Nice Neighborhood or Network Capital: What Drives Residential Quality of Life?

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1 Introduction

There is a broad agreement in the literature that a nice neighborhood, i.e. both local man-made and local natural amenities, has an impact on the individual perception of the local quality of life. Other non-pecuniary aspects, hidden reasons and motives such as a good circle of friends and a good social network embedding affect the individual quality of life evaluation, too. But these components are often neglected in investigations due to measurement problems and data availability. Wellman (2001) define these aspects, i.e. relations with friends, neighbors, relatives, and workmates that significantly provide companionship, emotional aid, goods and services, information, and a sense of belonging as network capital, a form of social capital. But the question arises what drives residential quality of life the most? - Which relative importance has the network capital of an individual compared to a nice neighborhood?

The aim of this paper is to answer this question and to gain a better understanding of the subjective evaluation of the home regions quality of life. Thus, we developed a questionnaire in which the interviewees were asked to evaluate the quality of life in their home region compared to the average quality of life of their country (much lower, lower, the same, higher or much higher). Further, the interviewees had to specify their satisfaction with different aspects of their local living conditions (very satisfied, satisfied, dissatisfied or very dissatisfied) according to quality of life categories. The network capital is measured on the one hand by asking for the satisfaction with social relations. On the other hand we collect EGO-centric network data. Applying the name generator concept, the state-of-the-art methodology to collect social network data (Wasserman and Faust, 1994), social network variables, as e.g. network density, network size, meeting frequency, contact frequency, social resources, and social positions, are generated.

From a methodological point of view it is important to take into account that the valuation of specific quality of life factors might differ across people. E.g. dependent on different life stages, a good endowment with care facilities might be much more valued by older inhabitants, while provision of good public education is higher valued by middle-aged family households (Whisler et al., 2008; Détang-Dessendre et al., 2008). Further, it is conceivable that women have different preferences than men, or that some people look at life pessimistically or optimistically, even though there is no difference in their level of well-being. Moreover, individuals' social networks can

affect their preferences systematically. Individual heterogeneity might imply that estimated parameters are biased and demand an adequate econometric implementation. Against this backdrop we apply a latent class analysis to allow for preference heterogeneity (Boxall and Adamowicz, 2002). The approach of this paper therefore amounts to asking not only whether e.g. the quality of the natural environment enhances the perceived local quality of life, but also for whom it enhances local quality of life mostly. This enables a better understanding of the evaluation of the home regions quality of life, i.e. to identify systematics in the preferences of people caused by their socioeconomic characteristics. Moreover, the relative impact of the explanatory variables on the local quality of life can be deduced.

Data-base is a household-survey: it includes around 600 heads of households in four different rural communities in Poland[1]. Socio-economic characteristics like gender, age, family status, education and income have been collected along with the social capital indicators, the quality of life evaluation, and the satisfaction questions.

As there is a multitude of approaches dealing with the evaluation of quality of life, the next section of this paper presents the approach taken by this study and the relevant literature. Section 3 introduces the latent class regression, which is the methodological approach used in this study. The database is described before the estimation results are included and discussed. The final section draws conclusions about potential policy advice related to the empirical findings.

2 Quality of life

2.1 Neighborhood

On a micro level, different aspects, i.e. the home environment, the neighborhood environment[2], the transport and recreational opportunities environment and the way an individual interacts with it on a day-to-day basis, comprise individuals quality of life (Bayulken and Huisingh, 2014). Individuals and households receive utility from consuming purchased goods, leisure time and local amenities. Local amenities are defined as local public goods and services. Amenities can be natural (e.g. open space, natural landscapes) or man-made (e.g. the cultural or recreational value of a region). Moreover,

[1] Due to missing values our sample comprises 582 individuals.
[2] The neighborhood environment includes pollution, noise, traffic and climate.

man-made dis-amenities like environmental pollution or crime are included in households' utilities, where dis-amenities generate dis-utility.

The positive influence of many environmental attributes, i.e. natural amenities upon quality of life as been shown in a multitude (Stigsdotter et al., 2010; Ewing et al., 2003; Doyle et al., 2006; Jackson et al., 2008). Furthermore, the availability of various man-made amenities such as accessibility to healthcare facilities, museums, theaters, cafes, pubs or shops and sport facilities, provide higher levels of satisfaction of one's sense of place, thus they positively influence the perceived quality of life (Bayulken and Huisingh, 2014).

There is a broad agreement in the literature that these local amenities, the local public good endowment and thus the local quality of life determines individuals' and thus societal well-being and the development of the community (Bovaird and Löffler, 2003). Since local public goods are under the control of local governments the relative importance and evaluation of several public goods is an important information for politicians, e.g. to influence or understand migration decisions because households choose between staying in their current location or migrating to a new location based on their expected utility and benefits derived from the perceived attributes of the different locations (Tiebout, 1956).

Because the utility expectations and environmental perceptions were found to vary depending on the societal structure and macroeconomic conditions (Abbott and Wallace, 2014), the social context is important to understand in seeking to determine the extent to which the public services play a role in one's perception of quality of life (see 2.2).

2.2 Network capital

Another determinant of one's subjective well-being and the community's satisfaction with life is the social cohesion. The residential neighborhood, is the place where one socializes, spends time for both recreation and leisure and perhaps works, thus creating the social networks, which provide a sense of community and belonging (Forrest and Kearns, 2001). The degree of social interaction within communities and families as well as civic engagement and associational activity compose the social network relations and the social capital. Man-made amenities, e.g. sport clubs, may provide the conditions for interaction among residents. But also subjective aspects such as shared values and purpose, mutual trust and willingness to help one another in a

community contribute to social cohesion (Jongeneel-Grimen et al., 2014). Therefore, positive relations within the family, social equity and solidarity' in its social fabric are dimensions of individuals quality of life perception (Sirgy, 2012). Moreover, both the objective factors that influence quality of life as well as the subjective well-being that is linked to perceptions of how we feel about our environment can be influenced by social network contacts. The satisfaction with the social network embedding has an impact on one's perceptions of quality of life (Sirgy and Cornwell, 2002).

2.3 Evaluation

The evaluation of quality of life has been gaining prominence in social research studies since the 1970s. It is a broad and multidisciplinary concept concerned with overall well-being throughout society. Assuming that quality of life includes people's ability, as far as possible, to achieve their goals and choose their ideal lifestyle, the quality of life concept goes beyond the living conditions approach, which tends to focus on the material resources available to individuals (Fahey et al., 2004; Shucksmith et al., 2006). Three major characteristics are associated with the quality of life concept (Fahey et al., 2003):

1. Individuality: The conditions and perceptions of individuals play a key role. The economic and social framework conditions of a certain society are only important determinants for putting the findings at an individual level into their proper context.

2. Multi-dimensionality: This not only requires the description of several life domains, but emphasizes the interplay between domains as this contributes to quality of life.

3. Dualism of objective as well as subjective indicators: Subjective perceptions are of particular relevance in identifying individual goals and orientations. Individual perceptions and evaluations are most significant when these subjective evaluations are linked to objective living conditions.

Bayulken and Huisingh (2014) suggest that 'neighborhood satisfaction', 'home-life satisfaction' and satisfaction with 'sense of community' were highly important elements in relation to how residents perceived their quality of life.

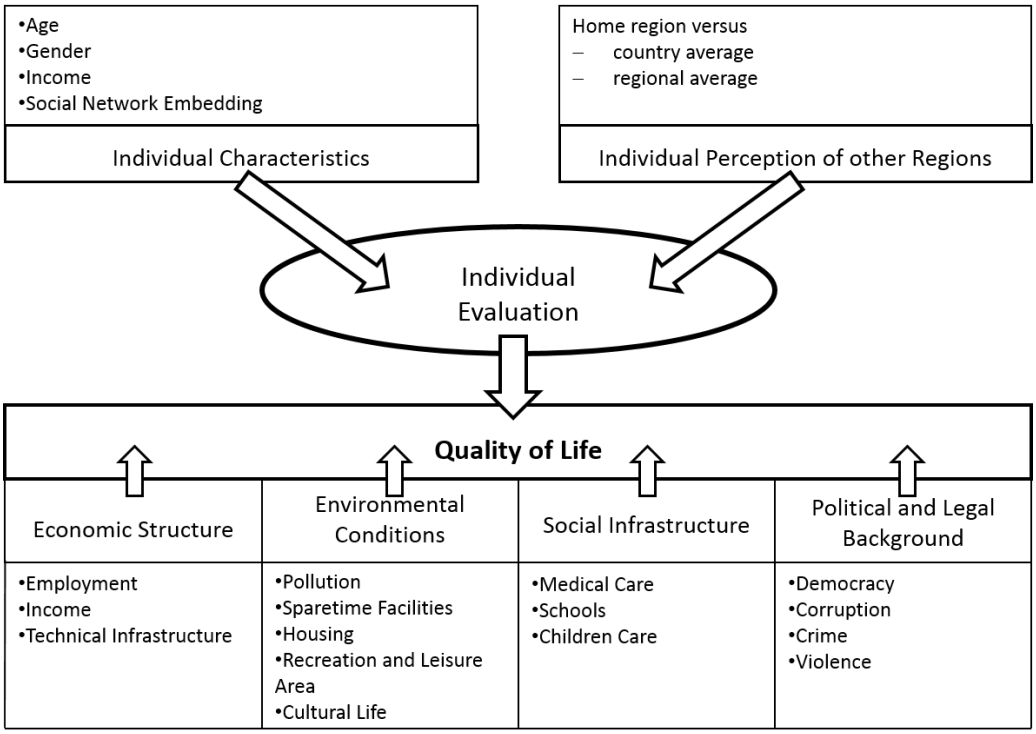

Figure 1: Quality of life measurement

Economic, social and subjective indicators refer to three philosophical approaches to well-being that are based, respectively, on normative ideals, subjective experiences and the ability to select goods and services that one desires. In considering the strengths and weaknesses of the various approaches, Diener and Suh (1997) point out that social indicators and subjective well-being measures are necessary to evaluate a society, and add substantially to the dominant economic indicators. They reflect social indicators such as health and levels of crime, subjective well-being measures (i.e. people's evaluation of their lives and societies) and economic indices.

Basically, economic indicators such as GDP, average income or the employment rate give an incomplete description of quality of life. From a political advice perspective the advantage of economic measures such as availability of data should be modified and not unduly favored by policy makers. Each approach to measuring quality of life contains information that is not contained in the others (Diener and Suh, 1997). Figure 1 illustrates the quality of life measurement followed in this study. The subjective evaluation of objective indicators such as living conditions and economic circumstances is linked to individual characteristics such as age or gender and also includes "relational aspects", since the evaluation of regional quality of life depends on comparison with other regions.

3 Database and methodology

3.1 Database

The data used for the analysis were collected in a household survey in 2007, covering 600 households in four Gminas communities in Poland. These communities were: Wieliszew, Kamieniec, Chotcza and Siemiatkowo. Under the OECD classification[3], Siemiatkowo and Kamieniec have rural locations, whereas Chotcza and Wieliszew are suburban. Within each Gmina, a representative household sample was selected to be interviewed.

In the framework of our study[4], socio-economic characteristics like gender, age and family status have been collected along with preferences and social network characteristics in order to analyze different aspects of rural development.

Furthermore, the interviewees were asked to evaluate the quality of life in their home region compared to the average quality of life in Poland (much lower, lower, the same, higher or much higher). To evaluate satisfaction with the local public goods and the local economy, interviewees had to specify their satisfaction with different aspects of their local living conditions (very satisfied, satisfied, dissatisfied or very dissatisfied). Following the literature we deduced following quality of life categories: the economic structure, the environmental conditions, the social infrastructure, and the social environment. Each category includes several indicators which are assumed to have an important influence on an individual's quality of life evaluation. An example are local job opportunities which are included as an economic structure variable. Further indicators are the accessibility (roads), the telephone system, the quality of the natural environment, job opportunities, the health system, cultural/social life in general and the safety of the neighborhood.

The network capital is measured on the one hand by asking for the satisfaction with social relations. On the other hand we collect EGO-centric

[3]The OECD methodology classifies LAU2s (Local Administrative Units) with a population density below 150 inhabitants per square kilometre as rural. LAU1 regions are predominantly urban if the share of population living in rural LAU2 is below 15 %. Intermediate/ suburban are LAU1 regions if the share of population living in rural LAU2 is between 15% and 50%. If the share of population living in rural LAU2 is higher than 50% a LAU1 region is predominantly rural.

[4]Data was collected within the Advanced-Eval project to evaluate the effect of European rural development aid in Poland and Slovakia. The Advanced Eval project was coordinated by the Institute of Agricultural Economics at the University of Kiel in the Sixth Framework Programme, financed by the European Union (Contract No.: 022708). The project ran from March 2006 to February 2009.

network data. Applying the name generator concept, the state-of-the-art methodology to collect social network data (Wasserman and Faust, 1994), social network variables, as e.g. network density, network size, meeting frequency, contact frequency, are generated.

The most straightforward network measure that we can construct is network size. Network size (NetSize) is calculated by counting the number of different persons mentioned in all the name generators. This count excludes household members, because we consider the network as the social contacts of the household rather than of the respondent per se. Moreover, interviewees were explicitly instructed to include social relations of other household members indicating that the network measured is more a property of the household as a whole than of the respondent. Beyond network size we calculated a measure of the strength of the relationships with the network members. In particular, we used the mean of the contact and meeting frequencies (NetMeetfreq, NetContfreq). The latter is measured as the frequency a household talks to his network contacts. Since the respondent gave us the strengths of relationships between the ten most important network members, we could calculate the network density (NetDens) (see Wasserman and Faust (1994)), an estimate whether all the network members are closely connected among each other or whether they consist of different subgroups in different realms of the society. In table 1 the summary statistic of the social network components is listed.

Table 1: Social network components: summary statistics

Variable	**Mean**	**(Std. Dev.)**	**Min.**	**Max.**	**N**
NetSize	2.631	(1.882)	0	11	582
NetDens	0.604	(0.42)	0	1	582
NetMeetfreq	2.795	(1.261)	0	4	582
(0 low, 4 high)					
NetContfreq	1.66	(1.243)	0	4	582
(0 low, 4 high)					

Since collected satisfaction ratings of quality of life factors are highly correlated we aggregate these factors applying a principal component analysis. Following Deller et al. (2001) applying the principal component analysis is

a adequate method to measure amenities and quality of life attributes. In detail our data suggest a four factor solution. With regard to the factor loadings we interpret the factors as "economic structure" (Econ), "environmental conditions" (Env), "social infrastructure" (Soc), and "social environment" (SocEnv). The summary statistics of the factor scores is given in table 2. Individual characteristics as the personal income per year in 1000 Euro (Inc), the age of the interviewee (Age), the sex of the interviewee (Sex), the family status (Spouse) and the education of the interviewee (1 basic, 2 vocational, 3 secondary, 4 high school, 5 university) are included in table 2, too.

Table 2: Individual characteristics: summary statistics

Variable	**Mean**	**(Std. Dev.)**	**Min.**	**Max.**	**N**
Scores for Econ	0	(1.38)	-4.728	3.479	582
Scores for Env	0	(1.234)	-4.906	2.233	582
Scores for Soc	0	(1.155)	-5.637	3.376	582
Scores for SocEnv	0	(1.045)	-4.1	3.098	582
Inc	11.162	(20.333)	0.141	407.52	582
Age	46.237	(10.035)	14	87	582
Sex (1: male, 0: female)	0.648	(0.478)	0	1	582
Spouse (1: spouse, 0: no spouse)	0.800	(0.400)	0	1	582
Educ	2.860	(0.998)	1	4	582

3.2 Methodology

Individual's subjective views differ depending on their characteristics, needs or past experiences (Marans and Rogers, 1975; Lee and Marans, 1980; Connerly and Marans, 1985). Therefore, in the context of measuring quality of life in a social unit, it is essential on the one hand to understand the interactions among man-made and natural amenities as well as of the social network components. On the other hand it is important to gain insights into how neighborhood qualities affect one's overall perceived well-being. Amenities are not measures of the overall residential desirability of places, but rather place-specific attributes that people value differently, e.g. dependent on different life stages, a good endowment with care facilities might be much more valued by older inhabitants, while provision of good public

education is higher valued by middle-aged family households. Moreover, the preferences of women and men might differ. For example, it is conceivable that women have different preferences regarding spare time facilities than men. Thus, empirical estimations of micro-econometric models of individual quality of life evaluation must explicitly consider potential preference heterogeneity (Henning et al., 2013).

In regression analysis this individual heterogeneity can imply that estimated parameters are biased. We decided to estimate a latent class regression model, i.e. an adequate econometric implementation to allow for individual heterogeneity and to avoid biased results. Latent class analysis is suited to explain the sources of heterogeneity based on socio-economic characteristics and individual attitudes (Boxall and Adamowicz, 2002). In a latent class formulation, the parameter heterogeneity across individuals is modeled with a discrete distribution or set of classes. The estimation results in a fixed number of classes while the estimates consist of class specific parameters and for each person a set of probabilities defined over the classes. For each individual the probability to be member of the different classes is thereby given. With this approach, class-membership probabilities, class-member characteristics and class-specific determinants of the conflict expectation are received.

Beyond the allowance for individual heterogeneity, an advantage of latent class regression models is to deal with dependent and independent variables of nominal and mixed types (Vermunt and Magidson, 2005), which is the case in this study. The latent class model has been applied to a number of choice problems, see e.g. Ouma et al. (2007), Deb and Trivedi (2002) or Henning et al. (2013). Also this paper focuses on the identification of subpopulations which are homogeneous with regard to their relations to the dependent variable, i.e. quality of life evaluation, but heterogeneous compared to other classes.

Assuming within the class individual choice probabilities are generated by the logit model, the probability that household h chooses alternative d, given that h belongs to class q is (Greene, 2003):

$$P(hd|q) = exp(\beta_{qw}\Delta W_d + \sum_k \beta_{qk}\Delta X_{kd} + \beta_c C_d) \tag{1}$$

, where β_q is the class-specific parameter vector.

Since classes are not observable, class probabilities are specified by the multinominal logit form:

$$P(q) = \frac{exp(z_h \gamma_q)}{\sum_q exp(z_h \gamma_q)}, \gamma_q = 0 \quad (2)$$

, where z_h is a vector of observable characteristics of household h that enter the model of class membership. The 1st parameter vector is normalized to zero to ensure identification of the model. For a given household h, the model's estimate for the probability of a specific alternative choice is the expected value, over classes, of class-specific probabilities.

To evaluate the goodness of fit of the model and also to decide about the number of classes, different measures such as the Bayesian Information Criterion (BIC), the Akaike Information Criterion (AIC), the Consistent Akaike Information Criterion (CAIC), and the Akaike Information Criterion 3 (AIC3) are examined. These information criteria are based on the Log-Likelihood and the degrees of freedom. Lower values will characterize optimal solutions, i.e. the better is the model fit. Andrews and Currim (2003) and Dias (2004) point out for determining the number of latent classes, that AIC3 is a better criterion than BIC and AIC (Vermunt and Magidson, 2005).

Furthermore, we will consider the classification error statistic (Class.Err.) and the R^2-statistic (R^2). The Class.Err. determines whether the model is able to predict the latent classes correctly. This value should be as close to zero as possible. The R^2 represents the proportional reduction of errors of a concrete model, compared with the baseline model. Following the suggestion of Andrews and Currim (2003) and Dias (2004) the optimal solution in this study is a 3-class regression model, which offers the lowest AIC3 value.

Following Greene (2003) one has to be careful in interpreting the coefficients of an ordered logit model. Therefore, in the following the significant effects are pointed out, but no suggestion is given upon what or in what direction those effects are exerted.

4 Results

With respect to the categorical scale of our dependent variable we estimate an ordered logistic regression latent class model. Applying a Likelihood Ratio (LR) test, we test for combining dependent categories, i.e. if two outcomes are indistinguishable with respect to the variables model, the estimates would be more efficient by combining them. Results show that the

Table 3: Estimation results

	Class1		Class2		Class3	
R^2	0.546		0.514		0.501	
Class size	0.400		0.379		0.221	
	Class1	z-value	Class2	z-value	Class3	z-value
Intercept						
higher	-4.199	-2.651	-8.578	-1.529	0.239	0.259
	(1.584)		(5.612)		(0.924)	
lower	1.441	2.648	6.105	1.818	1.766	3.858
	(0.544)		(3.358)		(0.458)	
same	2.758	2.404	2.474	0.865	-2.005	-1.846
	(1.147)		(2.859)		(1.087)	
Predictors	Class1	z-value	Class2	z-value	Class3	z-value
Econ	1.630	1.653	-0.238	-0.470	-2.086	-2.806
	(0.986)		(0.507)		(0.743)	
Env	1.042	1.374	0.225	0.364	0.396	0.730
	(0.758)		(0.618)		(0.543)	
Soc	1.856	1.807	-3.352	-1.575	-0.498	-0.831
	(1.027)		(2.128)		(0.599)	
SocEnv	-1.887	-1.392	6.213	1.709	-0.725	-1.043
	(1.355)		(3.636)		(0.695)	
NetDens	-11.101	-1.479	3.199	1.439	-0.195	-0.103
	(7.507)		(2.223)		(1.892)	
NetSize	10.443	1.313	-1.092	-1.248	-2.102	-3.156
	(7.955)		(0.874)		(0.666)	
NetMeetfreq	-3.493	-1.364	1.699	1.133	2.244	3.015
	(2.561)		(1.500)		(0.744)	
NetContfreq	0.208	0.322	0.078	0.136	-0.728	-1.094
	(0.645)		(0.574)		(0.665)	
Model for Classes						
Intercept	Class1	z-value	Class2	z-value	Class3	z-value
	-0.897	-1.369	3.121	3.187	-2.224	-2.515
	(0.655)		(0.979)		(0.885)	
Covariates	Class1	z-value	Class2	z-value	Class3	z-value
No spouse	0.204	1.804	-0.082	-0.494	-0.121	-0.739
	(0.113)		(0.166)		(0.164)	
Spouse	-0.204	-1.804	0.082	0.494	0.121	0.739
	(0.113)		(0.166)		(0.164)	
Age	0.000	0.010	-0.018	-1.305	0.018	1.503
	(0.010)		(0.014)		(0.012)	
Female	-0.040	-0.412	0.264	1.805	-0.224	-1.673
	(0.098)		(0.146)		(0.134)	
Male	0.040	0.412	-0.264	-1.805	0.224	1.673
	(0.098)		(0.146)		(0.134)	
Educ	0.181	1.851	-0.234	-1.614	0.053	0.382
	(0.098)		(0.145)		(0.138)	
Inc	0.091	3.798	-0.181	-3.813	0.090	3.769
	(0.024)		(0.048)		(0.024)	

Standard Errors are in parentheses.

outcomes much higher and higher should be combined, along with much lower and lower. Therefore, the analyzed quality of life measure comprises three instead of five categories.

In table 3 the estimation results of the latent class model are given. Class 1 represents 40% of the sample. With a mean of 0.890 the evaluation of quality of life is higher for a majority in this segment compared to the second class 2 (mean: 0.666) and to class 3 (mean: 0.376). The second group accounts for 38% of surveyed people. 22% of the interviewees have the highest probability for being a member of class 3.

It can be seen that the class membership for class 1 is determined significantly by the family status (Spouse), the education and the income of the interviewees. Class 1 members have a significant higher income, are higher educated and unmarried. The second class is characterized by women and interviewees having lower incomes. In contrast class 3 includes men and members with a significant higher income. Interestingly the age of the interviewees is not significant for determining the class membership.

Overall, the economic structure (Econ), the social infrastructure (Soc) and the social environment (SocEnv) are significant determinants of the quality of life evaluation. This appears in line with the quality of life literature. Significant results for the network size (NetSize) and network meeting frequency (NetMeetfreq) support the hypothesis that individual quality of life is significantly driven by network capital. Especially class 3 members, i.e. men with a significant higher income are influenced in their quality of life evaluation by their network capital. Contrary, the quality of life evaluation of women with lower incomes (class 2 members) is driven by the social environment.

5 Conclusion

This article has employed a latent class model to analyze individual evaluations of hometown's quality of life. The aim is to gain a better understanding of the subjective evaluation of the home region's quality of life. Moreover, relations with friends, neighbors, relatives, and workmates that significantly provide companionship, emotional aid, goods and services, information, and a sense of belonging are included as network capital in the estimations since they have been discussed in the literature as determinants of individual's

well-being. Therefore, the paper investigates the importance of individual's social network embedding for the quality of life evaluation.

Our empirical results provide several insights to understanding of subjective evaluations of home region's quality of life. Results show that individual's satisfaction with the local circumstances as well as several social network components are significant determinants of individual's quality of life evaluation. Interestingly, the quality of life of some interviewees is even more driven by the network capital indicators than by local amenities. The personal income has no significant influence on the perception of quality of life but allows for individual heterogeneity significantly. Further co-variates turn out to be significant, too and provide evidence of heterogeneous preferences within classes as well as between the three latent subgroups.

We can learn from the results that individual quality of life is significantly driven by network capital as well as by the economic and social infrastructure. The estimation results support our theory that individual heterogeneity is determined by the gender, the personal income, and the marital status of the interviewees. One aspects is left for future research at this stage: The localization and stage of development of the interviewees' hometown should be included in the estimation to avoid biases in the quality of life evaluation. Necessary measures are already surveyed but have not been included in the estimations, yet.

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