
MODELING ROMANIANS' LEVEL OF LIFE SATISFACTION¹

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Abstract:

As a multi-dimensional indicator that captures the quality of life and wellbeing, the level of life satisfaction is very important for designing future policy. The present analysis will focus on the study of life satisfaction based on the Romanian respondents' opinions and feelings about family life, work and society. We will look at the influence of several factors on the level of life satisfaction: quality of life, financial situation of the individual, position in society, life in different regions of Romania. The data used in our analysis is selected from the Eurobarometer survey responses. The Eurobarometer is a survey organized and launched periodically by the European Commission and it was designed to help understand various dimensions of the social, economic and political strategies, as well as future EU policies.

Key words: *life satisfaction, regression model, regression analysis*

Achieving a high level of (subjective) welfare is a process determined by the specificity of each individual. Aristotle (Nicomachean Ethics, 1988) believed that there is no single model of reaching happiness, or a unique form of its manifestation. Having in mind Aristotle's idea, we model the Romanians' life satisfaction with several factors that could influence the well-being.

The data we plan to analyze were selected from the Eurobarometer survey that was carried out in May 2011. Launched and organized periodically by the Commission, this survey is designed to better understand the various dimensions of social, economic, political, strategies and future EU policies. Our paper analyzes the responses of all Romanian citizens that were residents in Romania at the time of the survey.

The aim is to determine which factors from a series of several potential factors influence Romanians' level of life satisfaction and how this might happen. The data will be modeled using binomial logistic regression so that life satisfaction, a binomial variable, is estimated through the independent variables: age, sex, job, household financial situation, occupation, type of community, society level, house ownership, region of residence.

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Using the logistic regression we will estimate the probability that a Romanian with certain characteristics defined by the independent variables considers himself/ herself satisfied with his life in Romania.

In all, Eurobarometer 75.3 interviewed 31.769 citizens in the 27 countries of the European Union after the 2004/2007 enlargement. The Romanian respondents included in this survey were all residents and summed up to 1023. In order to conduct a binomial analysis (“0/1” response: “1”- the event takes place, “0” – the opposite) the “Do not know” type answers were removed from the life satisfaction data.

The dependent variable is encoded by the following values:

Life satisfaction: {1 - Total ‘Satisfied’, 0 - Total ‘Dissatisfied’}

The independent variables are encoded by the following values:

Job situation: {1 = “Total ‘Good’”; 0 = “Total ‘Bad’”; 99 = “DK”}

Occupation: {1 = “self-employed”; 2 = “employed”; 3 = “not working”}

Household situation: {1 = “Total ‘Good’”; 2 = “Total ‘Bad’”; 99 = “DK”}

House ownership: {1 = “Yes”; 2 = “No”}

Sex: {1 = “Male”; 0 = “Female”}

Age: {1 = “15-24”; 2 = “25-39”; 3 = “40-54”; 4 = “55 +”; 99 = “Refusal / DK”}

Type of community: {1 = “Village/ rural area”; 2 = “Small / middle size town”; 3 = “Large town”; 99 = “DK”}

Society level: (1 – lowest level in the society): {1 = “1-4”; 2 = “5-6”; 3 = “7-10”; 99 = “DK”}

Region: {1 = “Northeast”; 2 = “South-East”; 3 = “South”; 4 = “South-West”; 5 = “West”; 6 = “Northwest”; 7 = “Central”; 8 = “Bucharest”; 99 = “DK”}

The logistic regression models the relationship between a set of independent variables X_i (categorical, continuous) and a dichotomous dependent variable Y - “life satisfaction”. The binary dependent variable represents the membership in two classes or categories: “1” expresses the occurrence of an event, “0” the absence of this event.

The regression equation will provide information about:

- the importance of the independent variables in differentiating the classes/ categories
- the assignment of the observations in a class / category.

We will estimate the probability of being or not satisfied with life according to the values of the independent (predicting) variables. Following the general model for the binomial logistic regression [$\text{logit}(p) = \log(p/(1-p)) = \beta_0 + \beta_1 * x_1 + \dots + \beta_k * x_k$], the resulting model is:

$$\text{logit}(p) = \log(p/(1-p)) = \beta_0 + \beta_1 * \text{JobSituation}(1) + \beta_2 * \text{HouseholdSit}(1) + \beta_3 * \text{Age}(2) + \beta_4 * \text{Age}(3) + \beta_5 * \text{Age}(4) + \beta_6 * \text{SocietyLevel}(2) + \beta_7 * \text{SocietyLevel}(3) + \beta_8 * \text{Region}(2) + \beta_9 * \text{Region}(6)$$

where $\text{logit}(p)$ – notation for the logistic function
 p = the probability of being totally satisfied with life

Results of applying the R logistic regression

Table 1

Logistic Regression Model

```

lrm(formula = SatViata ~ as.factor(SitLocMunca) + as.factor(Activitate) +
  as.factor(SitGosp) + as.factor(Proprietate) + as.factor(Sex) +
  as.factor(Varsta) + as.factor(Comunitate) + as.factor(NivelSoc) +
  as.factor(Regiune), data = LifeSatRo, na.action = na.pass,
  y = TRUE)

```

	Model Likelihood Ratio Test	Discrimination Indexes	Rank Discrim. Indexes
Obs	1021	LR chi2 308.21	C 0.809
0	620	d.f. 23	Dxy 0.618
1	401	Pr(> chi2) <0.0001	gamma 0.620
max deriv	2e-13	Brier 0.171	tau-a 0.295

Source: Eurobarometer 75.3 data modeled with R

- Likelihood ratio –308 (chi-square likelihood ratio - LR chi2) and 23 degrees of freedom (P <0.0001) show that the model is statistically significant (at least one predictor has a n effect).
 - R: the percent of the dependent variable explained by the model
 - Brier: accuracy of assessing the probabilities - a score close to “0” means high accuracy

According to the P values obtained by applying the logistic regression, the following independent variables:

- job situation, the second type of occupation, household situation, almost all age categories, all the society levels, 2 of the 8 regions are statistically significant in estimating the dependent variable
- house ownership, sex, type of community, six of the eight regions are not significant in estimating the dependent variable.

Results of applying the R logistic regression – estimates for the independent variables

Table 2

	Coef	S.E.	Wald Z	Pr(> Z)
Intercept	-1.6826	0.4490	-3.75	0.0002
SitLocMunca=1	0.4833	0.2119	2.28	0.0226
SitLocMunca=99	0.4273	0.2116	2.02	0.0435
Activitate=2	0.6061	0.3249	1.87	0.0621
Activitate=3	0.2077	0.3425	0.61	0.5442
SitGosp=1	1.6042	0.1761	9.11	<0.0001
SitGosp=99	1.0264	0.4738	2.17	0.0303
Proprietate=1	0.0022	0.1857	0.01	0.9905
Sex=1	-0.0828	0.1538	-0.54	0.5901
Varsta=2	-0.7646	0.2579	-2.96	0.0030
Varsta=3	-0.9109	0.2650	-3.44	0.0006
Varsta=4	-1.0023	0.2465	-4.07	<0.0001
Comunitate=2	-0.0492	0.1938	-0.25	0.7995
Comunitate=3	-0.1334	0.2030	-0.66	0.5110
NivelSoc=2	0.5067	0.1880	2.70	0.0070
NivelSoc=3	1.2707	0.2171	5.85	<0.0001
NivelSoc=99	-0.2306	0.6479	-0.36	0.7220
Regiune=2	0.7358	0.2829	2.60	0.0093
Regiune=3	0.4140	0.2789	1.48	0.1378
Regiune=4	0.2235	0.3031	0.74	0.4609
Regiune=5	0.1592	0.3264	0.49	0.6258
Regiune=6	0.7412	0.2916	2.54	0.0110
Regiune=7	0.0928	0.3052	0.30	0.7612
Regiune=8	-0.0194	0.3666	-0.05	0.9579

Source: Eurobarometer 75.3 data modeled with R

The **coefficients** β_i indicate the change in $\log(\text{LifeSatisfaction})$ when changing the independent variable x_i by one unit, when all other independent variables are held constant. The R statistical software automatically selects the first level (category) of each variable as a reference.

- **Job Situation:** having a good job situation versus having a bad job situation increases the $\log(\text{Life Satisfaction})$ by 0,4833.
- **Household Situation:** having a good household situation versus having a bad household situation increases the $\log(\text{Life Satisfaction})$ by 1,6042
- **Age:** being of age 25-39 versus being of age 15-24 decreases $\log(\text{Life Satisfaction})$ by 0,7646
- **Age:** being of age 40-54 versus being of age 15-24 decreases $\log(\text{Life Satisfaction})$ by 0,9109
- **Age:** being of age over 55 versus being of age 15-24 decreases $\log(\text{Life Satisfaction})$ by 1,0023

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- **Society Level:** holding a society level type 5-6 versus a level type 1-4 increases $\log(\text{Life Satisfaction})$ by 0,5067
 - **Society Level:** holding a society level type 7-10 versus a level type 1-4 increases $\log(\text{Life Satisfaction})$ by 1,2707
 - **Region:** residing in Region 2 (South-East) versus in Region 1 (North-East) increases $\log(\text{Life Satisfaction})$ by 0,7358
 - **Region:** residing in Region 6 (North-West) versus in Region 1 (North-East) increases $\log(\text{Life Satisfaction})$ by 0,7412

Odds Ratio

We turn differences in the log of the odds [$\log(\text{OR})$] into differences in the odds ratio by applying the exponential function:

- **Job Situation:** the odds of being satisfied with life when having a good job situation versus when having a bad job situation are 1,62 ($\exp(0,4833)=1,621416$)
- **Household Situation:** the odds of being satisfied with life when having a good household situation versus when having a bad household situation are 4,974 ($\exp(1,6042)=4,9738789$)
- **Age:** the odds of being satisfied with life when being of age 25-39 versus being of age 15-24 are 0,465 ($\exp(-0,7646)=0,46552$)
- **Age:** the odds of being satisfied with life when being of age 40-54 versus being of age 15-24 are 0,402 ($\exp(-0,9109)=0,40216$)
- **Age:** the odds of being satisfied with life when being of age over 55 versus being of age 15-24 are 0,367 ($\exp(-1,0023)=0,36703$)
- **Society Level:** the odds of being satisfied with life when holding a society level type 5-6 versus a society level type 1-4 are 1,66 ($\exp(0,5067)=1,65980479$)
- **Society Level:** the odds of being satisfied with life when holding a society level type 7-10 are 3,563 ($\exp(1,2707)=3,563346$)
- **Region:** the odds of being satisfied with life residing in Region 2 (South-East) versus in Region 1 (North-East) are 2,087 ($\exp(0,7358)=2,08715$)
- **Region:** the odds of being satisfied with life residing in Region 6 (North-West) versus in Region 1 (North-East) are 2,098 ($\exp(0,7412)=2,09845$)

The conversion of the coefficients into odds ratios is shown in the results of the “`lrm`” R function: the summary of this function shows the effect of the predictors on the logit scale and the odds ratios when a predictor changes.

We use the regression coefficients obtained in our analysis and get the following model for life satisfaction:

$$\begin{aligned} \text{logit}(p) &= \log(p/(1-p)) \\ &= -1,6826 + 0,4833*\mathbf{JobSituation(1)} + 1,6042*\mathbf{HouseholdSit(1)} - \\ & 0,7646*\mathbf{Age(2)} - 0,9109*\mathbf{Age(3)} - 1,0023*\mathbf{Age(4)} + 0,5067*\mathbf{SocietyLevel(2)} + \\ & 1,2707*\mathbf{SocietyLevel(3)} + 0,7358*\mathbf{Region(2)} + 0,7412*\mathbf{Region(6)} \end{aligned}$$

Conclusions

As shown in our analysis, only some of the potential determinants of life satisfaction that we proposed had significant results. The positive impact of a good financial situation on the satisfaction level was confirmed: a good job situation and a good financial household situation will make Romanian admit they are more satisfied with their lives.

After performing this analysis, we could be able to answer the question “Can money can buy happiness or not?” that many authors have addressed in their studies. Just like Frijters, Haisken-DeNew & Shield (2004) showed in their life satisfaction study that took place in East Germany after reunification: “Money matters”!

At the same time, the differences between Romanian development regions regarding the financial situation lead to differences in life satisfaction. Income inequality in the eight regions will influence the life satisfaction level of the Romanians as shown in our analysis. The predictors that resulted to be significant for the level of life satisfaction of the Romanians are the job situation, the household situation, age, the society level.

This analysis clearly shows that one cannot strictly relate on these results, one can include additional variables to perform a more exact modeling of the level of satisfaction. Ideally, a multilevel analysis, including an analysis of the social subgroups or other types of groups could complete a further analysis, to show more real and reliable findings.

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