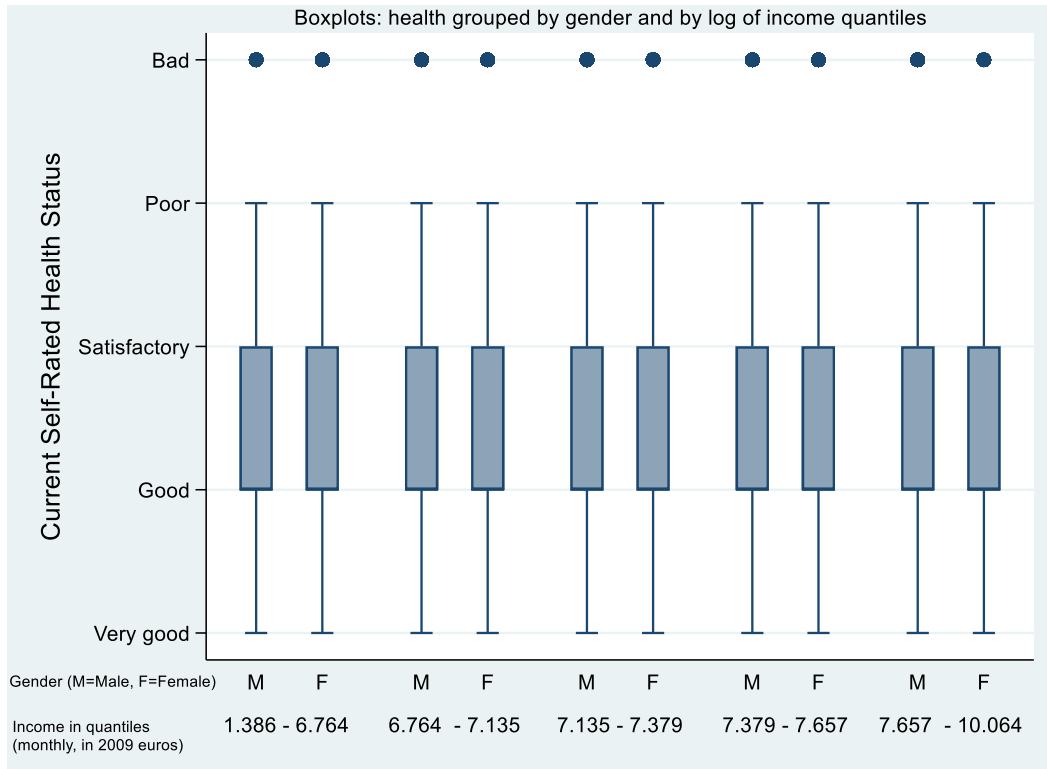


Figure 8: Boxplots of health grouped by gender and by log of income quantiles, based on SOEP v26 data sample (2010).

Table A4: Income estimation men			
	<u>Log of net real income (monthly, in 2009 euros)</u>		<u>Log of net real income (monthly, in 2009 euros)</u>
Hours worked (weekly)	.017*** (.000)	Year 2007	.090*** (.009)
White collar employees	.218*** (.004)	Year 2008	.084*** (.009)
Civil servants	.434*** (.007)	Year 2009	.081*** (.009)
Tenure (in years)	.011*** (.000)	No educational degree	-.010 (.007)
Year 1994	.067*** (.009)	Lower secondary school	-.073*** (.008)
Year 1995	.068*** (.009)	Intermediate secondary school	.040*** (.008)
Year 1996	.081*** (.009)	No vocational degree	.045*** (.005)
Year 1997	.055*** (.009)	Vocational degree	.209*** (.007)
Year 1998	.058*** (.009)	Age (in months)	.003*** (.000)
Year 1999	.075*** (.009)	Age² (in months)	.000*** (.000)
Year 2000	.081*** (.008)	Married, but separated	-.071*** (.010)
Year 2001	.087*** (.008)	Single	-.202*** (.004)
Year 2002	.144*** (.008)	Divorced	-.114*** (.005)
Year 2003	.151*** (.008)	Widowed	-.098*** (.022)
Year 2004	.144*** (.009)	Constant term	5.355*** (.036)
Year 2005	.139*** (.009)	Observations	69,975
Year 2006	.120*** (.009)	R-squared	.465

Notes to table: Linear regression output of income estimation for men.⁶ Numbers are based on a SOEP v26 data sample (2010), which consists of men and women between the ages of 25 and 65. Individuals in the sample are paid employees.

**** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$*

⁶ The industry variables are not presented in Table A4 but are included in the regression performed.