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The impact of health on professionally active people's incomes in Poland. Microeconometric analysis[81]

Abstract

In contemporary world human capital is one of the basic elements of development. In a broad understanding it means "the resource of knowledge, skills, health and stamina in the society" (Domański, 1993). Health, besides education, is one of the determinants of its quality. It determines work efficiency, physical and intellectual development, and conditions the average lifespan. It is the resource influencing the functioning of individuals, enterprises - having a connection with their competitiveness - and the whole economy.

The impact of health on economic processes may be observed both on macroscale level and on the level of individuals. In the presented research an attempt was made to verify the hypothesis that the state of health is one of the factors determining professionally active people's incomes. It was assumed, that there is a possibility of the health state impact on decreasing incomes, not only on their complete loss.

In the analysis the micro data gathered in the research "Social Diagnosis 2009" were used. The function was estimated basing on Mincerian wage equation with the logarithm of personal income as a dependent variable and respondents characteristics (gender, work experience, practiced profession) as independent variables. Above all, however, variables connected with respondents health were included in the model.

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The outcome of the research confirms the occurrence of positive interaction between professionally active people's incomes and the self-assessed state of health. People declaring a bad state of health have incomes by 20% on average lower than people who enjoy good health (assuming that the remaining characteristics of the surveyed person are the same). In case of men, the impact of health state on incomes is slightly greater than in case of women.

1. Introduction

In contemporary world one of the basic factors of development is human capital, in a broad interpretation meaning " the resource of knowledge skills ,health and stamina of the society" (Domański 1993). Health, besides education, is one of the determinants of its quality. It determines work efficiency, physical, emotional and intellectual development of the man, conditions the average lifespan. It is a resource influencing on the functioning of individuals, enterprises- affecting their competitiveness - and the whole economy.

The conception according to which the health condition is an inseparable element of the human capital was initiated in the seventies of last century by M.Grossman (1972). Grossman was the first to emphasize the value of good health state permitting, similarly to education, to take up professional activity and to be an efficient worker.

A significant contribution to the studies on spreading the role of health as the economic development factor were submitted by the reports of the World Health Organization "*Macroeconomics and health: Investing in health for economic development"* from 2001 and "*The contribution of health to the economy in European Union*" from 2005 concerning of the European Union countries before its enlargement (EU15). It resulted from both of them that there is a necessity of investing in health as a carrier of economic growth not only in the countries of low economic development, but also in developed countries.

The impact of health on the economic processes can be observed on the macroscale and on the level of individuals. On the level of national and regional economy the research involves the connection between differentiation of health indicators (characterizing lifespan, the sick rate of selected illnesses, the death rate caused by defined illnesses) and differences in the level and dynamics of GDP growth.

Microeconomic analyses basing usually on the research of household budgets, concentrate on the assessment of the influence of illnesses or subjective

health feeling on the achieved incomes, professional activity or the probability of the retirement.

A much worse health state of people in Poland than in other countries in Europe, excluding the countries of Middle-East Europe, and the high coefficient of sick absenteeism at work bring about the necessity of conducting broader analyses for our country.

In the presented research an attempt was made to verify the hypothesis that health status is the one of the factors determining individual incomes of professionally active people. It was assumed that there is a possibility of health state influence on the lowering of incomes, not only on their complete loss.

In the analysis micro data gathered within the frames of the research *Social Diagnosis 2009*, were applied. The function based on Mincerian wage equation with the logarithm of personal income as a dependent variable and respondents characteristics (gender, work experience, practiced profession) as independent variables was estimated. Above all, variables connected with the respondent's health status were included in the model.

The analysis was preceded by a short presentation of potential channels of health influence on the economic development and a characteristic of health situation in Poland with a special regard to health state aspects of working age people.

2. Potential channels of health impact on the economic development

The role of health as a human capital element may be shown by its impact on:

1. work supply,
2. productivity,
3. education,
4. savings (Suhrcke et al., 2006).

On the micro scale health is a necessary condition of personal development. Affecting earnings, participation in the labour market (Gannon, Nolan, 2003), earlier retirement (Jimenez-Martin, Labeaga, Grando, 1999) and limited possibilities of working for people nursing the sick (Charles, 1999), it creates the bases ensuring suitable economic status.

Numerous researches prove a negative impact of ill-health on earned incomes (Contoyannis, Rise, 2001; Pelkowski, Berger, 2004). Stern (1989) using the data for United States showed that limited possibilities of employment

connected with ill-health reduce earnings by 11.7% in case of men and as much as 23.8% in case of women, after taking into account the correction of selection regarding participation in the labour market. Moreover, the probability of remaining outside the labour market increases by 13%. It results from the researches conducted by Smith (1999, 2003, 2005) that in the whole lifespan every decrease in incomes is connected with worsening of the health state.

The present and past health state influences on taking the decision to retire (Disney, Emmerson, Wakefield, 2006). Illnesses limit savings made in lifetime (Strauss, Thomas, 1998).

On the scale of the whole economy the positive health influence may be seen in the increase of employees productivity, reduction of costs connected with absenteeism caused by illnesses, and thus may lead to the increase in the welfare level. Health shapes labour force supply measured by the employment level or the number of working hours. A better health state of the society means limiting negative for the economy consequences of illness and connected with them medical treatment costs.

The already conducted in many countries researches prove the positive impact of health capital on the rate of economic growth (Barro, 1997; Bhargava, Jamison and Murray, 2001; Bloom, Canning, Sevilla, 2001; Jamison, Lau, Wang, 2004), savings (Bloom, Canning, Graham, 2003), or the increase in efficiency (Bloom, Canning, Sevilla, 2004).

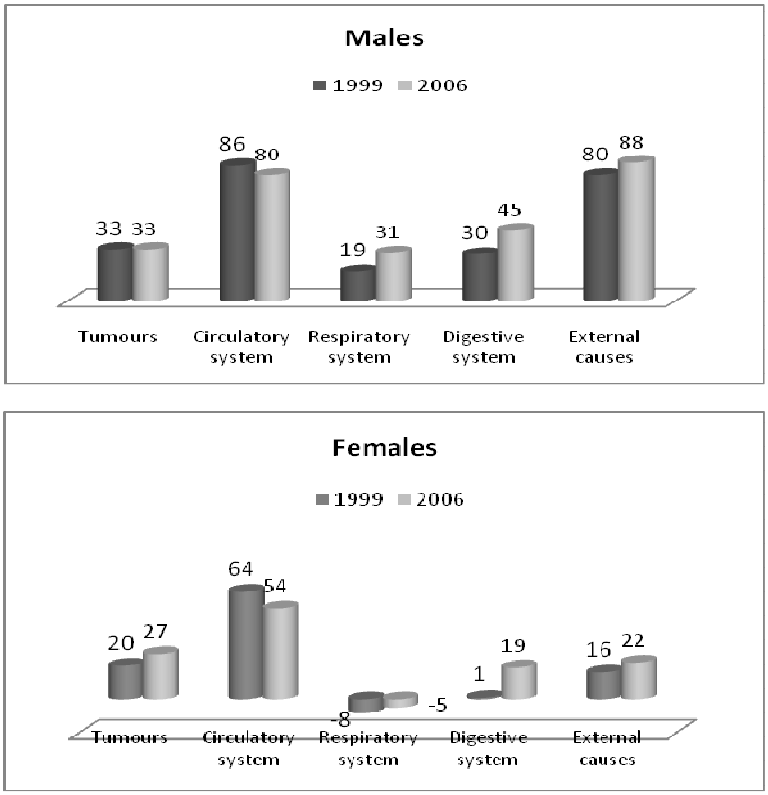
3. Health situation in Poland in the international context

In comparative analyses the so-called negative measures (showing ill-health) are generally applied. To the most popular ones belong the measures based on deaths, including average lifespan and mortality caused by selected reasons.

The average lifespan and its different variants are used in international comparisons. In Poland, both the average lifespan as well lifespan in good health are much shorter for men and for women than in the European Union countries- in case of men about 4,6 years, and in case of women about 2 years. The Polish live in good health 65.8 years on the average (women 68.5 years and men 63.1 years). Inhabitants of France or Germany live 6 years longer in good health (data come from 2002).

In Poland, at the background of the situation in the 27 European countries, premature deaths of working age people are serious problem. The available data permit to illustrate the situation for the age 25-64[82].

Chart 1. The surplus of mortality (in percentage) of people aged 25-64 in relation to the average in the 27 EU countries according to causes of deaths



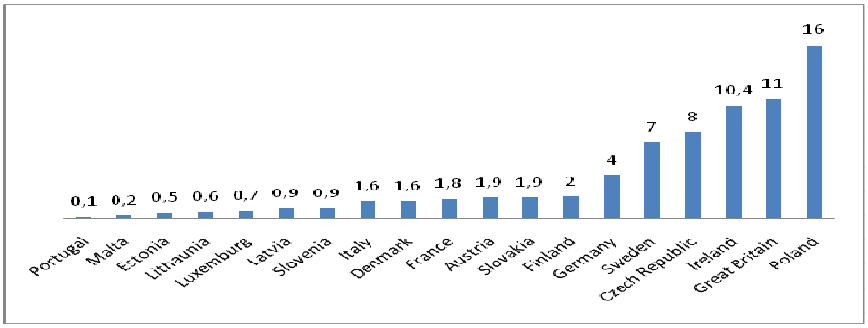
Source: *Health Status of Poland's Population*, B.Wojtyniak, P.Goryński (ed.), The National Institute of Public Health, the National Department of Hygiene, Warsaw 2008, p.74.

In case of all considered causes of deaths (except the respiratory system among women) the excess of premature mortality with reference to the average mortality in the EU is significant. The least advantageous situation concerns deaths connected with circulatory system diseases. The level of premature mortality caused by circulatory diseases is 76% higher than the average in the EU (80% in case of men and 54% in case of women).

[82] The above data were taken from *Health Status of Poland's Population*, B.Wojtyniak, P.Goryński (ed.), The National Institute of Public Health, the National Department of Hygiene.

In Poland there is very high share of disabled in the total working age population amounting to 16%. According to the European Union assessment it is the highest value among the membership countries.

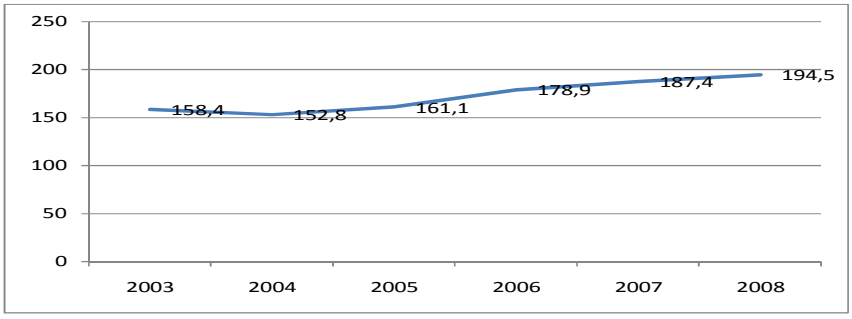
Chart 2. Share of disabled in the total working age population in 2005 (in %)



Source: As for Chart 1, p. 173.

The sick absenteeism rate (the relation of days on sick leave to the number of working days) is also very high. In 2008 it amounted to 5% and surpassed by 1.2 percentage point the European average[83]. The average yearly sick absenteeism per one person insured in the Social Insurance Institution amount to 34,41 days and is higher than in previous years. The total number of days of sick absenteeism for people insured in the Social Insurance Institution is on the increase (Chart 3).

Chart 3. The number of sick absenteeism days caused by one's own illness of the insured in the Social Insurance Institution 2003- 2008 (mln)



Source: *Sick absenteeism in Poland*, the Social Insurance Institution yearbooks of the selected years.

[83] G.Jabłońska *Healthy as a Pole – sick absenteeism in Poland,* www.labourmarket.pl, The date of publication: 13.03.2009.

The health situation in Poland, in spite of its improvements in recent years, is still worse than in the European Union.

4. The concept of the health state measurement for the needs of empirical analyses

Measuring health capital is an extremely difficult task. It is a complex, multidimensional idea consisting of the assessment of physical and mental condition as well as social health[84] (Golinowska, 2007; Tobiasz-Adamczyk, 2000) and there is no characteristic reflecting the health state in a complete way. To measure it various indicators presenting different aspects of health state are used. Their application requires meeting the following conditions:

- health should be a category indirectly measurable,
- there exists certain arrangement of health state differences.

To define health state in empirical analysis information resulting form demographic, epidemiological and sounding researches are applied. Among demographic and epidemiological measures there are sick rates and death rates.

For the needs of analysis synthetic measures are created. They express by means of one indicator different aspects of the health state, usually arising by assigning points to certain categories defining health (Feeny et al., 2002; Salomon et al., 2002). A few point indices were worked out to assess general health problems (eg. EQ-5D).

In sounding researches the following measures are used: occurrence of ill-health conditions or chronic diseases, descriptions of ability range. Limitations of abilities in the context of economic consequences of ill-health assessment are essential, considering the fall in productivity they cause and treatment costs of people suffering from them.

However, the most often applied in surveys indicators of health state consists in self-assessment. Self- assessment of health state, being an aggregate of many factors known only to an individual, deciding about its self-related health, in spite of subjectivity connected with it, is convergent with measures which can be considered as objectives ones, eg. a doctor's diagnosis or the

[84] Limitation of performing public functions may testify the lack of social health.

probability of death (Mossey, Shapiro, 1982, Golinowska (ed.), 2007)[85]. The application of this measure, besides given above arguments, is supported by the fact of including in the conducted in Poland statistical reports concerning the population's heath state only serious cases of illness leading to hospitalization or death. There is not enough information on disorders in health condition of a less dramatic character which can determine chances on labour market.

5. Econometric analysis

In the research individual data gathered within the project *Social Diagnosis 2009* (Czapiński, Panek ed., 2009) were applied. The data basis comes from the individual questionnaire (questionnaire addressed to all member of a household over sixteen years old). The initial base was limited to people 18-64 years old. The research covered only professionally active people. There were excluded pensioners, retired employees, full-time students, the unemployed and maintaining from non-earned sources (N=9311)[86].

The questionnaire used in the research *Social Diagnosis* contains questions concerning different aspects of the health state: disabilities, limitations in doing everyday activities, occurrence of physical complaints, somatic symptoms and self-assessment of health. The last mentioned was used in the econometric analysis as the indicator of health condition. Respondents assessed their health state answering the questions according to the 6-point scale: from very satisfied to very dissatisfied, it means with the application of the ordinal scale. Due to criticism of this tape of scale, as an approximation of health status in econometric analysis an artificial variable *ill- health state,* combining health assessed as rather bad, bad and very bad, was applied (Shurcke at al., 2006) [87].

Differentiation of incomes in groups separated in respect of health state is shown by Chart 4.

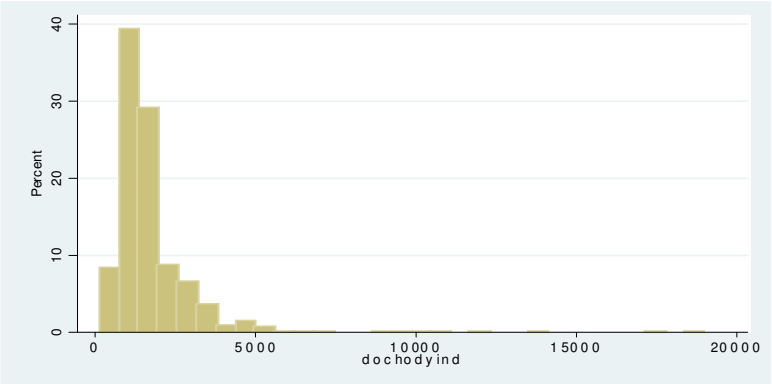
[85] Research carried out at a regional level indicates a strong correlation between the average life expectancy in the region and self-assessment of state of health of inhabitants of the region (Golinowska, 2007).

[86] Required data have been obtained from the website*:* www.diagnoza.com (17.11.2009).

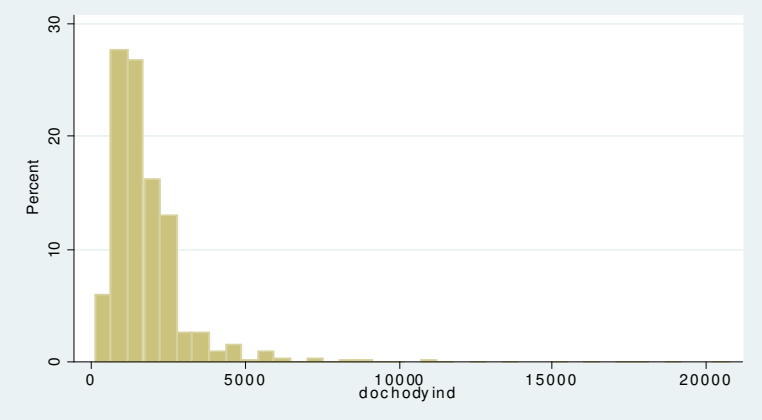
[87] It is connected with the loss of some information and requires an arbitrary defining the cut point.

Chart 4. Distribution of income (in zl) for people of good and bad health

Ill-health state



Good state of health



Source: Own calculations based on: *Social Diagnosis 2009.*

The graphic analysis indicates the existence of differences in distribution of incomes between people of good and bad health state. Among people of ill-health there is a higher percentage of those having low incomes, while the percentage of people having incomes above 5 thousands in considerably lower.

To verify the hypothesis, that health influences economic outcomes, measured as individual's income, there was estimated a model of individual wages based on the Mincerian equation (1974) extended by the variables characterizing the respondent's health:

$$\ln W_i = \beta_0 \ + \beta_1 \ \mathbf{Z}_i + \beta_2 \ \mathbf{X}_i + \varepsilon_i ,$$

where W_i are monthly personal incomes at constant prices from 2005, $\boldsymbol{Z}_i$ vector of variables reflecting the health state, $\boldsymbol{X}_i$ vector of variables representing both an employee's characteristics and those of employing him/her company.

Besides the state of health, as independent variables, socio-demographic characteristics of surveyed people were applied:

- *work experience* - continuous variable defining total work experience in years,
- *education:* binary variables defining respectively education: vocational/ lower secondary, secondary, higher/post-secondary (reference category: primary/lower education),
- *gender* – binary variable (1- male),
- *ownership of the employing institution:* binary variables – state ownership or territorial self-government entities, cooperative ownership (the reference category: private ownership),
- *class of the inhabited place* (introduced to approximate conditions of the local labour market- binary variables corresponding to the respective size of the inhabited place (reference class is the country),
- *practiced occupation*: binary variables for the defined below large professional groups consistent with the applied by the Central Statistical Office classification of professions (excluding armed forces):

Group_1	Representatives of public authorities, senior officials and managers
Group_2	Professionals
Group_3	Technicians and associate professionals
Group_4	Clerks
Group_5	Service workers and shop and market sales workers
Group_6	Skilled agricultural and fishery workers
Group_7	Crafts and related trades workers
Group_8	Plants and machine operators and assemblers
Group_9	Elementary occupations

In this case elementary occupations are the reference category.

Additionally the model includes binary variables for: the mazowieckie voivodeship- the region of the highest average earnings, full-time employment, married people, people with active knowledge of English or active knowledge of other foreign languages.

The method of estimation

The choice of methodology results mainly from the availability of statistical data and the possibility of taking into consideration the problem of endogeneity, that in this context may signify a simultaneous interdependence between the accepted for the analysis approximation of the health state and incomes.

From the purely point of view, the income affects health. It secures such basic determinants of health as a flat, food and the possibility of participating in social life. Higher income enable better satisfying of health needs (financing health care). Low incomes are often accompanied by anti-health behavior (eg. smoking) often caused by stress resulting from a difficult economic situation.

Therefore, none of the hypothesis: ill-health causes low incomes or inversely should be rejected by assumption.

One of the solutions applied in case of endogeneity is the instrumental variables method. As instruments for *ill-health* binary variables were used showing occurrence of limitations in doing everyday activities, physical ailment and disability as well as the indicator connected with the occurrence of somatic symptom and their intensity.

Table 1. Estimation results of individual incomes model including health capital (dependent variable: logarithm of net individual monthly income)

Exogenous variable		Estimated parameters		
		Full sample (N=9311)	**Males** (N=4991)	**Females** (N=4320)
Ill-health state		- .2169***	- .2170***	-.1908***
Age		.0301***	.0306***	.0398 ***
Age squared		- .0005***	- .0005***	- .0005 ***
Gender (1 in case of male)		.2618***	-	-
Class of the inhabited place	Towns 500 thous. and more	.2143***	.1963***	.2318 ***
	Towns 200 - 500 thous.	.1327***	.1561***	.1129 ***
	Towns 100- 200 thous.	.0949***	.1243***	.0708 **
	Towns 20- 100 thous.	.0648***	.0678***	.0663 **
	Towns below 20 thous.	.0379**	.0367**	.0409 **
Mazowieckie		.1215***	.0881***	.1625 ***
Years of education		.0238***	.0235***	.0235 ***
Education	Higher and post-secondary	.1516***	.1370***	.1478 ***
	Secondary	.0642**	.0715**	.0469
	Vocational	.0142	.0139	.0087
Married		.0768***	.1708***	-.0083
Active knowledge of English		.0543**	.0732**	.0315
Active knowledge of another language		.0210	.0246	.0083
Full-time Job		.3327***	.3353***	.3114 ***
State ownership		- .0402***	-.0173	-.0655 ***
Self-government ownership		- .0957***	- .0545	-.1262 ***
Occupational group	Group_1	.3830***	.3290***	.5116 ***
	Group_2	.2210***	.1983***	.2902 ***
	Group_3	.1518***	.1121***	.2165 ***
	Group_4	.0121	-.0546	.0888 ***
	Group_5	- .0624***	- .1356***	.0114
	Group_6	- .3531***	-.3544	-.3206 ***
	Group_7	-.0558**	- .0412	-.0623 *
	Group_8	.0274*	.0096	.0611
Work experience		.0102***	.0088 ***	. 0103 ***
Cons.		5.6421***	5.642***	5.5311 ***
Adjusted R^2		.321	.282	.332

*p < .05, **p < .01, ***p < .001

Source: Own calculations based on: *Social Diagnosis 2009.*

The main results from conducted researches may be formulated in the following way. Professionally active people's incomes grow with age (after surpassing certain age they begin to fall), work experience and the number of learning years. Better educated people earn higher incomes. The performed profession is of importance. In towns incomes are higher than in the country (the reference category) and the difference increases with the growth in size of town. Women's income remain lower than men's income.

The most important effect of the conducted research is confirming an essential impact of the health state on the earned incomes. The negative estimate of the parameter at the variable connected with health indicates that ill- health is a cause of lowering incomes. People declaring a bad state of health have incomes by 20% on average lower than people who enjoy good health (assuming that the remaining characteristics of the surveyed person are the same. It is the outcome similar to the analogous researches conducted in other countries (Suhrcke at al., 2007).

In case of men the dependence of incomes on the health state is slightly stronger than in case of women.

6. Conclusion

The presented results confirm that there is a positive dependency of professionally active people's incomes on the self-assessed state of health. It allows to recognize health as one of the indispensable conditions of economic development. Activities directed at improving one's state of health may be beneficial for an individual, but as it seems, also on a larger scale.

To improve economic outcomes it is necessary to invest not only in human capital in the form of education, but also in human capital in the form of health, in Poland considerably worse than the average level of the European Union. From this perspective the sphere of health care should be treated not as an area burdening the budget, but giving a chance of economic development.

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Streszczenie

WPŁYW STANU ZDROWIA NA DOCHODY OSÓB AKTYWNYCH ZAWODOWO W POLSCE. ANALIZA MIKROEKONOMETRYCZNA

We współczesnym świecie jednym z podstawowych czynników rozwoju jest kapitał ludzki, w szerokim rozumieniu oznaczający „zasób wiedzy, umiejętności, zdrowia, energii witalnej zawartej w społeczeństwie" (Domański, 1993). Zdrowie, obok edukacji, stanowi zatem jeden z wyznaczników jego jakości. Determinuje wydajność pracy, rozwój fizyczny, emocjonalny i intelektualny człowieka, warunkuje przeciętną długość życia. Stanowi zasób wpływający na funkcjonowanie poszczególnych osób, przedsiębiorstw-poprzez związek z ich konkurencyjnością- oraz całej gospodarki.

Wpływ zdrowia na procesy ekonomiczne może być obserwowany w skali makro i na poziomie jednostek. W prezentowanych badaniach podjęta została próba weryfikacji hipotezy, iż jednym z czynników determinujących dochody indywidualne osób aktywnych zawodowo jest stan zdrowia. Przyjęto założenie, że istnieje możliwości wpływu zdrowia na obniżenie dochodów, nie tylko ich całkowitą utratę.

W analizie wykorzystane zostały mikrodane zgromadzone w ramach badania Diagnoza Społeczna 2009. Oszacowana została funkcja bazująca na równaniu płac Mincera z logarytmem dochodu osobistego w charakterze zmiennej objaśnianej i charakterystykami respondenta (płeć, staż pracy, wykształcenie, wykonywany zawód) w charakterze zmiennych objaśniających. Przede wszystkim jednak, do modelu włączone zostały zmienne związane ze zdrowiem respondenta.

Wyniki badań potwierdzają istnienie pozytywnej zależności dochodów osób aktywnych zawodowo od stanu zdrowia mierzonego jego samooceną. Osoby deklarujące zły stan zdrowia osiągają dochody przeciętnie o 20% niższe niż osoby, które cieszą się dobrym stanem zdrowia (przy założeniu, że pozostałe charakterystyki badanej osoby są takie same). W przypadku mężczyzn zależność dochodów od stanu zdrowia jest nieznacznie silniejsza niż w przypadku kobiet.