THE EFFECT OF OVERWORKING ON HEALTH IN TRANSITION COUNTRIES

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Abstract

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The optimal number of working hours is an indubitably enticing item for economists due to its effect on productivity and consequently on economic growth and development. We studied how human capital could be affected by utilizing health-related indicators of economic agents. The innovative approach and findings of this paper present a case that overworking has a negative effect on health of laborers. It has never been done before for transition countries, as the only particular developed countries fell under the study in most of the previous research we could find.

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GLOSSARY

Overworking. A situation when an individual works too long (as well as too hard or too much) i. e. beyond specific normal or optimal level.

SAH. Self-assessed health. Generalized rating of self-health usually along a scale of four or five points grading from of "Poor" to "Excellent" equivalents.

SEH. Self-estimated health. The same as SAH

SRH. Self-rated health, self-reported health. The same as SAH

SPH. Self-perceived health. The same as SAH

OECD. The Organisation for Economic Co-operation and Development

EU. European Union.

EBRD. European Bank for Reconstruction and Development

LITS III. The third wave of Life in Transition Survey

SOEP. German Socio-Economic Panel Survey

ESPS. French Enquête Santé et Protection Sociale Survey

WERS98. UK Workplace Employee Relations Survey

NPHS. Canadian National Population Health Survey

Chapter 1

INTRODUCTION

Since sustainable growth is the critical objective for any economy, people who maintain it should always think about a proper use and accumulation of human and physical capital. Significant changes in policies and work regulations were taken into action being heavily driven by preserving health of workers to reach the most efficient economic model at both firm and country levels. Comprehensive understanding need for long or short lasting working timetable is obvious and did not decrease from the times of "workweek" and "holidays" words appearance, and became especially hot topic altogether with unions establishment. Neoteric "yellow vests" protests followers' and recently strengthened populistic movement supporters', as described by Lichfield (2018) and Kyle and Gultchin (2018) correspondently, references to slogans about underpaid excessive work and bad health consequences – quite an evidential example of importance and interest grade of the topic for the humanity.

A significant amount of research was done dealing with working conditions and its impact on health Burgard, and Lin (2013). Whereas longevity in most parts of the world has been increasing for decades and even centuries (20th century has accommodated extremely intensive progress) (Figure 3) doubled for some 150 years in sundry regions of the globe, at the same time a working schedule seems to have unrelated dynamics (Figure 4). As can be seen, among OECD countries, which is just about a quarter of the world's countries the curves are mismatching. Most rates were decreasing until 1980s and 1990s and slowing down thereafter, but actual starting points are of a multifarious time: some a few out of an organization started to loosen the working hours burden in the late 90s and after the millennia of 2000. The latest indeces show us dissimilarity of telling size being less than 1400 hours per worker in

minimum and almost 2300 at maximum points. To add more, increased years of life means different distribution between active living activity and harder enduring under variety of disabilities, diseases and difficulties (Figure 5).

Nevertheless, the evidence of negative effects of abnormally long working time remains just partially revealed, since studies were published affirm only that specific disadvantageous effects (for instance, stress), which were in the center of interest from the very beginning and that is plausible that there were present framing outgrowth. It would advert to risky choices, attribution, and goal framing (Krishnamurthy, Carter, and Blair 2001) in health decisions. In continuation of our conversation we shouldn't disregard the fact posted by Froberg, and Kane (1989) that "medical knowledge and/or experience with illness may influence raters' valuations of health states". Similarly, the optimum workweek is not really known and the average number of time spent at work varies indicatively from country to country. Therefore, more effective policies regarding working activity could be implemented if the light on possible relationship of working hours number and health to be shed. First of all, we will try to support the hypothesis about the presence of aforementioned liaison.

Cygan-Rehm and Wunder (2018) are among those, who found some evidence of detrimental effect of overworking and connected it with constrains in week organizing in Germany. Analogous results were obtained by Berniell and Bietenbeck (2017) for France. Versatile surveys and et seq. findings and recommendations are published regularly for the United States of America and Canada (Luo at el 2005). We have been meaning to try and see the larger picture then ever before doing research for representatives from both developed and transitional groups, not just within one country. We expect to isolate a negative impact of overworking (Cygan-Rehm and Wunder (2018) understood it as more hours than the average or statutory number for a country, while we expand the determination to 3 specifications), and even more, to find that it is of somewhat different power for mature and emerging

economies. In the end, comparing the conclusions we want to answer the primary question: "How big is the impact of adding more hours to already established workweek on a country workers' health?". There were splendid research calculating health, specifically self-rated one, but the direct effect of a long-term workweek was not in focus ever. On the other hand, this impact was in-depth examined, but only for distinct, mostly developed, countries. This paper should contribute to both previous investigations covering transition and developed countries and its specifics considering the impact of protracted workweek on self-reported health.

The thesis is structured in the following order: the next chapter contains the literature description on linkage between health and working hours; Chapter 3 includes the methodology of the analysis and models specifications; Chapter 4 describes the data sources and issues; Chapter 5 reports the main results; Chapter 6 underlines all findings and postulates ideas for future research works.

Chapter 2

LITERATURE REVIEW

The massive research on health begins one way: understanding of how to measure this abstract category condition. Following International Health Conference held in New York, signed on 22 July 1946 "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." WHO (1946). While some researchers found some limitations of the well-known definition as Huber (2011) did, some publications investing an additional meaning into the subject claiming that it is less as an abstract state, but rather means to a productive life WHO (1998) and promoting healthy lifestyle. If we are more straightforward and results-oriented then we would clearly observe its composition and possible tools and approaches to operate it, make correct conclusions and application recommendations. How quickly health fundamentals change, what is the occasionality of its reasonable measurement, and how precise could we feel it, how legitimate other individuals' beliefs or judgments regarding us? We explored current mostly used designs, which capture this physical/mental wellness to find the most optimal among them. At the same time, the purpose is to be in line with other researchers' terms and elucidations so that the ensuing results would be easily refinable and applicable further. Bearing in mind not just above-named factors, but also available datasets with its own vantages and shortcomings, we would stop at those in the class of extent literature, which are the most suitable due to its austerity and informativeness.

2.1. Health measurement methods

It is the healthcare market where demand on health-related issues meets supply. Though features of this economic subject are much more complicated

comparing to the traditional economics' markets (for instance, buyers i. e. patients are not always good judges of what they could receive from sellers: doctors, nurses etc.), there is a need to provide three primary-mentioned services: a) the illnesses cure or suffering alleviation, principally with biomedical intervention; b) prophylaxis and set of biomedical interference means for diseases prevention; c) providing people with moderation to interpret risks and senses of possible or present sickness. On this basis, health measurement has been developing the most active way by health frames construction to put in order operational needs of healthcare system laborers. As an illustration, to get the difference between the health status of persons and population or to set apart objective and subjective indicators of health.

As mentioned earlier, more practice-oriented incentives to deal with health identification and composure, direct linkage would be connected with healthcare regulations, programs and outlines produced by healthcare services operators and firms. We would bring into discussion some international, governmental organizations' and local clinics' and hospitals' terminologies plans, and experiences. As several bullet points were or would be given in other parts of the thesis, the classification for the purposes of clinicians and techniques with medical tools were written by Blackwood, and Bindra (2009) offers blueprint where those institutions' views are displayed broadly enough.

The general partition gives us three sorts of measurement of diseases due to their visibility and detectability, especially important when some similarities between illnesses are possible and could be often met. There are issues of different understanding of the same ailment not just in different countries and territories regarding their well-being and scarcity of resources, but even between different personalities and schools. The list is as follows

- Signs: normal ranges for these ones vary by weight, gender, age etc. Mostly used are four "vital signs". There are breathing rate, heart rate, body temperature, and blood pressure. However, there are two more, introduced by Logical Observation Identifiers Names (LOIC) and

may refer to, for instance, pain or menstrual cycle as "fifth" one and delirium or gait speed for the "sixth". A way more stretching list embodies X-ray imaging, tumour size recognition and other related features, which only in the complex set would fit and do the puzzle

- Symptoms: sets of paragraphs descripting specific to each disease manifestations. An usual practice is marking this checklist and if coincidence reaching the threshold level (oftentimes fluctuating around 75%) suspicions turn into further procedures related to treatment algorithms. The otherness of symptoms is that it is noticeable by the patients and most often they are the first to react on that (signs are those easier to recognize by the doctors). Still, these two types of measurement and breaks in normal function detection could be evident by all sides and named as both symptoms and signs

- Comorbidity: it is more rooted and profound thing. There is always a primary condition of interest resulted out of previously detected illness symptoms and signs. But thousands of diseases and their interactions lead to the need of describing all other conditions concomitant or concurrent with dominant one individual patient might have. This goes to severity of either disease itself or functional passing (known as "Charlson Index", index of co-existing disease). Adversity of events like readmission, bleeding etc. described in Clavien-Dindo Classification of Surgical Complications. We could simply state that those terms like pain, and complications could be used to mention the product of opposite and/or almost the same locations' traumas and encumbering organ functioning

All of those different local interpretations perplex and bewilder more and more confusing exercising of intrinsic health-understanding questions; diseases causes and consequences; treatments, trainings requirements. Owing to all of that, World Health Organization (2019) reprocessed a handful of classification systems, which all approach orderings of health measuring from

different perspectives. Therebetween are wellbeing, functioning indices, perceived quality of life, disabilities aspects assessment. To add more examples of standardization, we would name primary care case, the one developed by Dartmouth Cooperative Information Project Group of World Organization of National Colleges, Academies and Academic Associations of General Practitioners/Family Physicians - (COOP)/Wonca. The intended goal is more detailed patient's functional status assessment. Through cultural environments and social settings verification the survey conductor gathers awareness of the perceived health by individuals. We could see some similarities with SPH methodology here. To continue with, these charts propose six different health dimensions. The drawings, accompanied by easy to understand due to its cartoon style formalizations, continues the main tendency to be simpler to be equally treated by both sides of the interviews. Here it is achieved via scaling from 1 to 5 (again, we will see that SAH bring absolutely the same) the ability to perform general daily life activities. Nonetheless, instruments are still limited hardly dealing with dynamics of the reaction and perception by humans. Along with the indication of capacity to cope with problems and to adapt to shocks, and registration of the power of physiological and psychological resilience, the insights would be much more informative.

There is always greater efficiency of existing measures usage, those, which are adopted in season and out of season, tested and become standardized rather than attempts of inventing a new one. It is very unlikely that dataset with all that specific medical information is available for transition economies or at least for the groups of developed countries with the same standardized surveying, where relevant information about working hours also included and not yet known to us. For a sake of proven reliability, validity and responsiveness, we would go to the one, which unites plainness and workability.

2.2. Measurement of health via SAH

The first link in the chain among the most popular and widely used instruments of measurement of health in economics scientific community is self-rated health (SRH). Altman, Van Hook, and Hillemeier (2016) paper goes into detailed discussion of the subject. It includes a good description of the previous experience of incorporating the index into research and the related issues. Mainly they have not dramatically changed till present after decades of extensive use in theoretical and empirical studies, therefore we will pay attention to them as well. They observed that obesity indication is affected by different components, such as the information about diseases and availability of resources to manage it in the society. This could lead us to new postulates about the difference between developed countries and the transition ones regarding working hours effect on health. Such approach is common for logics behind all incorporate pros of generally distributed methods prepared by those who are the most interested in macro data processing for the call "to promote health, keep the world safe, and serve the vulnerable" (WHO, 2019) – organizations like WHO working worldwide.

Since we decided that SPH serves our general intention validly as a popular and informative instrument, we should find the best application of it.

2.3. The models dealing with SEH as dependent variable for transition countries

(Obrizan 2018) is probably the most recent paper estimating the transition gap in self-rated health. The dataset includes 241,698 observations from the World Values Survey and the European Values Study within the period of 1989 - 2014. The author showed that the process of transition is very far from being called finished. Another finding is that developed countries self-rated health predictive of mortality and onset of disability, which is undoubtedly important in their own way. But what we should pay special attention to is

that transition countries showed much lower levels of SRH than either developed or developing countries. There were mentioned two aspects to achieve the proper level of vision of the gap and absence of the possible ways to overcome it: suggestions involve economic reasons on one side, and psychological on another. There are a few effective things, which we can make use out of it. The first is the techniques of measurement of health. The second is uncovered specifics of transition countries while dealing with them. The third is the most recent transition-countries-related data processing of a high academic standard. The last but not the least, is the list of factors, which were proven to be significant on the data of three separated periods of transition. They are the following:

- Very significant variables describing objective factors: dummy for transition country; age and age squared, which were both of a very good level of p-value; female control for gender
- Significant variables, which could be characterized as those controlling mental health aspect or any other condition (especially, related to other members of society) assessment: being separated, widowed, status of becoming retired. More apparent are "Most people can be trusted" and "Subjective income on 1–10 scale" responses
- Variables, whose gravity was lower or appeared only for certain models or transition specifications. Those stop on some settled forms of social opinion: marriage status - living together as married, divorced; employment status - part-time employee, unemployed, housewife, student; health expenditure stays to some extent separately in this row

We would find ourselves on a very similar ground, because the dataset of our research will mention most of them. Those ones haven't been included into many cases related to more or less straightforward way (for example, total

income, as we did, and subjective income on 1–10 scale as professor Obrizan did earlier). Regarding the models, which could cover the needs related to the goal of this research, I should say that high significance of our variables could be perceived as a very good initial step. Ensuing rigorous analysis could implement probit estimations. Our next publications proposed by us aim at understanding a possible causal effect of working hours and health outcomes variation for economies of a different scale.

2.4. Findings about factors affecting health conditions

From the very beginning, we should mention the fact that only developed countries have very well collected datasets e. g. United Kingdom (Figure 1), while transition ones suffer from lack of research. Bryan (2004) concentrates on dissimilarity of both firms and workers employed. Workplace Employee Relations Survey (WERS98) with collected data among British firms was used for analysis. Third part of variation could be explained with differences between firms (gap between 25th percentile – of working the shortest hours, and fourth quartile - the longest, is about 6 hours per week). Another third part is associated with productivity- and family-related personal characteristics connected to individual's preferences (especially noteworthy for women with children: 6 hours per week). The final third part of the variance induced by a combination of firms and individual attributes. Scientist perceived that as evidence of labor market imperfect competition with barriers for mobility and recommended changes towards more diverse working arrangements within the firm. As a result, we should keep in mind the constitution of explained variance and control for enlisted reasons. Additionally, the competition at the transition markets is likely to be less grown therefore market imperfections could stay behind variant power of overworking effect in transition countries.

Shields (1999) presents the Canadian research about possible implementation of Karoshi model referred to lasting workweek. Growing number of cases of

deaths from cardiovascular diseases at most productive age in Japan led to questioning the effect of overworking. Data were taken from cycles of National Population Health Survey (NPHS) of 1994-1997. We can find a reasonable explanation by focusing on people aged 25-54 as well as defining overworking as 41 or more hours per week. Results displayed increasing peril of unhealthy behaviors: cigarettes and alcohol consumption, weight gain and depression of a different grade for men and women. These are among key factors, which will be in our model likewise.

Berniell and Bietenbeck (2017) is a recent publication questioning causality effect of working time on health. The unique case of French reform in 1998, which shortened statutory workweek from 39 to 35 hours, was analyzed. It is conceivably exogenous to workers' health due to its declarative nature. Furthermore, it represents decreased number of hours dedicated to work occurrence. Enquete sur la Sant´e et al., Protection Sociale (ESPS) reported longitudinal data gathered in 1998 and 2002. It included the question about implementation of the reform making possible to apply difference-in-differences and lagged models. It concludes that working time negatively affects health and health behaviors reflecting changes in reports of smoking, body mass index, and SRH. These findings pushed authors confidence towards the opinion that causal impacts were reverberated. It is something that very rarely appears in the papers: authors usually do not go beyond declaration of correlated variation.

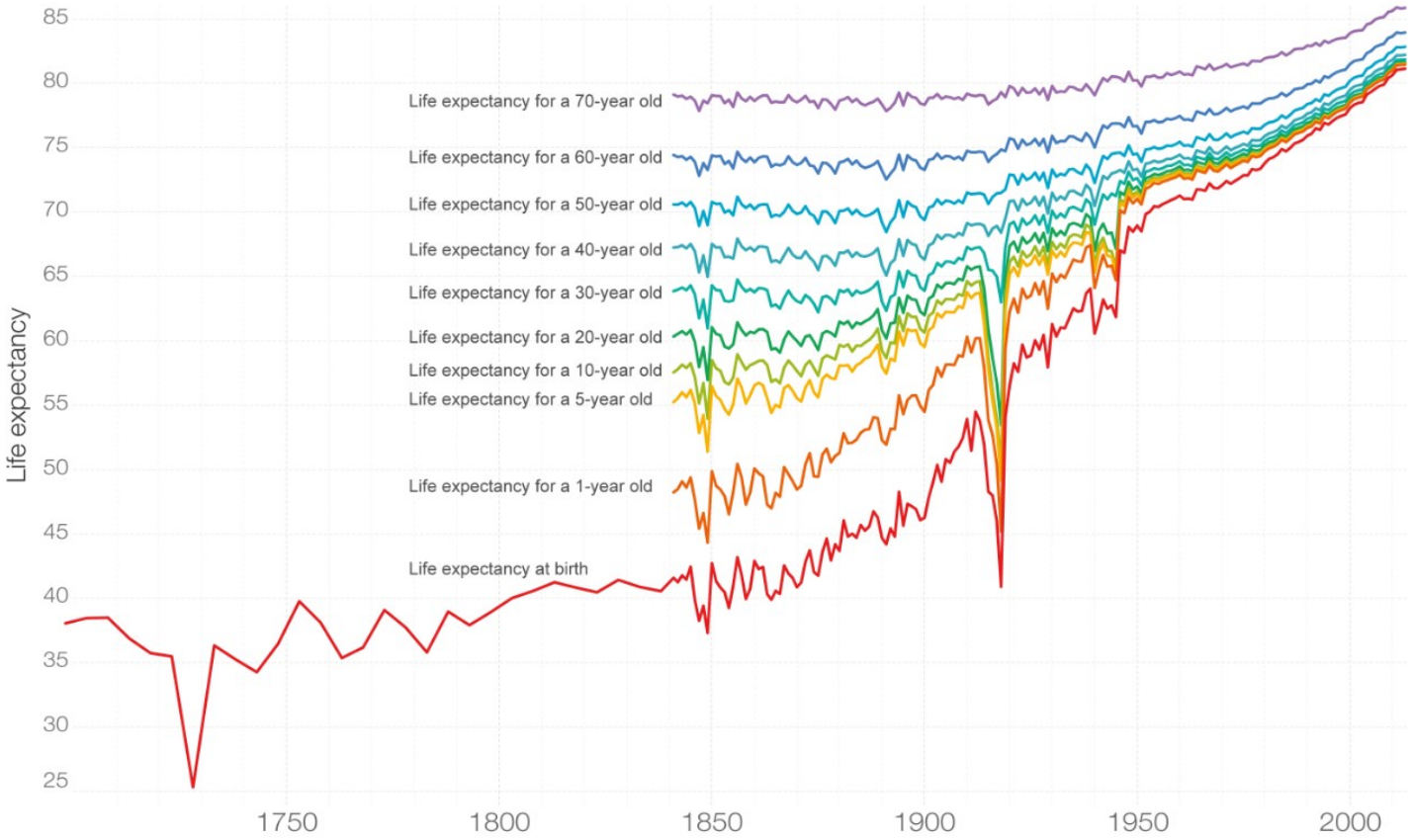

Figure 1. Life expectancy by age in England and Wales. Source: Rozer (2019)

Cygan-Rehm and Wunder (2018) utilize German Socio-Economic Panel (SOEP) data on individual level and state-layer statutory workweek length facts. It describes objective and subjective measurements of health and focuses on causal effect of working time adjusting for individual fixed effects. A number of doctor visits as well as sick leaves were considered as important determinants. The strongest effect concerned women and parents of young children revealing tight constraints in organizing the workweek. The conclusion says that more flexible policies for workweek arrangements might mitigate negative health effects.

2.5. Rundown of the review

It is very logical to continue these perceptible publications with attention to revealed problems and findings about the number of working hours effect on health to further understanding of the situation in transition countries in addition to developed ones. Some of them would be addressed directly (as education), while others would be uncovered less obviously in relation to availability of the data.

Chapter 3

METHODOLOGY

We would use the regression of the subsequent form

$$Y = \beta_0 + \beta_1 x_1 + \sum_{i=2}^{n} (\beta_i) x_i + \varepsilon, \quad (1)$$

where Y is the health outcome (SAH measure), x_1 – indicator of overworking, and $\{x_i\}$ is a set of observed important socio-economic characteristics, while ε represent error term. We gave β_1 separately since it is the coefficient of main interest answering the objective question.

The following formula shows the final specifications we will use

$$\begin{aligned} SAH = \beta_0 &+ \beta_1 overworking \\ &+ \beta_2 log(total\ expenditures) \\ &+ \beta_3 log(health\ expenditures) \\ &+ \beta_4\, log(total\ income) \\ &+ \beta_5 treatment\ received + \beta_6 male \\ &+ \beta_7 own\ education \\ &+ \beta_8 father\ education \\ &+ \beta_9 mother\ education \\ &+ \beta_{10} age + \beta_{11}(age^2) + \beta_{12}\, urban \\ &+ \beta_{13} trip + \beta_{14} food + \varepsilon \end{aligned} \quad (2)$$

Regressand, SAH would be measured in two ways. First, with SAH taking possible value out of set: {1, 2, 3, 4, 5}, where 1 corresponds to "Very bad", 2 – "Bad", 3 – "Medium", 4 – "Good", 5 – "Very Good".
Second, with SAH_GVG indicator holding value "1" for "Good" or "Very good" and value "0" for others SRH reports;

Main explanatory variable, "overworking" would be determined in such ways:

1) *more40* adhering to "1" when person worked more than 40 hours per week – such cutoff is natural level corresponding to statutory workweek in most of the countries and the most popular nonzero answer in our dataset (23.59% out of 27530 responds);

2) *more75* clinging to "1" when individual workweek is longer than 75th percentile of reported set (actually, 48 hours);

3) *TwoJobs* – "1" corresponds to pointer of respondent being employed at 2 different jobs whatever the number of hours reported by him/her.

Otherwise each of the three freeze to "0" value as standard indicator.

Secondary regressors include important individual socio-economic characteristics

- *log(total expenditures)* - logarithm of total expenditures per year;
- *log(health expenditures)* - logarithm of health expenditures per year;
- *log(total income)* - logarithm of total income per year;
- *treatment received* – indicator of whether during the past 12 months any member of household used public healthcare services for any kind of treatment preserving "1" for feedback "Yes" and "0" for rebuttal;

- *male* – gender dummy variable with "1" for men and "0" for women;

- *own education* - the highest education level primary respondent has completed taking one of 8 possible outcomes: {"1" for "No degree / No education", "2" for "Primary education", "3" for "Lower secondary education", "4" for "(Upper) secondary education", "5" for "Post-secondary non-tertiary education", "6" for "Tertiary education (not a university education diploma)", "7" for "Bachelor's degree or more" and "8" for "8 Master's degree or PhD"};

- *father education* - the highest education level the main respondent's father has completed taking one of 8 possible outcomes (the same set as for *own education*);

- *mother education* - the highest education level the primary respondent's mother has completed taking one of 8 possible outcomes (the same set as for *own education*);

- *age* and age^2 - dispose information about number of years old;

- *urban* – retain "1" value for those living in urban area, while "0" for rural;

- *trip* – one more indicator with "1" if in general household afford (if wishes) each *year*, one-week holiday out of home, including stay in a second home/country house or at friends/relatives and "0" for spare answer;

- *food* – indicating "1" if in general household afford (if wishes) consumption of meat, chicken, or fish (or vegetarian b equivalent)

each second day and "0" if doesn't;

- ε – error term absorbing other effects which are not represented by other terms.

Enlisted approaches and controls could deal with big share of issues and factors influencing SEH. With all of that in mind, we would develop 6 regressions. As a result, β_1 coefficient might provide us with understanding of SPH affection due to overworking.

Chapter 4

DATA DESCRIPTION

Availability of data regarding transition countries among which we could name Ukraine is vital for the success of the whole research. Withal, there are not so many of high quality reports containing such information. Howbeit, we are thankful to those people whose work made this research possible.

4.1. Data description

For the fulfillment of our research, number of time worked as well as self-estimated health status and other characteristics, which have mentioned earlier, would be taken from of Life in Transition Survey (LITS), third wave[1]. It was collected by European Bank for Reconstruction and Development (EBRD), in collaboration with the World Bank. Previous publications were in 2006 and 2010. LITS for the third time was provided in 2016. Number of countries included has been changing from wave to wave. The last one contains polls among central and eastern Europe, Baltic countries, altogether with Mongolia, Turkey, Cyprus, Morocco and Greece - 31 countries in total. According to the interviewer institutions methodology, nearly all of them could be named as "transition". For the purposes of comparing results for those with more prosperous western economies, investigators added Germany and Italy. Consequently, entire set consists of 33 countries, which is just one country less then in previous wave, but more than initial 29 regions 10 years earlier. We can argue that the quality has been growing due to growing number of households covered: 29000 turned into 39000 and later extended to more than 51000 increasing by 10 thousands each time. I would mention conjointly how evenly

[1] http://www.ebrd.com/cs/Satellite?c=Content&cid=1395256887465&d=&pagename=EBRD%2FContent%2FDownloadDocument

interviewers asked the question: it was no less than 1500 in each and every country. The main conclusions authors of LITS III came to are the following: life satisfaction has risen across the former Soviet bloc; overall concerns about corruption weaken but still retain to be strong; incessant division by gender in business together with in the markets of work force. We will take into account such tendencies during our analysis by including corresponding variables. Table 1 enlists the features and our expectations about their impact on SPH according to general ideas and latter one stops on distribution of their outcomes.

We expect negative effect of overworking indicators due to previously mentioned findings for separate developed countries. While expectation of positive income and expenditures' effects are in line with well-developed economic theory, expenditures on health could be related to either treatment of chronic or urgent diseases (consequently negative sign) or regular prophylactic treatment (positive). Luckily we have ability to include variable about received treatment, but it could be related to other member of household and reflect only on accustomed level of happiness or time spend on helping with this issue, that;s why those two variables are of ambiguous effect. As transition countries are more likely to have patriarchal misbalance, being a male should increase SEH. Education level of individual and his/her parents are likely to be connected with better SAH due to ability to work at jobs with higher salary; presence of mother education testifies better conditions for women in a specific environment. Age indicators are very interesting since health indicators are likely to decrease with seniority, while some moral positives like respect, life comprehension and attitude to its difficulties etc. could play positive role. We expect to find signs of nonlinearity with their reverse signs. Urban areas propose more diverse workplaces, better infrastructure and more disparate cultural activity. Nevertheless, rural territories offer better ecology, easier food cultivation and usually closer family relationships with more active support of household members. Therefore, we would say nothing about its positive or negative impact.

Table 1. Variables and their expected effect for the six models

Variable	Description	Expected effect
more40	Indicator of overworking: more than 40 hours per week	Negative
more75	Indicator of overworking: more than 48 hours per week (75th percentile)	Negative
TwoJobs	Indicator of overworking: being employed at more than 2 jobs	Negative
lte	Continuous: log(total expenditures)	Positive
lhe	Continuous: log(health expenditures)	Ambiguous
lti	Continuous: log(total income)	Positive
treatment_received	Indicator of received medical treatment	Ambiguous
male	Indicator of male gender	Positive
own_education	Discrete: scale of values from 1 to 8	Positive
father_education	Discrete: scale of values from 1 to 8	Positive
mother_education	Discrete: scale of values from 1 to 8	Positive
age	Discrete: set of values from 18 to 95	Ambiguous
age_2	Discrete: set of squared values from 18 to 95 (namely, from 324 to 9025)	Ambiguous, different sign to age
urban	Indicator of living in urban area	Ambiguous
trip	Indicator of affordability of high quality food	Positive
food	Indicator of affordability of high quality food	Positive
Constant	Continuous: basic SAH in range from 1 to 5	Baseline of SAH, Ambiguous value

Table 2. Categorical variables and their values distributions in used dataset

Variable	**Distribution of categorical values**
more40	**0**: 9,969 (36.21%); **1**: 17,561 (63.79%)
more75	**0**: 12,893 (46.83%); **1**: 14,637 (53.17%)
TwoJobs	**0**: 15,749 (57.21%); **1**: 11,781 (42.79%)
treatment_received	**0**: 13,698 (49.76%); **1**: 13,832 (50.24%)
male	**0**: 7,687 (27.92%); **1**: 19,843 (72.08%)
own_education	**1**: 179 (0.65%); **2**: 1,564 (5.68%); **3**: 3,626 (13.17%); **4**: 10,214 (37.10%); **5**: 3,993 (14.50%); **6**: 2,949 (10.71%); **7**: 3,589 (13.04%); **8**: 1,416 (5.14%)
father_education	**1**: 908 (3.30%); **2**: 4,931 (17.91%); **3**: 5,390 (19.58%); **4**: 8,478 (30.80%); **5**: 3,109 (11.29%); **6**: 1,781 (6.47%); **7**: 1,338 (4.86%); **8**: 570 (2.07%)
mother_education	**1**: 1,511 (2.59%); **2**: 5,668 (5.49%); **3**: 5,110 (20.59%); **4**: 8,454 (30.71%); **5**: 2,957 (10.74%); **6**: 1,608 (5.84%); **7**: 1,002 (3.64%); **8**: 506 (1.84%)
urban	**0**: 11,872 (43.12%); **1**: 15,658 (56.88%)
trip	**0**: 13,884 (50.43%); **1**: 13,646 (49.57%)
food	**0**: 8,526 (30.97%); **1**: 19,004 (69.03%)
SAH (dependent variable)	**1**: 242 (0.88%); **2**: 1,274 (4.63%); **3**: 7,779 (28.26%); **4**: 13,257 (48.15%); **5**: 4,978 (18.08%)
SAH_GVG (dependent variable)	**0**: 9,295 (33.76%); **1**: 18,235 (66.24%)

Ability to go for a trip abroad or to have each second day very delicious food represent not just richness of family unit, but also ability of mitigation some risks of domestic food or environment meaning better opportunities for rehab or basic recovery. The standard level of SAH is one more detail magnifying interest, since it could be interpreted as intrinsic level of self-perceived health.

Whether people have positive thinking or they tend to be more skeptical or just neutral – coefficient should shed a light on it later.

We took a look at the models with two different indexes as Y: first, with SAH of possible value out of set: {1, 2, 3, 4, 5}, second, with GVG indicator taking 1 for SAH "Good" or "Very good" and 0 for others. All factors were considered as significant of a very high level . Even more, they are of relatively the same size for both sets of models. Negative sign of health expenditures is related to unexpected illnesses, while age and urban effects are well-descripted by authors mentioned in the literature review. Overall magnitude of overworking factors are very high comparing to other.

Number of households, which would be analyzed is 27530 out of 51206. The distribution of hours worked for each primary respondent is as follows

Table 3. Continuous variables and their values distributions in used dataset

Variable	**Distribution of continuous values, percentiles**				
	Minimum	25th %	Median	75th %	Maximum
lte	0	8.771525	9.650561	12.36734	18.14361
lhe	0	0.0	5.298317	7.600903	14.50866
lti	0	7.426549	9.798127	12.10071	18.09218
age	18	35	44	52	95
age_2	324	1225	1936	2704	9025

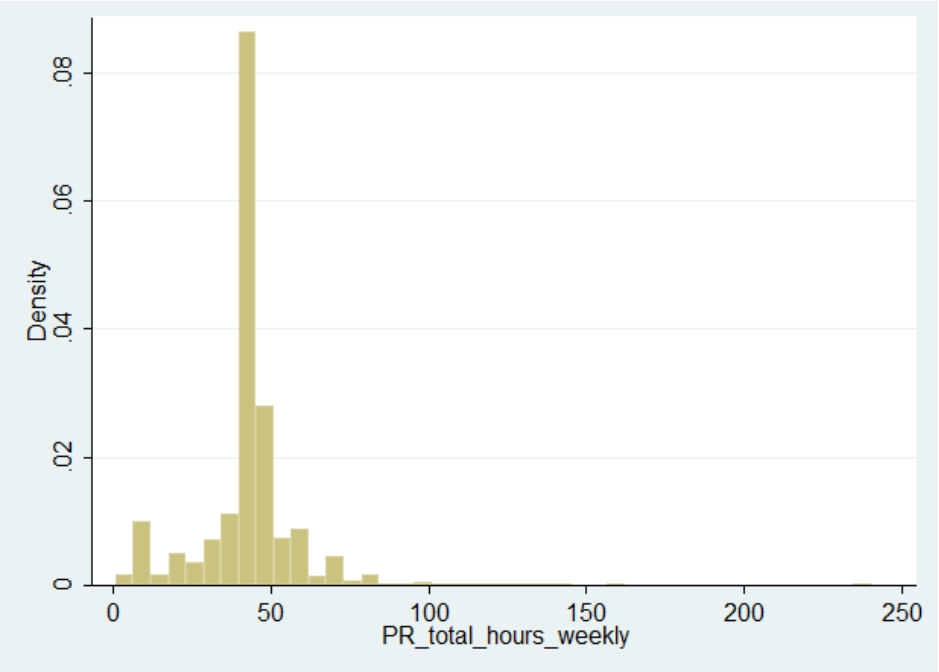

Figure 2. Primary respondent total hours number per week
Source: author's calculations

4.2. Limitations

Before proceeding any further, some data limitations should be discussed:

1. This survey could be specified as household-oriented. Because of that we would be focused on head of the household characterization since it is not always an obvious who (if not the one) was affected by, for example, losing of the job. We will operate by more information about males as a result (Table 2).

2. We assumed that those, who reported that they have never been worked at all, shouldn't be in focus of our study. The number of primary respondents who responded in such manner was a little bit greater than 11000. The reasons why the did so could vary from disability (which is sensitive information and could be underreported) or many other aspects, for instance, local cultural specifics (it is suspicious that the head of the family, which the primary respondent is likely to be, would support the family even consisting of only herself alone without making a money)

3. Some responses, which could be interesting as they could describe the dynamics over 5 years like "decreasing of working hours" are located in 10th section regarding crisis in Greece and only those 1480 people were asked.

4. Variables included are affected by error of self-estimation (and set of values of each person), different scaling for attitudes. Also, those misspecification can come from environmental traditions and/or other external pressure

5. Information about smoking and alcohol consumption could not be directly revealed as it was eroded among 21 possible answers on question regarding decline in income or other economic difficulty as reduction in consumption. Another question unites consumption of beverages, tobacco and food into one category differencing them only from utilities expenditures and money spend on transportation.

6. Another important question, which is hardly to focus on is understanding of number of children and/or elderly people who need care or doesn't work. This is connected to the fact of unavailability of most answers by other members besides primary (or secondary) respondent. It seems like a point for the following research.

Chapter 5

RESULTS

Ordinary least squares regressions gave very good results in respect of the logic behind variables included. We would focus on their outcomes and leave another possible designs implications for the future research.

In the Table 1 all variables are enlisted. Some of them planned for inclusion as such used in previous papers regarding the case (see Literature review), while some more are also here.
The former are significant controls for age, gender, and income. Our findings regarding them are similar to the previously published research papers (Table3 and Table 4). The main conclusion is that all the variables demonstrate statistically significant values and that their relative values in Table 3 and Table 4 are alike, whereas the signs are the same.

Expenditures on health and dummy for treatment received in the last twelve month cover situations corresponding to basic level of needed cure or any kind of medical prevention as well as urgent medical interventions. They both demonstrated negative sign due to connection with untoward situations. The latter are trip and food – these variables correspond to ability of luxury goods and healthy food consumption as well as ability to go for personal needs (for example, they could be related with treatment abroad). Also, urbanity status brings negative effect in all 6 models.

Our attention could be stopped on the fact that 27530 observations represent the sample of more than 51 thousands due to many missing values. We have tested our models for the respondents of only age 25 to 55 years and those results are consistent with the main, which we declare. We think that because of that there is no need to drop 4302 observation out of 27530.

Table 3. Variables and their significance for the first three models

Independent Variables	Dependent SAH is on a scale of 1 to 5		
	Model 1	**Model 2**	**Model 3**
more40	- 0.115***	-	-
	(-11.35)		
more75	-	- 0.145***	-
		(-14.74)	
TwoJobs	-	-	-0.204***
			(-20.53)
lte	0.00561**	0.00561**	0.00475**
	(3.21)	(3.22)	(2.74)
lhe	-0.0229***	-0.0222***	-0.0216***
	(-14.49)	(-14.05)	(-13.78)
lti	0.000769	0.000356	-0.0000804
	(0.73)	(0.34)	(-0.08)
treatment_received	-0.0712***	-0.0736***	-0.0730***
	(-7.30)	(-7.55)	(-7.53)
male	0.135***	0.134***	0.127***
	(12.58)	(12.53)	(11.99)
own_education	0.0391***	0.0378***	0.0373***
	(12.22)	(11.80)	(11.72)
father_education	0.00172***	0.00167***	0.00164***
	(5.06)	(4.90)	(4.84)
mother_education	0.000273	0.000287	0.000304
	(0.67)	(0.71)	(0.75)
age	-0.0327***	-0.0329***	-0.0333***
	(-14.38)	(-14.52)	(-14.74)
age_2	0.000244***	0.000248***	0.000255***
	(10.46)	(10.66)	(10.98)
urban	0.00181	0.00138	-0.00288
	(0.18)	(0.14)	(-0.30)
trip	0.175***	0.169***	0.158***
	(15.62)	(15.14)	(14.13)
food	0.121***	0.117***	0.112***
	(10.20)	(9.87)	(9.45)
Constant	4.428***	4.448***	4.488***
	(75.50)	(76.18)	(77.27)
Observations	27,026	27,026	27,026
R-squared	0.098	0.101	0.108

Note: Model 1. Owerworking indicator: More40; Model 2. Overworking indicator: More75; Model 3. Owerworking indicator: TwoJobs. *** ¬significant at 99% level, ** ¬significant at 95% level

Doing the research initial model of SAH dependence on each hour in week has shown very similar results. Yet, our main attention is riveted to overworking. In addition, squared terms looks like immoderate, so we wouldn't play with each and every element of the model leaving undiscovered effects to constant.

Constant term shows that the baseline level of self-expected health is close to the possible maximum value for each scale, which could mean that people a likely to born happy.

To finalize, we took a look at the models with two different indexes as Y: first, with SAH of possible value out of set: {1, 2, 3, 4, 5}, second, with GVG indicator taking 1 for SAH "Good" or "Very good" and 0 for others. As we can see, if we would follow that by models controlled for overworking, each indicator of overworking has negative and statistically significant effect. (Table 3). To continue with, once again these indicators of overworking are negative and significant even in models with "Good or Very Good SAH" indicator (Table 4).

Therefore, our main suggestion (negative impact) has confirmed and one can try to calibrate a little bit the model and look for deeper insights.

Table 4. Variables and their significance for the second three models

Independent Variables	Dependent SAH "Good" or "Very Good" level indicator taking 1 or 0 value		
	Model 1	**Model 2**	**Model 3**
more40	-0.0578***	-	-
	(-9.84)		
more75	-	-0.0708***	-
		(-12.42)	
TwoJobs	-	-	-0.0965***
			(29.53)
Lte	0.00321**	0.00320**	0.00279**
	(3.17)	(3.17)	(2.77)
Lhe	-0.0117***	-0.0113***	-0.0111***
	(-12.79)	(-12.43)	(-12.21)
Lti	0.000149	-0.0000508	-0.000248
	(0.24)	(-0.08)	(-0.41)
treatment_received	-0.0217***	-0.0228***	-0.0224***
	(-3.84)	(-4.04)	(-3.98)
Male	0.0713***	0.0708***	0.0677***
	(11.53)	(11.46)	(11.00)
own_education	0.0168***	0.0162***	0.0161***
	(9.09)	(8.75)	(8.71)
father_education	0.000993***	0.000966***	0.000956***
	(5.04)	(4.90)	(4.86)
mother_education	0.0000299	0.0000370	0.0000443
	(0.13)	(0.16)	(0.19)
Age	-0.0158***	-0.0159***	-0.0160***
	(-11.99)	(-12.09)	(-12.23)
age_2	0.000113***	0.000115***	0.000118***
	(8.38)	(8.53)	(8.76)
Urban	0.00182	0.00162	0.000366
	(0.32)	(0.29)	(-0.06)
Trip	0.104***	0.101***	0.0962***
	(16.05)	(15.66)	(14.85)
Food	0.0677***	0.0658***	0.0635***
	(9.82)	(9.56)	(9.25)
Constant	0.969***	0.978***	0.994***
	(28.57)	(28.92)	(29.53)
Observations	27,026	27,026	27,026
R-squared	0.083	0.085	0.089

Note: Model 1. Owerworking indicator: More40; Model 2. Overworking indicator: More75; Model 3. Owerworking indicator: TwoJobs. *** ¬significant at 99% level, ** ¬significant at 95% level

Chapter 6

CONCLUSIONS, RECOMMENDATIONS AND FURTHER RESEARCH SUGGESTIONS

With all given assumptions and limitations we could say that statistically significant coefficients prove the main hypothesis of the paper: overworking has a negative effect on health. Our dataset focused on transition countries while particular developed countries individuals' responses were included into the research as well.

Even though the main answer was received, the thorough additional analysis could be made upon the obtained results to choose the best specification of the models to fit some smaller subset. The abovementioned detailed description could be obtained regarding:

1) whole dataset of LITS III (which was performed)
2) developed countries
3) transition countries
4) some separated groups, e.g. Baltic ones
5) separate countries of interest, for instance, Ukraine

We are likely to see the differences between those two groups and uniqueness (if such would be present) of the Ukrainian case. These all will show more for policymaking.

Also, cut along the industries and countries could lead us to new discoveries and make us able to enlarge (proxies usage is possible) with previous waves of LITS. Some recommendations of inclusion into surveys questions, which would be more easily interpreted for the sake of unveiling the overworking effect are worthy and might help in data collection, especially regarding a deviant behavior such as smoking, alcohol consumptions and aspects of social health affection, which hasn't been covered for the transition countries yet controlling for above-named factors.

Previous researchers mentioned two aspects of measuring SAH. There are psychological and economic ones. Our analysis showed not only that overall effect of overworking is negative, but also that the baseline level of self-assessment is close to the highest possible for the both types of regressions. This positive attitude is a very interesting fact by itself. I hope that the following research would shed more light on the transitional countries experiencing the negative effect of excessive working hours and bring more facts about linearity/concavity of each factor impacting SEH. Alike research could be done for firm-level datasets, especially international companies, which have their facilities in transition countries.

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APPENDIX A

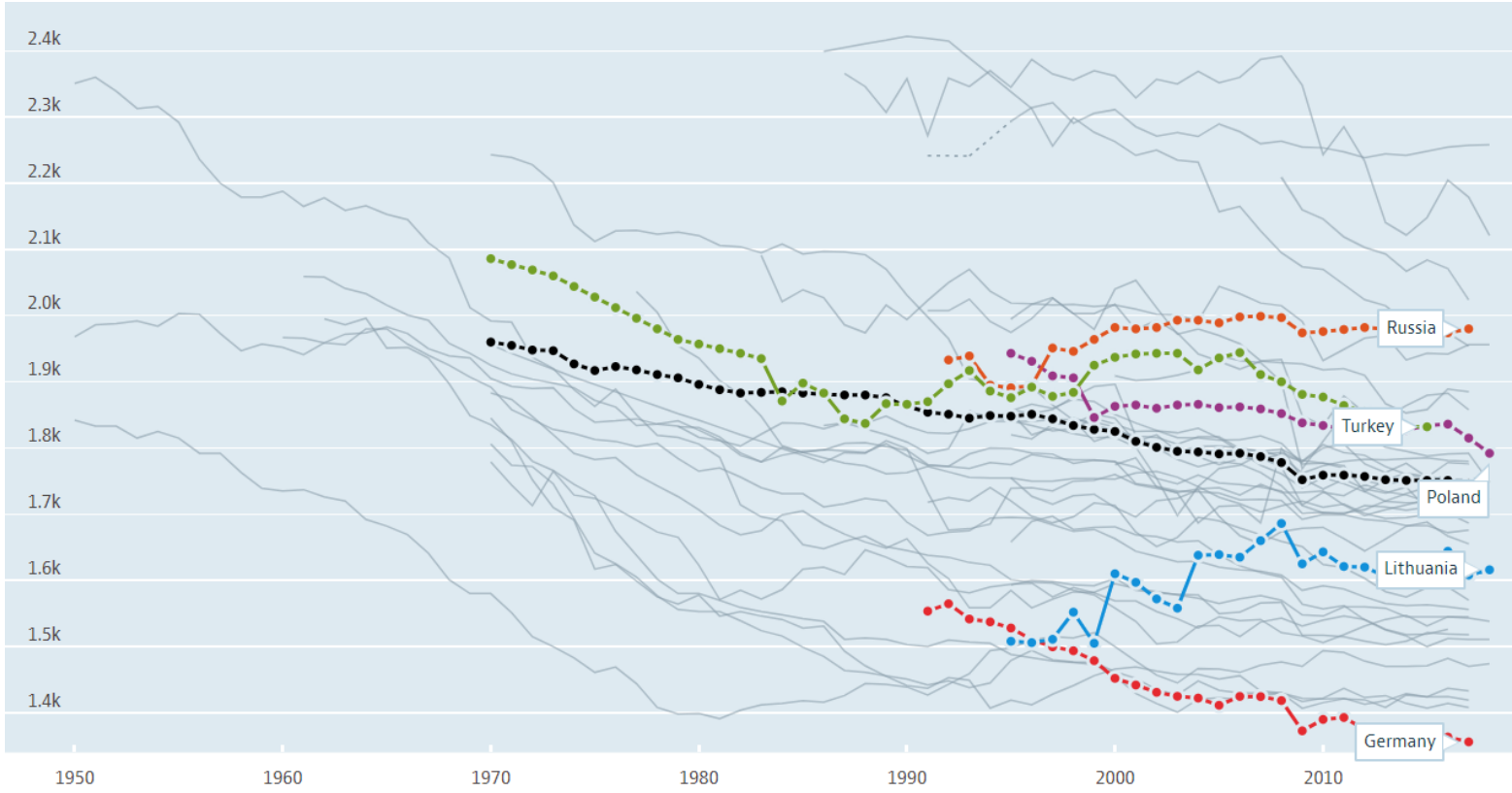

Figure 3. Average annual hours actually worked/worker, 1970 – 2018, OECD countries. Source: OECD (2017)

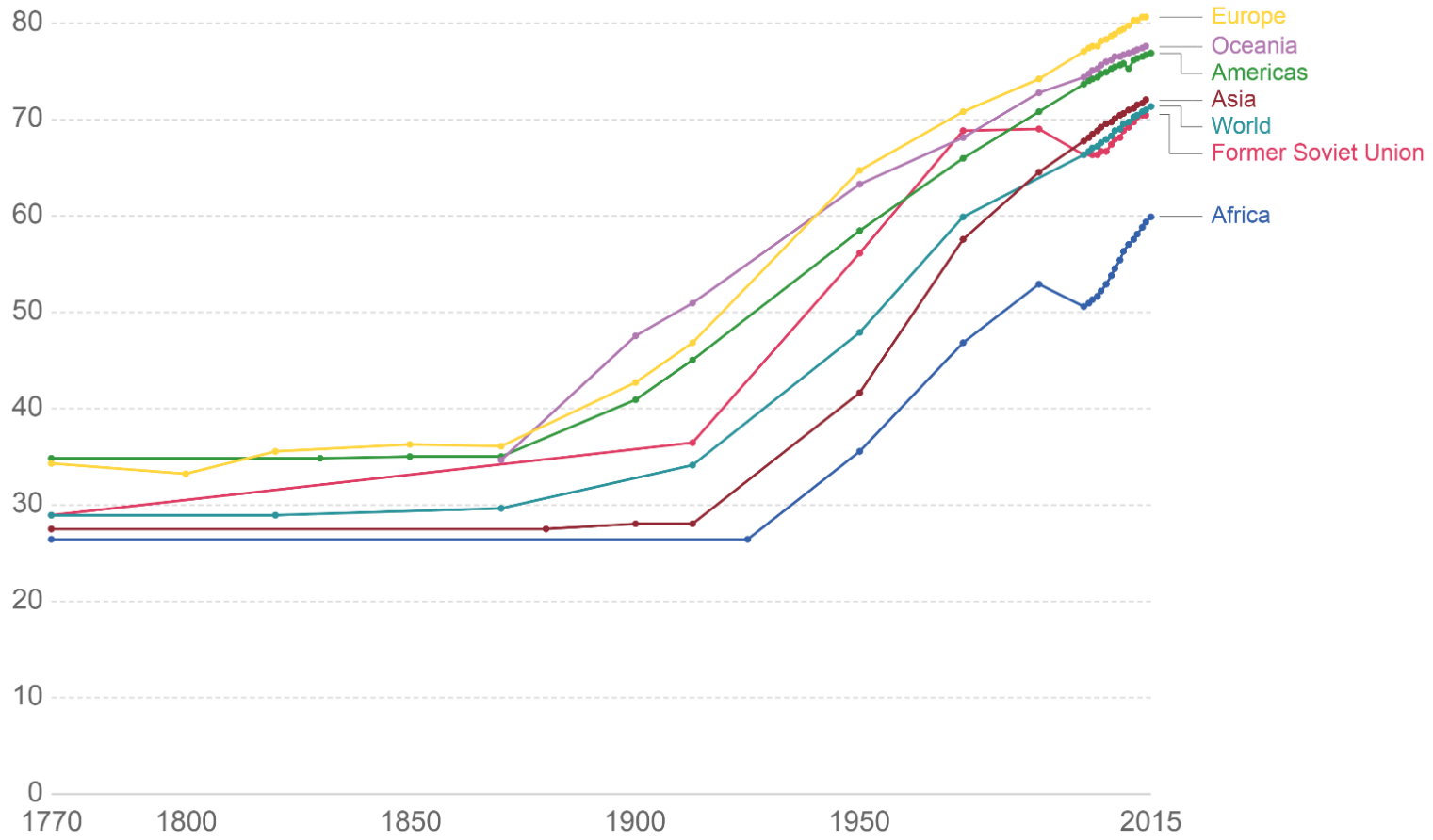

Figure 4. Life expectancy globally and by world regions 1770. Source: Rozer (2019)

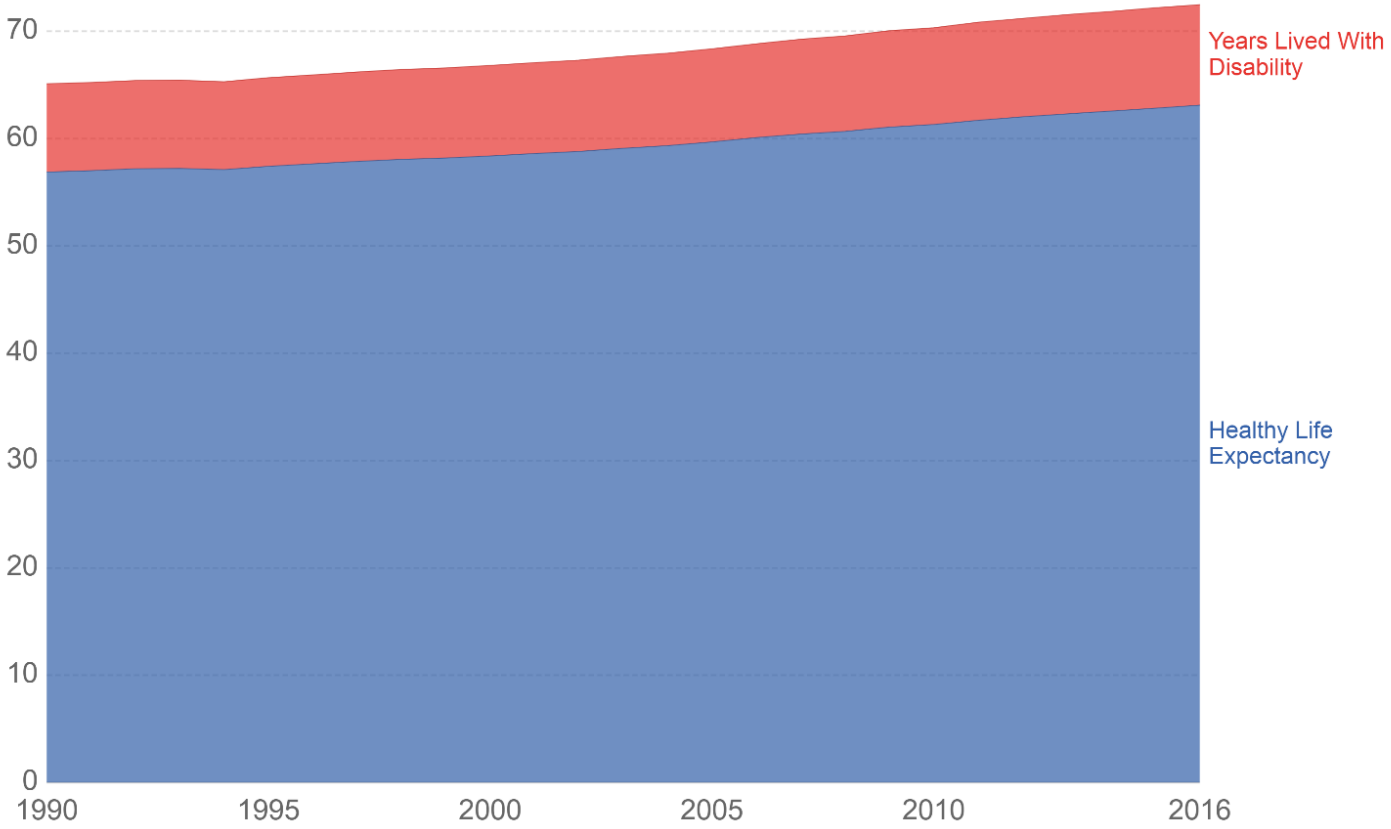

Figure 5. Healthy life expectancy and years lived with disability, world. Source: Rozer (2019)

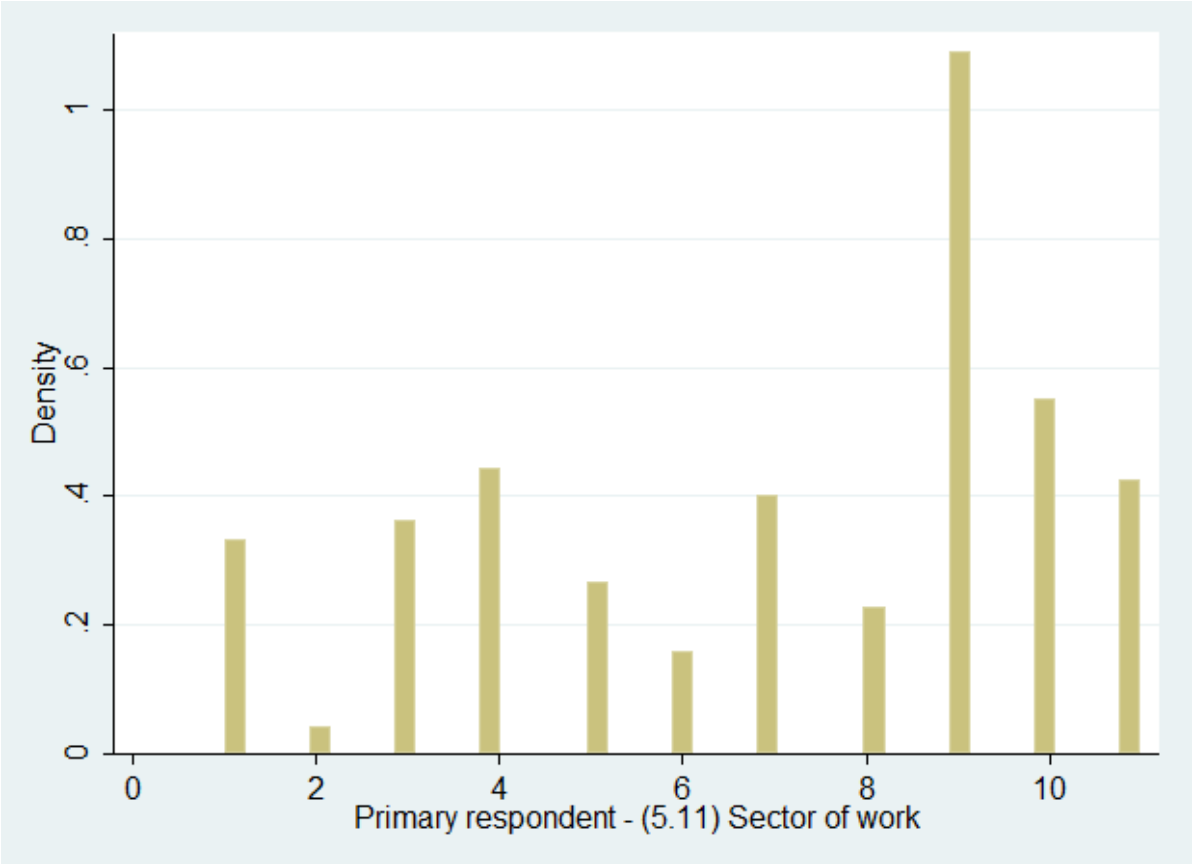

Figure 6. Primary respondent sector of work. Source: author's computations