

## ASSOCIATION BETWEEN SELF-ASSESSED HEALTH AND ATTITUDE TOWARDS OWN HEALTH

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### Abstract

*This paper explores association between health and attitude towards own health in two dimensions – taking care of own health and lifestyle. We apply two-dimensional stereotype logit model to estimate association between self-assessed health and attitude towards health, after accounting for socioeconomic factors. We find evidence of strong positive association between health status and (perceived) taking care of own health and lifestyle. Analysis of perception of the two concepts – "taking care of own health" and "healthy lifestyle" – provides insights into possible reasons of not very good indicators of health behaviour among Latvian population.*

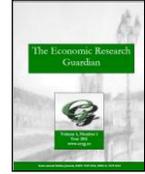
**Keywords:** Self-assessed health, Attitude towards health, Lifestyle, Stereotype logit

**JEL classification:** I10, I18, C52

### 1. Introduction

Health takes central role in individual's well-being. It strongly defines overall life satisfaction (Donovan et al., 2002; Delhey, 2004) and is one of the main life values; health both provides possibility to obtain welfare and to enjoy it fully, it can increase or reduce one's chances to implement personal plans and to fulfil dreams. Seemingly there should be no need to explain and persuade one to take care of own health, avoid obvious health risks etc. However, the reality is different: people tend to ignore healthy lifestyle and choose adverse health behaviour, they often don't pay attention to their health problems unless these problems hamper normal path of life they got used to. Even knowing what and how should be done to improve health, people in reality in many cases don't do that.

In this paper we pursue two main objectives. First, we analyse attitude towards own health of adult population of Latvia defining attitude towards own health as an intensity of actions aimed to maintain good or to promote deteriorated health. We explore attitude towards health in two dimensions: taking care of own health and healthiness of lifestyle, paying close attention to perception of the two concepts. The analysis carried out provides insights into problems of health and illness behaviour of adults in Latvia, helps to shed more light on reasons why more or less



healthy lifestyle is chosen, what attributes of health behaviour contribute mostly to perception of "taking care of health" and "healthy lifestyle" and what features are secondary etc.

Second, we estimate association between taking care of own health and self-assessed lifestyle on the one hand and health status on the other hand, after accounting for various socioeconomic factors. For this purpose we employ multidimensional stereotype logistic regression (Anderson , 1984). The concept of health might be too complicated to analyse it in a single dimension. We observe nonmonotonicity in association between explanatory variables and self-assessed health (SAH), and multidimensional approach allows indicating some significant factor effects that remain unrevealed if single dimension models, e.g. ordered probit or logit, are used. These and other advantages of applying multidimensional approach to modelling SAH are in detail discussed by Mozhaeva (2012).

The results of econometric analysis propose strong positive association between propensity to take care of own health and propensity to keep to healthy lifestyle on the one hand and health on the other hand, after accounting for socioeconomic factors. The methodology used doesn't prove a causal relationship between taking care of own health and lifestyle on one the one hand and health on the other hand. The measures of association can indicate a true causal impact, but also they can partly reflect unobserved heterogeneity and/or reciprocal causality (for example, poor health limits physical activity and therefore assessment of healthiness of one's lifestyle is expected to be lower).

Our paper contributes to the two main strands of the literature: studies on health and illness behaviour and lifestyle (Weber , 1978; Bandura , 1984; d'HoutaudHoutaudHoutaud and Field, 1984; Cockerham et al., 1997; Zhuravleva , 2005; Budesa et al., 2008; Suhrcke et al., 2008; Shumaker , 2009; Hankonen , 2011 among others) and studies on association between SAH and health behaviour (e.g. Segovia et al., 1991; Mackenbach et al., 1994; Manderbacka et al., 1998; Vaez and Laflamme, 2003; Kasmel et al., 2004; Molarius et al., 2007; Lim et al., 2007).

The rest of the paper is structured as follows. Section 2 presents estimation methodology and data. Section 3 analyses problems of perception of the concepts "taking care of own health" and "healthy lifestyle" among adult population of Latvia. Section 4 presents the results of econometric analysis along with the related discussion. The last section concludes.

## **2. Data and methodology**

This paper employs two national population survey data. Both surveys were carried out in early 2008 which allows comparing the data without necessity to keep in mind major economic and social changes that were observed in Latvia after 2008 as a result of the financial crisis. At the same time this implies that the problems related to a dramatic reduction of the average income level, including changes in health behaviour patterns, remain outside the scope of this study.



The econometric models developed in this study are based on the survey "Self Assessment of Quality of Life and Its Relation to Health Behaviour of Latvian Population"<sup>1</sup> (further in the text Quality of Life Survey). The questionnaire contains a set of questions on respondent's health, health and illness behaviour, doctor visits etc. as well as information on individual's socioeconomic characteristics. Face-to-face interviews were conducted with 1000 persons aged 15 to 64 all over Latvia. In this paper we analyse adults only, i.e. respondents aged 18 and above. After omitting all observations with missing values for health and independent variables we obtain an 834 cases big nationally representative sample.

SAH is used as a dependent variable in the econometric models developed in this study. The information on health status was obtained from individuals' answers to the question: "How would you assess your health in general?" with five possible answers: excellent, very good, good, fair, poor.

The first indicator characterizing attitude towards health – intensity of taking care of own health – is derived from the question "How much do you take care of your own health?" with 5 ordered answers from "take care very much" to "don't take care at all". The variable we analyse as the second dimension of attitude towards own health is self-assessed lifestyle; respondents evaluated healthiness of their lifestyle on a 5 point ordered scale from "very healthy" to "not healthy at all".

The second survey employed in this study, mainly for descriptive purposes, is Health Survey<sup>2</sup>. Face-to-face interviews were conducted with residents of Latvia aged 15 to 74. After omitting all observations with missing values for analysed variables and dropping respondents below 18 we obtain a nationally representative sample of 921 observation. Inter alia, the Health Survey contains information on respondents' SAH, health behaviour and illness behaviour, as well as socioeconomic characteristics.

Similarly to the Quality of Life Survey the Health Survey includes a question on taking care of own health. Although the variable is available in both surveys, for our econometric purposes we employ the Quality of Life Survey since appropriate instruments for the endogeneity test for the taking care of health variable were found in this data base only.

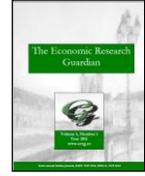
We apply multidimensional stereotype logistic regression model (Anderson , 1984) to estimate impact of attitude towards own health on SAH after accounting for socioeconomic factors. The model allows specifying multiple equations to capture nonmonotonic effects of some latent variables. Unlike with multinomial logit, the number of equations one specifies could be less than  $m-1$ , where  $m$  is the number of categories of the dependent variable.

In the multinomial logistic model, you estimate  $m-1$  parameter vectors  $\beta_k$ ,  $k=1 \dots m-1$ . In the stereotype logistic model there are  $d$  parameter vectors, where  $d$  is between one and  $\min(m-1, p)$ , and  $p$  is the number of regressors. The relationship between the stereotype model's coefficients  $\beta_j$ ,  $j=1 \dots d$ , and the multinomial model's coefficients is

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<sup>1</sup> The survey was organised by the Riga Stradins University.

<sup>2</sup> The survey was supported by a grant from the CERGE-EI Foundation under a program of the Global Development Network. The survey was directed by the Baltic Institute of Social Sciences and carried out by Sociological Research Institute.



$$\beta_k = -\sum_{j=1}^d \phi_{jk} \beta_j. \quad (1)$$

The  $\phi$ s are scale parameters to be estimated along with the  $\beta_j$ s.

Given a row vector of covariates  $x$ , let  $\eta_k = \theta_k - \sum_{j=1}^d \phi_{jk} x \beta_j$ .

The probability of observing outcome  $k$  is

$$\Pr(Y_i = k) = \begin{cases} \frac{\exp(\eta_k)}{1 + \sum_{l=1}^{m-1} \exp(\eta_l)} & k < m \\ \frac{1}{1 + \sum_{l=1}^{m-1} \exp(\eta_l)} & k = m. \end{cases} \quad (2)$$

If  $d=m-1$ , the stereotype logistic model is just a reparameterization of the multinomial logistic model. To identify the  $\phi$ s and the  $\beta$ s, at least  $d^2$  restrictions on the parameters are essential. By default stereotype logit uses the "corner constraints"  $\phi_{jj} = 1$  and  $\phi_{jk} = 0$  for  $j \neq k$ ,  $k \leq d$ , and  $j \leq d$  (StataCorp LP, 2005).

In this study we apply a two-dimensional stereotype logit model to estimate effects of explanatory variables on health outcomes.

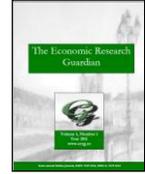
### 3. Attitude towards health as a health risk: perception of taking care of own health and healthy lifestyle

In this paper we address attitude towards own health as an intensity of activities aimed to keep good health or to improve deteriorated health. In this context we explore the two dimensions of attitude towards health: self-assessed taking care of own health and healthiness of lifestyle. Both affect health and are mutually related, both are defined by numerous personal and socioeconomic factors.

The concept of attitude towards health as a research object was explored by Loransky et al. (1980); authors propose that taking care of own health is closely related to person's attitude towards own health and is not that much defined by objective health status. Many authors find that individual's lifestyle and life choices are predefined by his or her social status (e.g. Crombie et al., 2005; Gerdtham UG, Trivedi PK (2001). Equity in Swedish Health Care Reconsidered: New Results Based on the Finite Mixture Model. *Health Economics*. 10(6): 565-572.

Graham, H. and Kelly, 2004; Van Doorslaer E, Koolman X, Jones AM (2004). Explaining Income-Related Inequalities in Doctor Utilisation in Europe. *Health Economics*. 13: 629-647.

Wagstaff, 1986). Weber (1978) identified that lifestyles are mainly defined by life chances and life conduct, where life conduct refers to self-direction and choice in behaviour. Dahrendorf (1979) states that life chances are not a matter of pure chance, but are defined by one's social situation or



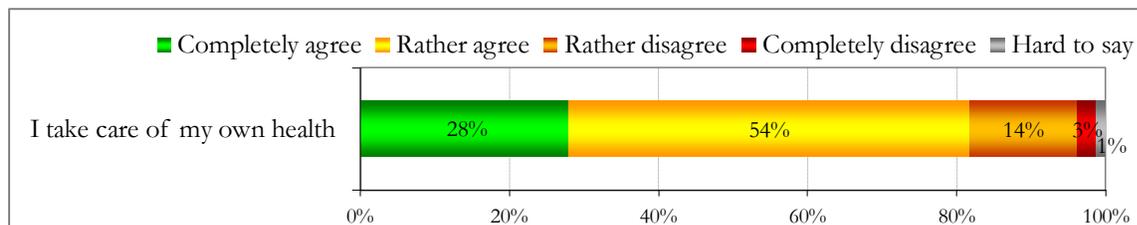
"class position". Abel and Cockerham (1993) emphasize that people choose their own lifestyle, while their choices are defined by their social situation. Andersen (1995) finds that socioeconomic environment together with other factors determines one's notion of necessity of health care and incentive to use it. Schneider and Schneider (2009) provide empirical evidence of relationship between health behaviour and socioeconomic status of an individual.

Hence lifestyle and attitude towards health is not just randomly defined and independent from the environment, but imply a set of various choices which to some extent are conditional on socioeconomic factors and possibilities defined by these factors (Cockerham et al., 1997; Frohlich KL, Corin H, Potvin L (2001). 2001). Taking this into account it is important to control for impact of socioeconomic determinants when estimating association between health and taking care of own health and lifestyle. The results of such estimation are provided in the Section 4. Further in this section we analyse the overall perception of taking care of own health and healthy lifestyle among adult population of Latvia.

### 3.1. Perception of taking care of own health

According to the Health Survey data only 28% of adults aged 18-64 agree with the statement "I take care of my own health" (Figure 1), and according to the Quality of Life Survey data only 33% of adult population say they take care of their health very much or rather much (Figure 2). The share of those who admit not taking care of their health is not very big in Latvia – 17% (Figure 1); however, discriminant function analysis provided below (see Figure 3) indicates that in terms of health and illness behaviour those who rather agree that they take care of their health are closer to those who admit not taking care of their health rather than to those who do take care.

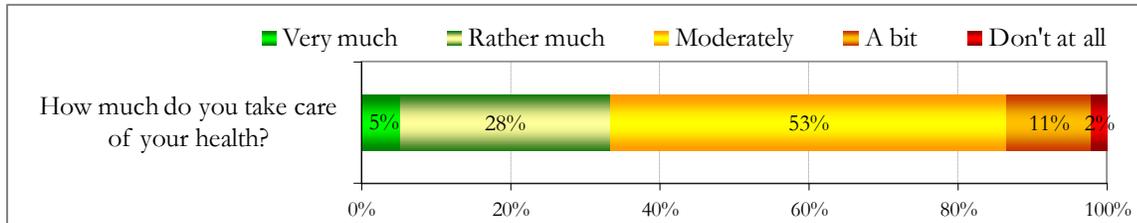
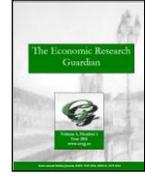
Taking into account similarity of categories distribution (despite formulation of the questions and categories was different) we divide the two scales on the Figures 1 and 2 into three parts and analyse the three groups on Figure A1 and A2 (see in Appendix) as comparable.



Source: Health Survey data<sup>3</sup>

Figure 1. Self-assessed taking care of own health

<sup>3</sup> To ensure comparability of the results with the Figure 2, here we analyze respondents aged 18-64.

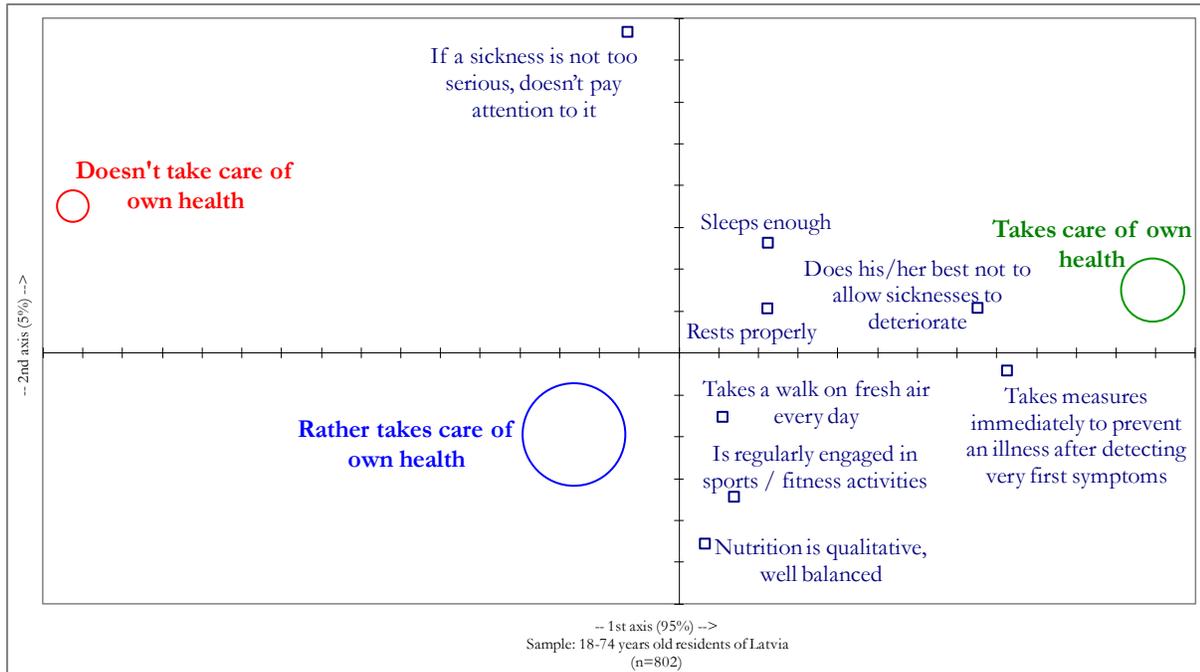
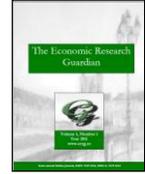


Source: Self Assessment of Quality of Life and Its Relation to Health Behaviour of Latvian Population survey data

Figure 2. Self-assessed intensity of taking care of own health

Mean assessment of features related to health and illness behaviour in the whole sample and in the three groups according to self-reported intensity of taking care of own health is provided on Figure A1 and A2 (in Appendix). In distinction to the Figure A1, the answer scales are different for each aspect of lifestyle on the Figure 4. Therefore Figure A2 doesn't allow making a conclusion on prevalence of each lifestyle aspect in one's life, however we still can analyse differences between the three groups.

As the Figure A1 proposes, adults in Latvia on average assess their meals culture most highly among the behaviour characteristics analysed, while intensive physical activities and sports on average are not very regular. The results are coherent with the international findings: population of Latvia can be characterised with low engagement into intensive physical activities – only 27% of Latvians aged 15 years and above exercise or play sports at least once a week, while the average EU indicator is 40% high. However, 76% of population regularly or with some regularity take part in moderate physical activities such as cycling and walking (EU average – 65%) (European Commission, 2010). This explains why we find no significant difference between the three groups in terms of moderate physical activities, while the difference in terms of regularity of sports and intensive physical exercises is larger (Figure A1 and A2).



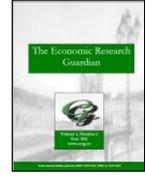
Source: Author's calculations using Health Survey data

Figure 3. Association between self-assessed taking care of own health and health and illness behaviour

The Figure 3 provides results of discriminant function analysis that allows indicating the parameters of lifestyle and the components of illness behaviour that are associated with perception of taking care of own health the most. The placement of the features and the groups indicates that those who say they take care of their health can be distinguished from the other two groups most of all by illness behaviour: on average they put greater efforts not to allow existing illnesses to deteriorate and tend to take necessary actions for curing illnesses in early stages. Such factors as proper rest and physical activity explain the difference between the three groups analysed to a substantially lesser degree. In their turn those who admit they do not take care of their health most of all are distinguished by superficial attitude towards illnesses that they find not very serious. This finding is supported by the Quality of Life Survey data presented on the Figure A3: 38% of those who report not taking care of their health say that they do nothing special in case of illness. Only 30% of this group usually visit a doctor when they fall ill.

The obtained results allow indicating peculiarities of perception of the concept "taking care of own health": residents of Latvia perceive it first of all as an illness behaviour, while association between the concept and daily activities (especially physical activities) aimed to maintain organism's well-functioning is less common.

Placement of the groups and features on the Figure 3 indicates that regarding health and illness behaviour analysed, the middle group is actually closer to those who do not take care of their health. This allows making a conclusion that only about a third of adult population really takes care of own



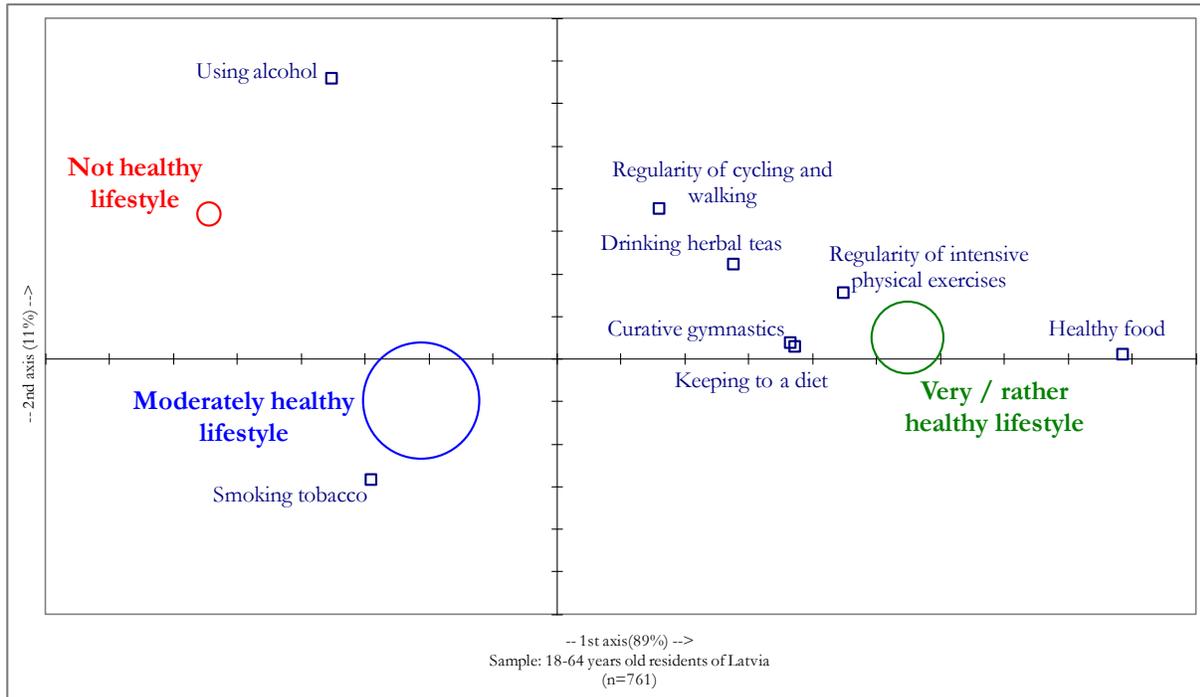
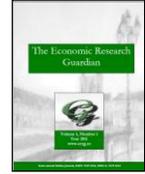
health. However, here once again we should note that taking care of own health in Latvia is perceived first of all as intensity of efforts for curing illnesses.

In this context, one of the important issues is that residents of Latvia usually turn to doctors only when health problems become rather serious. Of course poor physical health is found to be a significant predictor of increased utilization of health care services in most of the European countries studied (Gerdtham UG, Trivedi PK and Trivedi, 2001; Van Doorslaer E, Koolman X, Jones AM et al., 2004; Fernández de la Hoz K, Leon DA 2006; Economou A, Nikolaou A, Theodossiou I (2008). ; Grasdal AL, Monstad , 2011; Gundgaard J, Lauridsen JT , 2013 among the others). However, turning to a doctor lately and neglecting illnesses can be considered an important health risk factor in Latvia. 67% of adults admit they don't pay attention to an illness if they think it is "not too serious" (Health Survey data). Such behaviour is probably defined not only by attitude towards own health, but also by very low level of trust to the health care system and its elements (European Commission, 2007b), inability to pay for healthcare services etc. Together with low doctor visits indicators such neglect probably contributes to poor health indicators in the country and partly explains the fact that serious illnesses, such as cancer, are often detected at later stages in Latvia.

### **3.2. Perception of healthy lifestyle**

The results of discriminant function analysis presented on Figure 4 allow indicating the lifestyle parameters that distinguish those who assess their lifestyle as healthy from the other two groups. The results propose that perceived healthiness of lifestyle most of all is associated with healthy diet and relatively low usage of alcohol and tobacco products; to a noticeably lower extent the difference between the groups analysed is explained with engagement into physical activities. Complete exclusion of tobacco and/or alcoholic drinks is not a prerequisite for considering one's lifestyle to be healthy: according to Quality of Life Survey data 39% of those who characterise their lifestyle as very or rather healthy smoked tobacco during the last month and 61% used alcohol; moreover 1/5 of the group reported using alcohol at least once a week. Relatively large share of alcohol users in Latvia (European Commission, 2007a) and average level of intensity of consumption of alcoholic drinks among EU countries (WHO Health for All Database) puts this adverse health behaviour into the place of the top health risk in Latvia (WHO Europe , 2005).

Healthcare system in Latvia suffers from various difficulties including lack of financing; however, we cannot neglect the problem of low level of personal responsibility for own health: even knowing how and what should be done to improve own health people in reality often do not do that. In 2008-2009, the opinion that ensuring adequate health care for the sick should be entirely governments' responsibility in Latvia was more popular than in the other European countries (European Social Survey 4th round data). This may indicate conscious or unconscious inclination of residents of Latvia to shift the main weight of responsibility for health from personal to institutional level.



Source: Author's calculations using Self Assessment of Quality of Life and Its Relation to Health Behaviour of Latvian Population survey data

Figure 4. Association between self-assessed healthiness of one's lifestyle and lifestyle characteristics

Some explanation of superficial attitude towards health can be also found in the work of d'Houtaud and Field (1984). Authors propose that health is just a source of such factors as capability to work, feel and look good, and enjoy life. Similar conclusion is made by Silis (2006): health is often perceived just as an instrument necessary to ensure life quality, not as a part of life quality and not as a terminal value. Hence until health resources are enough to implement personal plans, it is quite common that one doesn't pay too much attention to own health.

#### 4. Association between health and attitude towards health

Two-dimensional stereotype logit was applied to estimate association between self-reported taking care of own health (Table 1) and healthiness of lifestyle (Table 2) on the one hand and SAH on the other hand, after accounting for socioeconomic factors. Marginal effects show change of probability of according health outcome for each factor, other parameters controlled.

The Table 1 and Table 2 provide the results with bootstrapped standard errors; the bootstrapping procedure was applied since exogeneity of the initial ordered variables for "taking care of own health" and "healthiness of lifestyle" was rejected, and continuous variables "propensity to take care of own health" and "propensity to keep to healthy lifestyle" included into the models were estimated from the first stage regression.



Endogeneity test (Gerdtham UG, Trivedi PK and Trivedi, 2001 and Vuong, 1988) was performed for both factors – taking care of own health and healthiness of one's lifestyle. Two-step probit with instrumental variables was used for this purpose for the two dimensions of the stereotype logit model<sup>4</sup>: in the first dimension very good health is compared to excellent health; in the second dimension the test was conducted combining good, fair and poor health into one category and comparing it to excellent health. Two variables were used as instruments for the endogeneity test for both "suspicious" variables: (1) satisfaction one gets when taking care of own health and (2) willingness to look better. Exogeneity of the both tested variables was rejected for the second dimension of the model<sup>5</sup>.

Since bootstrapping procedure doesn't allow weighting the data, the results presented in the Table 1 and the Table 2 are estimated without design weights. The models estimated without bootstrapping procedure and with design weights are presented in the Table A4 and the Table A6 (see Appendix). The results obtained using the bootstrap and without it are similar both qualitatively and quantitatively.

#### **4.1. Association between health and taking care of own health**

The Table 1 provides results for the two-dimensional stereotype logit model designed to estimate the association between propensity to take care of own health and SAH after accounting for socioeconomic factors. The obtained results propose that propensity to take care of own health is positively associated with SAH increasing the probability of very good health and reducing probability of fair and poor health (other parameters equal). The marginal effects of the factor are very strong; for example, change by one standard deviation of propensity to take care of own health provides increase or reduction of probability of very good health by 5,3% while the mean probability of very good health is 16,1%.

According to the results obtained using a two-dimensional approach the effect of the propensity to take care of own health is not statistically significant or is considerably weaker at the very beginning of the SAH scale and at the end of it, i.e. at excellent and poor health; however the effect is strong when very good or fair health status is considered. This may imply that taking care of own health a lot (if it's perceived first of all as illness behaviour) is not a prerequisite for excellent health (since excellent health as such to a large extent is predefined by genetics, age<sup>6</sup>, favourable socioeconomic background etc.) and may not be very efficient anymore when health has already deteriorated dramatically.

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<sup>4</sup> The two dimensions of the model developed and scale parameters are provided in the Table A5

<sup>5</sup> Tables with the results of endogeneity tests and first stage regressions are available upon request

<sup>6</sup> The group of adults who assessed their health as excellent is mainly (80%) comprised by relatively young people below 35.



Table 1. Association between self-assessed health and propensity to take care of own health (socioeconomic parameters controlled)<sup>7</sup>

		Association between factors and health outcomes (comparison with the reference category)				
Mean probabilities, %		Excellent 8.5	Very good 16.1	Good 46.4	Fair 25.7	Poor 3.3
		dP/dX	dP/dX	dP/dX	dP/dX	dP/dX
<b>Female</b>		-0.017**	-0.054**	-0.017	0.078***	0.009**
<b>Age</b>		-0.003***	-0.009***	-0.002	0.013***	0.001***
<b>Income per household member</b> (Ref. cat.: 1st income quintile)	2nd income quintile	0.049	-0.023	0.081**	-0.097**	-0.010*
	3rd income quintile	0.055*	0.023	0.055	-0.120***	-0.012*
	4th income quintile	0.047*	-0.017	0.080**	-0.099**	-0.011*
	5th income quintile	0.062*	-0.019	0.088**	-0.118***	-0.012**
	Unknown income	0.066*	-0.013	0.099***	-0.136***	-0.015**
<b>Marital status</b> (Ref. cat.: Married and live together)	Widowed / Divorced / Married, but live separately	-0.015**	-0.003	-0.055	0.064*	0.010
	Never married	-0.007	-0.026	-0.008	0.037	0.004
<b>Education</b> (Ref. cat.: Lower than secondary general)	Secondary general	0.048*	0.019	0.069**	-0.123***	-0.014**
	Secondary professional	0.050**	0.055	0.059	-0.148***	-0.017**
	Higher / incomplete higher (at least 2 years)	0.046**	0.094 <sup>a</sup>	0.011	-0.137***	-0.013**
<b>Employed / student</b>		0.020***	0.085***	0.036	-0.124***	-0.017*
<b>Ethnicity</b> (Ref. cat.: Ethnic Latvian)	Non-Latvian	-0.002	-0.006	-0.003	0.010	0.001
<b>Propensity to take care of own health</b>		0.010	0.053***	-0.002	-0.055**	-0.006 <sup>a</sup>

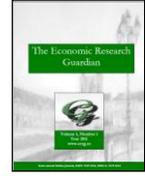
Note: Asterisks \*, \*\*, \*\*\* indicate a statistically significant difference from the reference group at 10%, 5%, 1% level respectively.

<sup>a</sup> Effect is significant at 11% level

Source: Author's calculations using Self Assessment of Quality of Life and Its Relation to Health Behaviour of Latvian Population survey data

When interpreting the results one should keep in mind two important points. First, we estimate the effect of a subjective measure, i.e. of self-assessed intensity of taking care of own health. While residents of Latvia perceive the concept mainly as illness behaviour and much less as everyday activities aimed to improve health, we expect that the effect of the factor on health would be stronger if the perception of taking care of own health was enriched with the full set of activities related to health behaviour. Second, the methodology used doesn't prove a causal relationship between taking care of own health and SAH. The measures of association can indicate a true causal impact, but also they can partly reflect unobserved heterogeneity and/or reciprocal causality.

<sup>7</sup> Full results are provided in the Table A1.



## 4.2. Association between health and healthiness of lifestyle

According to the results of the two-dimensional stereotype logit model provided in the Table 2 propensity to keep to healthy lifestyle is positively associated with SAH. The effect of the variable is one of the strongest in the model. Other parameters equal, change by one standard deviation of the propensity to keep to healthy lifestyle, for example, provides increase or reduction of probability of fair health by 11,5%. The effect is huge taking into account that the mean probability of fair health is 25,7%. As stated in the Section 3, the weight of intensive physical activities is not very big in the perceived healthy lifestyle among adults in Latvia; this means that if the weight of sports was greater in the lifestyle factor, the estimated effect of the variable could be even stronger.

In contrast to the taking care of own health variable (section 4.1.), the effect of propensity to keep to healthy lifestyle is significant at the both ends of the SAH scale, and similarly to taking care variable the effect is particularly strong for very good SAH and for fair health. This proves that keeping to healthy lifestyle is an efficient measure to improve health or prevent it's deterioration no matter what is one's health condition.

As mentioned above, engagement into intensive physical activities is relatively low in Latvia. Of course active sports are easier to promote among well-off population since such activities imply financial investment. However, even if the social programmes aimed to change health behaviour in this direction in the short run would be efficient mainly among better-off social groups, one should expect broader effect in the long run. Cockerham et al. (1988) proposes that healthy lifestyles originated in the upper middle-class, have the potential to spread across class boundaries; although the author admits that the degrees of quality may be different.

Zhuravleva (2005) finds that changes in lifestyle that are observed as a result of changes in overall social norms and traditions are more stable than behavioural schemes that are dependent mainly from cognitive motivation. Thus paying more attention to own health and improving lifestyle should be motivated and induced on societal level as a part of culture, not only on personal level.



Table 2. Association between self-assessed health and propensity to keep to healthy lifestyle (socioeconomic parameters controlled)<sup>8</sup>

		Association between factors and health outcomes (comparison with the reference category)				
Mean probabilities, %		Excellent 8.5	Very good 16.1	Good 46.4	Fair 25.7	Poor 3.3
		dP/dX	dP/dX	dP/dX	dP/dX	dP/dX
<b>Female</b>		-0.015**	-0.046**	-0.017	0.070***	0.008**
<b>Age</b>		-0.002***	-0.008***	-0.003	0.011***	0.001**
<b>Income per household member</b>	2nd income quintile	0.036	-0.046	0.088***	-0.069	-0.008*
	3rd income quintile	0.048	0.010	0.061	-0.108***	-0.011**
	4th income quintile	0.037	-0.037	0.085***	-0.076*	-0.009*
	5th income quintile	0.057*	-0.025	0.090***	-0.111***	-0.012**
	Unknown income	0.066**	-0.011	0.097***	-0.137***	-0.015**
<b>Marital status</b> (Ref. cat.: Married and live together)	Widowed / Divorced / Married, but live separately	-0.015**	-0.001	-0.056	0.062*	0.009
	Never married	-0.012	-0.054	-0.012	0.070*	0.009
<b>Education</b> (Ref. cat.: Lower than secondary general)	Secondary general	0.041*	0.001	0.075**	-0.105**	-0.012*
	Secondary professional	0.040*	0.024	0.068*	-0.118**	-0.014*
	Higher / incomplete higher (at least 2 years)	0.033	0.049	0.030	-0.102**	-0.011*
<b>Employed / student</b>		0.020**	0.088***	0.039	-0.129***	-0.018*
<b>Ethnicity</b> (Ref. cat.: Ethnic Latvian)	Non-Latvian	-0.006	-0.027	-0.004	0.033	0.004
<b>Propensity to keep to healthy lifestyle</b>		0.020**	0.109***	-0.001	-0.115***	-0.013*

Note: Asterisks \*, \*\*, \*\*\* indicate a statistically significant difference from the reference group at 10%, 5%, 1% level respectively.

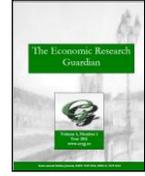
Source: Author's calculations using Self Assessment of Quality of Life and Its Relation to Health Behaviour of Latvian Population survey data

## 5. Conclusions

This paper explores association between self-assessed health and attitude towards own health considered in the two dimensions – taking care of own health and healthiness of lifestyle, after accounting for socioeconomic parameters. We also analyse peculiarities of perception of the concepts "taking care of own health" and "healthy lifestyle" by adult population of Latvia.

We indicate a potential problem of perception of taking care of own health mainly as of illness behaviour, while everyday activities, including sports, aimed to maintain and promote health are rather weakly associated with perceived care of own health. Weight of physical activity in perceived healthy lifestyle is not very big as well. Perception of healthy lifestyle is mainly based on healthy diet

<sup>8</sup> Full results are provided in the Table A3.



and not very intensive consumption of (but not giving up) tobacco and alcoholic products. Providing more incentive for population engagement into active sports and other intensive physical activities within the public health policy would be very important for population health. This could move Latvia up from the list of 7 countries with the least physically active population in the EU (European Commission, 2010).

The results of the two-dimensional stereotype logit models developed in this study reveal strong positive relationship between SAH on the one hand and the two factors examined – propensity to take care of own health and propensity to keep to healthy lifestyle – on the other hand, socioeconomic factors controlled. Effects of both factors are very strong; for example, the effect of the lifestyle variable exceeds the positive effect provided by high income level. The effects could be even more impressive if perception of the two concepts – "taking care of own health" and "healthy lifestyle" – was enriched by additional components that constitute positive health behaviour. The obtained results can indicate a true causal impact, but also they can partly reflect unobserved heterogeneity or reciprocal causality.

Together with major problems of health care system in Latvia there exists a serious problem on the individual level: people lack personal responsibility for own health. Major part of population is ready to admit that they do not really take care of their own health and that they often neglect illnesses. No doubts, social and economic factors play a major role in one's possibilities to ensure positive health and illness behaviour; unfavourable socioeconomic environment can also reduce one's motivation to take care of own health. However, in terms of heavily reduced state budget for healthcare we face in Latvia, positive attitude towards health and readiness to accept personal responsibility for own health becomes especially important.

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Any opinions expressed here and remaining mistakes are those of the author.

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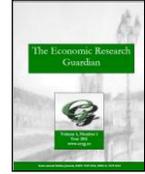
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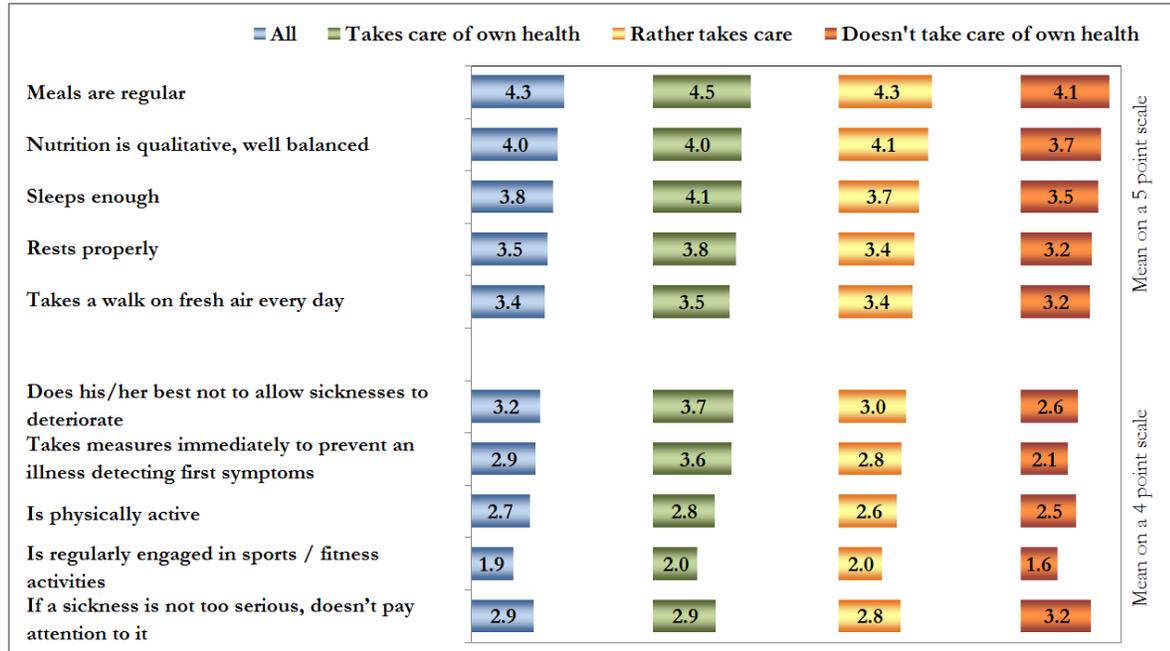
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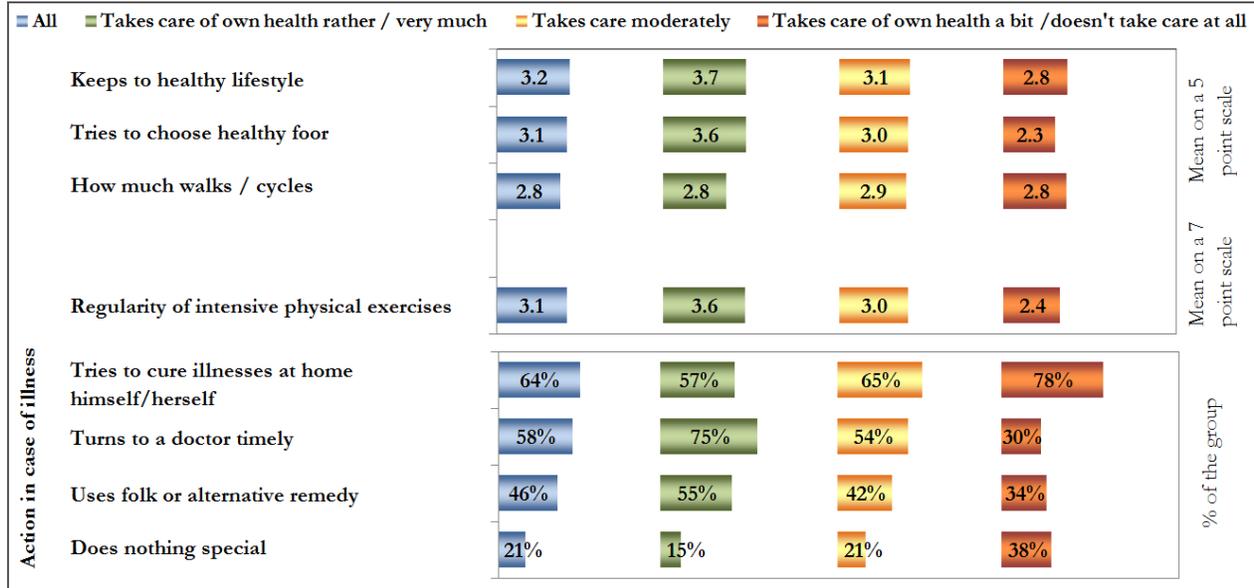
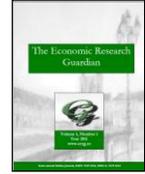
## Appendix



Source: Author's calculations using Health Survey data

Figure A1. Health and illness behaviour of adults in Latvia depending on self-assessed taking care of own health<sup>9</sup>

<sup>9</sup> The upper five statements were assessed on a 5 point scale (single scale was used for these five statements), while the lower five statements were assessed on a (single) 4 point scale.



Source: Author's calculations using Self Assessment of Quality of Life and Its Relation to Health Behaviour of Latvian Population survey data

Figure A2. Health and illness behaviour of adults in Latvia depending on self-assessed intensity of taking care of own health<sup>10</sup>

<sup>10</sup> In distinction from the Figure A1, the answer scales are different for each aspect of lifestyle on the Figure A2. Thus Figure A2 doesn't allow making a conclusion on prevalence of each lifestyle aspect in one's life; however, we still can analyse differences between the three groups.



Table A1. Association between self-assessed health and socioeconomic determinants and propensity to take care of own health

Two-dimensional stereotype logistic regression with bootstrapped standard errors

		Association between factors and health (comparison with the reference category)					
		Excellent 8.5		Very good 16.1		Good 46.4	
Mean probabilities, %		dP/dX	S.E.	dP/dX	S.E.	dP/dX	S.E.
<b>Female</b>		-0.017**	0.007	-0.054**	0.027	-0.017	0.022
<b>Age</b>		-0.003***	0.001	-0.009***	0.001	-0.002	0.002
<b>Income per household member</b>	2nd income quintile	0.049	0.031	-0.023	0.043	0.081**	0.035
	3rd income quintile	0.055*	0.030	0.023	0.048	0.055	0.045
(Ref. cat.: 1st income quintile)	4th income quintile	0.047*	0.029	-0.017	0.036	0.080**	0.036
	5th income quintile	0.062*	0.035	-0.019	0.039	0.088**	0.037
	Unknown income	0.066*	0.035	-0.013	0.036	0.099***	0.036
<b>Marital status</b>	Widowed / Divorced / Married, but live separately	-0.015**	0.007	-0.003	0.044	-0.055	0.038
(Ref. cat.: Married and live together)	Never married	-0.007	0.007	-0.026	0.030	-0.008	0.029
<b>Education</b>	Secondary general	0.048*	0.025	0.019	0.044	0.069**	0.032
(Ref. cat.: Lower than secondary general)	Secondary professional	0.050**	0.021	0.055	0.043	0.059	0.037
	Higher / incomplete higher (at least 2 years)	0.046**	0.023	0.094 <sup>a</sup>	0.058	0.011	0.037
<b>Employed / student</b> (dummy)		0.020***	0.007	0.085***	0.025	0.036	0.041
<b>Ethnicity</b>	Non-Latvian	-0.002	0.007	-0.006	0.028	-0.003	0.024
(Ref. cat.: Ethnic Latvian)							
<b>Propensity to take care of own health</b>		0.010	0.007	0.053***	0.020	-0.002	0.023

Note: Asterisks \*, \*\*, \*\*\* indicate a statistically significant difference from the reference group at 10%, 5%, 1% level respectively.

<sup>a</sup> Effect is significant at 11% level

Source: Author's calculations using Self Assessment of Quality of Life and Its Relation to Health Behaviour of Latvian Population survey data

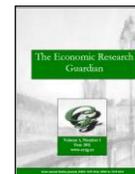


Table A2. Association between self-assessed health and socioeconomic determinants and propensity to take care of own health

Two-dimensional stereotype logistic regression

		Association between factors and health (comparison with the reference category)					
		Excellent 8.5		Very good 16.1		Good 46.4	
Mean probabilities, %		dP/dX	S.E.	dP/dX	S.E.	dP/dX	S.E.
<b>Female</b>		-0.019**	0.008	-0.067***	0.026	-0.021	0.027
<b>Age</b>		-0.002***	0.001	-0.008***	0.001	-0.004**	0.002
<b>Income per household member</b> (Ref. cat.: 1st income quintile)	2nd income quintile	0.038	0.029	-0.015	0.036	0.072**	0.035
	3rd income quintile	0.038	0.027	0.026	0.046	0.047	0.039
	4th income quintile	0.037	0.028	-0.033	0.029	0.088***	0.033
	5th income quintile	0.061	0.042	-0.003	0.033	0.089***	0.031
	Unknown income	0.086**	0.039	-0.006	0.033	0.105***	0.032
<b>Marital status</b> (Ref. cat.: Married and live together)	Widowed / Divorced / Married, but live separately	-0.016**	0.008	0.000	0.035	-0.069*	0.041
	Never married	-0.013	0.008	-0.018	0.027	-0.046	0.039
<b>Education</b> (Ref. cat.: Lower than secondary general)	Secondary general	0.056*	0.029	0.029	0.044	0.076*	0.039
	Secondary professional	0.053**	0.025	0.026	0.042	0.090**	0.042
	Higher / incomplete higher (at least 2 years)	0.026	0.022	0.097 <sup>a</sup>	0.060	-0.006	0.050
<b>Employed / student (dummy)</b>		0.026***	0.009	0.090***	0.021	0.106	0.077
<b>Ethnicity</b> (Ref. cat.: Ethnic Latvian)	Non-Latvian	-0.006	0.007	-0.009	0.024	-0.016	0.027
<b>Propensity to take care of own health</b>		0.011 <sup>a</sup>	0.007	0.041*	0.023	0.012	0.024

Note: Asterisks \*, \*\*, \*\*\* indicate a statistically significant difference from the reference group at 10%, 5%, 1% level respectively.

<sup>a</sup> Effect is significant at 11% level

Source: Author's calculations using Self Assessment of Quality of Life and Its Relation to Health Behaviour of Latvian Population survey data



Table A3. Association between self-assessed health and socioeconomic determinants and propensity to keep to healthy lifestyle

Two-dimensional stereotype logistic regression with bootstrapped standard errors

		Association between factors and health (comparison with the reference category)					
		Excellent 8.5		Very good 16.1		Good 46.4	
		dP/dX	S.E.	dP/dX	S.E.	dP/dX	S.E.
<b>Female</b>		-0.015**	0.007	-0.046**	0.023	-0.017	0.022
<b>Age</b>		-0.002***	0.001	-0.008***	0.001	-0.003	0.002
<b>Income per household member</b> (Ref. cat.: 1st income quintile)	2nd income quintile	0.036	0.027	-0.046	0.040	0.088***	0.034
	3rd income quintile	0.048	0.030	0.010	0.044	0.061	0.039
	4th income quintile	0.037	0.025	-0.037	0.036	0.085***	0.031
	5th income quintile	0.057*	0.031	-0.025	0.040	0.090***	0.033
	Unknown income	0.066**	0.033	-0.011	0.041	0.097***	0.030
<b>Marital status</b> (Ref. cat.: Married and live together)	Widowed / Divorced / Married, but live separately	-0.015**	0.007	-0.001	0.043	-0.056	0.041
	Never married	-0.012	0.009	-0.054	0.033	-0.012	0.042
<b>Education</b> (Ref. cat.: Lower than secondary general)	Secondary general	0.041*	0.023	0.001	0.036	0.075**	0.036
	Secondary professional	0.040*	0.023	0.024	0.034	0.068*	0.040
	Higher / incomplete higher (at least 2 years)	0.033	0.023	0.049	0.042	0.030	0.038
<b>Employed / student (dummy)</b>		0.020**	0.009	0.088***	0.029	0.039	0.050
<b>Ethnicity</b> (Ref. cat.: Ethnic Latvian)		-0.006	0.007	-0.027	0.024	-0.004	0.027
<b>Propensity to keep to (perceived) healthy lifestyle</b>		0.020**	0.009	0.109***	0.036	-0.001	0.032

Note: Asterisks \*, \*\*, \*\*\* indicate a statistically significant difference from the reference group at 10%, 5%, 1% level respectively.

Source: Author's calculations using Self Assessment of Quality of Life and Its Relation to Health Behaviour of Latvian Population survey data

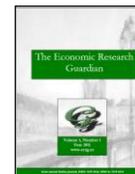


Table A4. Association between self-assessed health and socioeconomic determinants and propensity to keep to healthy lifestyle  
Two-dimensional stereotype logistic regression

		Association between factors and health (comparison with the reference category)					
		Excellent 8.5		Very good 16.1		Good 46.4	
Mean probabilities, %		dP/dX	S.E.	dP/dX	S.E.	dP/dX	S.E.
<b>Female</b>		-0.017**	0.008	-0.060**	0.024	-0.021	0.026
<b>Age</b>		-0.002***	0.001	-0.007***	0.001	-0.003*	0.002
<b>Income per household member</b> (Ref. cat.: 1st income quintile)	2nd income quintile	0.024	0.024	-0.031	0.032	0.070*	0.037
	3rd income quintile	0.030	0.024	0.015	0.043	0.049	0.039
	4th income quintile	0.026	0.024	-0.046	0.028	0.085**	0.037
	5th income quintile	0.055	0.039	-0.008	0.032	0.091***	0.031
	Unknown income	0.084**	0.039	-0.004	0.033	0.104***	0.032
<b>Marital status</b> (Ref. cat.: Married and live together)	Widowed / Divorced / Married, but live separately	-0.015**	0.008	0.002	0.035	-0.069*	0.041
	Never married	-0.017**	0.008	-0.037	0.025	-0.062	0.043
<b>Education</b> (Ref. cat.: Lower than secondary general)	Secondary general	0.046*	0.027	0.016	0.043	0.077*	0.040
	Secondary professional	0.040*	0.024	0.006	0.042	0.089**	0.045
	Higher / incomplete higher (at least 2 years)	0.014	0.018	0.061	0.056	0.000	0.052
<b>Employed / student</b> (dummy)		0.025***	0.009	0.091***	0.021	0.110	0.077
<b>Ethnicity</b> (Ref. cat.: Ethnic Latvian)	Non-Latvian	-0.010	0.007	-0.023	0.025	-0.024	0.028
<b>Propensity to keep to (perceived) healthy lifestyle</b>		0.022**	0.011	0.077**	0.037	0.030	0.041

Note: Asterisks \*, \*\*, \*\*\* indicate a statistically significant difference from the reference group at 10%, 5%, 1% level respectively.

Source: Author's calculations using Self Assessment of Quality of Life and Its Relation to Health Behaviour of Latvian Population survey data

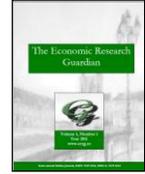


Table A5. Scale parameters of the two-dimensional stereotype logit model

1st dimension	/phi1_1	Excellent health	0	(base outcome)
	/phi1_2	Very good health	1	
	/phi1_3	Good health	(omitted)	
	/phi1_4	Fair health	(omitted)	
	/phi1_5	Poor health	(omitted)	
2nd dimension	/phi2_1	Excellent health	0	(base outcome)
	/phi2_2	Very good health	(omitted)	
	/phi2_3	Good health	1	
	/phi2_4	Fair health	1.61	(0.14)
	/phi2_5	Poor health	2.13	(0.24)