**World Economics Department**

# Summary of thesis

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## Subjective well-being in the European Union

PhD thesis

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# 1. Subject of the Thesis

During the past five decades one of the major questions in social sciences has been the methodological support for development: how can we measure economic and social development and well-being. After the Second World War several scientists attempted to set better approaches to measure economic and social progress. *"The largest centre for measuring social progress became the German and the Scandinavian School, with leading names like Wolfgang Zapf, Erik Allard and later Joachim Vogel. In Hungary such research began at the Central Statistical Office under the control of Rudolf Andorka, and not only the results of the research were published but also the strategy of social modernization. Later in the 90s the Social Report published by the social research institute TÁRKI and the Social Outlook series of the Central Statistical Office reported the results."* (Gaspar, 2013, p. 77, own translation)

There are three larger sets of approaches for measuring well-being. Objective measurements try to use several economic, social and environmental statistical data to interpret well-being. This method is mostly used by the Scandinavian school. The second approach focuses on subjective data and qualitative methods. The German school used this approach due to the lack of life quality information in objective statistical data. Finally, the component approach used by the UN and the OECD assumes that different components (households, healthcare, education) may characterize social progress. (Gaspar, 2013)

As Gaspar (2013) summarized objective measurement used to focus on GDP. After the 1960s several scholar criticized the methodology of GDP. Most of these critics mentioned the lack of inequality and poverty, health, education, crime and later environmental information in GDP. Thus some measurement focuses on improving GDP, like the measured economic welfare, index of sustainable economic welfare, genuine progress indicator. Other methods unify GDP with other objective indices. Such composite indices are the Human Development Index and the physical quality of life index.

Subjective measurement has also become important in the last three decades. Subjective well-being indicators measure the overall life quality of the individual. Usually surveys ask question about the respondent's happiness level or their level of satisfaction with their life. Despite the strong methodological fights and the concerns of economists the use of subjective well-being indicators in social sciences increased exponentially. The reason why it happened like that is based on two facts. First, the improvements measured in objective data sometimes were not followed by subjective reporting, and this gap required explanation. Secondly, methodological critics that emphasized the limits and the biasedness of subjective

survey data became silent due to the rapidly increasing number of convincing empirical findings.

Our dissertation focuses on subjective well-being (life satisfaction), thus we would like to interpret one small detail of this well-being measurement classification. However, all our estimations and calculations try to build a bridge between objective and subjective data. Our model estimations and regressions will use objective statistical data to explain the changes in subjective well-being within the European Union.

## 2. Motivation: why is the subjective approach relevant?

Empirical happiness (or life satisfaction) research found that after the Second World War reported happiness levels did not increase remarkably in any developed countries. However, real income rose, the quality of life improved, the number of working hours decreased without any positive avail to people's mood. These findings were published in several journal articles and books[1]. The result contradicts many principles of theoretical economics; furthermore, it suggests that our present theories about utility and economic goals need reconsideration.

Recent Eurobarometer (EB) and Word Values Survey (WVS) data[2] show not only that Hungary and Bulgaria are very dissatisfied societies in the EU, but also that transition economies lag far behind the former EU members (EU15) in reported subjective well-being level. These messages should not give a relevant message, but taking into account that more than 20 years ago the political and economic system of the Central and Eastern European (CEE) countries were changed, and during the so called transition life satisfaction has not increased remarkably, even after the EU accession, it should be taken seriously. The past two decades changed the everyday life, the mood and the motives for most of the people in CEE.

Approximately 20 years after the transition, surveys carried out independently[3] reported that a relevant part of people living in the transition countries prefer the pre-transition economic situation to the present ones (see Table 1). Besides, some of them reported significantly lower subjective well-being than that before the transition[4]. Despite these facts several objective indices[5] represent a successful socio-economic process during the previous two decades. We believe this puzzle makes it necessary to study subjective well-being in the European Union and in the CEE region.

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[1] See Layard (2005a), Bruni and Porta (2005), Bruni, Comim and Pugno (2008) or Frey (2010)
[2] All EB since 2004 and the latest World Values Survey
[3] EBRD Transition Report (2007), Washington Institute and Eurobarometer
[4] Transition Report 2007, 48-61.
[5] See Guriev and Zhuravskaya (2009) for details.

**Table 1**

*Views on living standards and economic situation compared with 1989 (survey based on 2007)*

|  | Economic situation worse than in 1989 | Living standards worse than in 1989 |
|---|---|---|
| Bosnia and Herz. | 86 | 67 |
| Bulgaria | 65 | 47 |
| Croatia | 66 | 53 |
| Czech Rep. | 33 | 28 |
| Estonia | 16 | 25 |
| Hungary | 75 | 61 |
| Latvia | 40 | 41 |
| Lithuania | 31 | 37 |
| Poland | 41 | 33 |
| Romania | 52 | 38 |
| Russia | 42 | 42 |
| Slovak Rep. | 46 | 28 |
| Slovenia | 43 | 25 |
| Ukraine | 70 | 53 |

*Source*: EBRD (Life in Transition Survey)

Furthermore, the latest Eurobarometer data suggest that many countries suffered a huge subjective well-being loss due to the crisis (for instance Greece, Portugal). In these countries unemployment has increased to historical heights, while their GDP contracted by 20-40 percentages. Such a shock to the economy affects individual mood and subjective well-being as well, but the decline in subjective well-being is much below that of objective economic indices. These correlations among socio-economic variables and subjective well-being are very important to deal with as general policy making should have a clear view on the effect of different economic scenarios.

Finally Kopp and Martos (2011) studied the relationship between economic growth, social well-being and life quality in Hungary. They argued that the modern consumption based culture people live their life as more income and consumption would result in a better life quality. Meanwhile the increase in the number of depressive symptoms shows that adaptation tensions exist. Pursuing more consumption is not a solution for the life quality puzzle. Their approach used subjective health indicators. They found that generally the health situation in Hungary improved since the transition. Furthermore they found that Hungarians are not more depressed than citizens of other countries. However, chronic stress and negative mood is very usual among those groups of the society who live in uncertain situation. That leads to a negative subjective life quality.

We could have collected several further examples, but we believe these examples are interesting puzzles and suggest that we have to study and try to get any further details about the correlations between subjective and objective indicators.

## 3. Goal of the dissertation

The contradictions and findings we mentioned are shocking. We believe that all further findings of subjective well-being measurements are needed to be summarized to rethink some basic principles and assumptions of economics. My goal is to give an insight to subjective well-being based research, summarize several economics related findings of it. I would like give more information on Europe by using Eurobarometer data for econometric modeling to find the strongest ties among objective socio-economic variables and Eurobarometer's life satisfaction.

The socioeconomic developments are difficult to be evaluated. In case of a progress some groups of the society lose while others win. Generally socioeconomic developments are extremely complex and complicated, thus we have to be careful when we would like to analyze them or conclude any inference. Our dissertation uses Eurobarometer data and the whole database covers the 27 EU member states. Since the first year in our dataset several major economic and social changes happened, which may have had a significant effect not only on socioeconomic indices, but also on subjective well-being, we have to be cautious with the analysis. Such events were the transition in CEE, the German reunification, the enlargements of the EU (especially the 2004), the adaptation of the euro or the global financial crisis since 2008. We chose some of these events are tried to estimate there effects on subjective well-being.

As subjective well-being is a relatively new tool for economists we would like to use it strictly for economic research. Subjective well-being data may be very useful for studying the individual well-being effect of economic processes and decisions. Monetary policy related decision making is a rule-based one, but monetary economics suffers from the lack of empirical evidence about the social utility function. As usually model estimations and simulations need a good goal function such empirical results are important to get an impression about the social preferences among macroeconomic variables. For this goal we will use subjective well-being data as utility surveys and assume that the SWB answers can reflect the subjective effects of different macroeconomic developments. With these assumptions we will be able to estimate such preferences and results may be supportive for monetary policy decisions.

Subjective well-being gives the chance to deal with human well-being effects of several economic factors and historical changes. We do not want to give an attempt to deal with all the interesting questions and all the possible usage of subjective data in Europe. As standard economics do not use subjective data we believe that the effect of events like the EU enlargement, the adaptation of the euro should be studied by such a tool. Based on arising questions we put the following hypothesis into shape:

**1. EU accession in 2004 and 2007 has not increased life satisfaction on average in new EU member states (EU12).**

**2. Adopting the euro increased life satisfaction in the participating countries**.

**3. Real GDP growth has a significant effect on life satisfaction of the new member states (EU12).**

For monetary policy decision making the preference between inflation and employment is crucial. The fourth hypothesis focuses on this relationship:

**4. Employment is more relevant for life satisfaction than inflation**.

Hypothesis number one and three focus on the new member states only, while hypothesis number two is for the euro zone countries. Yet, hypothesis number 4 is generally for the whole European Union.

In the second chapter the Reader can get an insight into the scientific development of happiness research based on the work of former and present scholars. We try to expound the appearance of the Happiness Approach in comparison to Sen's Capability Approach, and introduce the major schools, their basic methods and assumptions. Chapter two furthermore, explains the different definitions, which are widely used as synonyms in the literature. To make the present text transparent we introduce a structure of definitions and use these terms strictly in the dissertation.

The third chapter tries to explain the methodological background of subjective well-being. It is not a goal of the present dissertation to defend the methodological approach of

subjective well-being. Frey (2010), Bruni and Porta (2005), Bruni, Comim and Pugno (2008) framed the basic principles and methodological facts about happiness economics. Further studies[6] detailed its methodological background, the critics regarding subjective well-being and proved the suitability of the Happiness Approach. We will only summarize the major points of the discussion and explain why we think that subjective reporting is useful. We believe that the introduction of the methodological debate may be useful to underpin our research and the models we used to analyze the European Union.

The fourth chapter aims at explaining the most relevant findings of happiness research. We find it necessary to get to know these results, because they may explain several problems and difficulties especially why standard economics misunderstood some relevant questions during the CEE transition. Questions like 'can money buy happiness' are answered by empirical results of the literature. We try to summarize all the relevant findings of happiness research and all remarkable relationship that scholars could prove. Besides the effect of income, we will show the most important results regarding other facts and variables which affect subjective well-being. Adaptation is relevant as individuals can get used to social conditions. Rivalry or relative income is also an important factor in understanding subjective well-being. Other factors like unemployment, inflation, religion, marriage, crime, corruption or income mobility also affect self reported well-being. We also show results that may be useful to rethink some economic principles, the form of the utility function or the decision making in public policy. Mainstream economics uses different assumptions and in some cases consequences may not be true for real life or regions like the CEE region. We would like to collect the new findings that may be important to understand such difficulties.

In the fifth chapter we summarize how these findings may affect the utility function and our understanding of utility. We give an attempt to explain why utility based on the revealed preferences theory is not appropriate and effective in explaining human well-being. The difference between experienced and decision utility is based on a preference ordering and memory failure. The mistake may be very significant and none of the globally used mainstream models can deal with it. Furthermore, these mistakes may result a bias in human well-being and thus can be important for any important economic analysis as well.

The sixth chapter will turn the topic to the major issue. This part will demonstrate examples for applying subjective well-being surveys. We regressed life satisfaction survey data of Eurobarometer for the 27 European Union member states. We chose some models and

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[6] Ditella and MacCulloch (2006), Kahneman ad Krueger (2006)

estimated them for the EU12 and the EU15 group and compared the differences between the results. We also analyzed the Eurobarometer 69 survey results to find out important consequences about preferences on happiness within the EU27. This data was used for backwards estimation to check the relevance of the variables people think are important for their happiness and compare them to the reported life satisfaction levels. On the other hand, we made econometric regressions to find correlation between variables that may be important for explaining subjective well-being.

During the model estimations we faced several methodological challenges. As the variance in subjective well-being among EU member states are larger than the variance in time. As argued by Diener and Suh (1999) a large part of the variation can only be explained by unobservable country specific variables, thus we used different type of econometric models to fight this challenge. Due to the number of observations, the number of cross sections and periods the most trustful model results come from fixed effect panel models. However, the subjective well-being differences among the examined countries should be analyzed by other type of models as well. We used cross section estimations as well to have a more detailed view on effects on well-being of the socioeconomic differences. We also gave an attempt to use data for estimations supporting economic policy decision making with a special focus on monetary policy decision making.

# 4. Methodology

The key part of the dissertation focuses on econometric model estimations. The literature rarely used the Eurobarometer and the Eurostat data bases to regress subjective wellbeing in the European Union.

Due to several methodological difficulties we used different type of models. We believe that the usage of fixed (country) effect panel models is reasonable due to the unobservable country features we cannot explain with socioeconomic variables. On the other hand fixed effect panel models cannot deal with the starting level differences among countries (as the estimated country specific constant also contains that information), thus we also used cross section regressions. Due to the relatively large number of model specifications we put several model estimation results in the appendix and hold only the most important results in the main text.

As argued in chapter five, individuals make mistakes during their decisions. We used Eurobarometer 69 survey to check how certain nations think about the values that are important for their happiness. We used the four most important values from all countries and estimated a "suggested" life satisfaction based on those value weights and value specific statistical data. We found that most EU member states are "bright". This means most countries report a higher level of life satisfaction to Eurobarometer, than the level which is reasonable based on their national value weights and also on European constant weights.

Furthermore, as monetary policy is strictly rule based, we gave an attempt to estimate the life satisfaction effects of employment[7] and inflation using the Eurobarometer for the euro area, the former EU member states (EU15) and the new member states (EU12).

**For dependent variables of our model estimations used three types of data from the Eurobarometer life satisfaction surveys**. These surveys are carried out with the same statistical method; national surveys are representative in each country. Each wave is independent, meaning that the same individuals are not surveyed more than once. Therefore the data is not a panel at the micro level, but a panel at the macro level, with measurement error (as different people are asked in each survey waves). Standard Eurobarometer surveys measure life satisfaction on a four-level scale. The four levels are the following:

1) Not at all satisfied.

2) Not very satisfied

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[7] We prefer using emplyument instead of unemployment as the variation among EU member states is largerand we believe that differences in the national rules of unemplyoment result in larger estimation mistakes.

3) Fairly satisfied

4) Very satisfied.

From this scale we used the proportion of very satisfied and the proportion of not at all satisfied answers without any changes. The extreme levels can be useful to interpret some relevant socioeconomic changes for different segments of the European society.
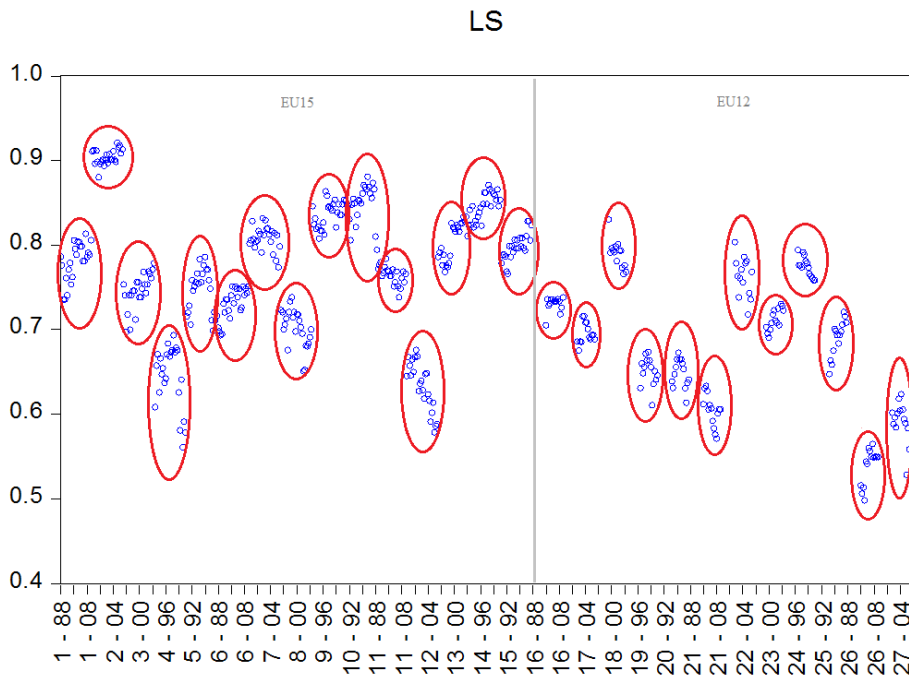
For estimating correlations and regressions, we generally used life satisfaction statistics (Eurobarometer) by establishing the proportion of those who are generally satisfied with their life. We assumed that people who were generally satisfied with their life had replied with the two positive answers: they were fairly satisfied or very satisfied with their life (level three and four on the scale). Therefore, LS denotes the proportion of people who answered with the two better answers[8]. Yet, we also regressed the extreme answers. In this case we estimate the probability of the answers 'very satisfied' (VS) and 'not at all satisfied' (NAAS).[9]

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[8] LS = (number of fairly satisfied with life answers + number of very satisfied with life answers) / (number of all answers)

[9] Part 5.1.2 explaines why these answers should be understood as probabilities and what is a linear probability model.

**Figure 1**

*The value cloud of the dependent variable LS for the whole data set. Clouds show different country averages ranked in time form 1988-2011 starting with the EU15 in the left corner and showing new member states from number 16.*



*Source*: Eurobarometer (Eviews figure)

**As independent variables for the model estimations we used several economic and social indicators that are relevant based on the literature and our hints**. The source of most of these indicators was Eurostat.

We used several types of model specifications in Eviews. Due to methodological and data difficulties we decided to use two types of models: **fixed effect panel estimations and first difference fixed effect models.** The reason why we narrowed our model framework is based on two problems. Firstly, a large part of the variation among dependent variables was between the EU member states (countires), thus country fixed effects were necessary to be used. Secondly, the difference method was needed as in some cases the dependent variable trended differently (increasing and decreasing trends). To deal with this trending problem, we estimated first difference models.

As life satisfaction variance is relatively large among the analyzed European countries, **cross section models** can give further information about the country specific differences. Country specific constants in fixed effect models differ strongly and thus cross section

analysis may explain somewhat of these differences. The problem with fixed effect estimations is that models cannot deal with the level differences in the beginning period. Thus we also used cross section models.

Finally we calculated **estimated levels of life satisfaction** based on national values thought to be important for happiness and EU average of such values. We used objective statistics that were similar to those values.

We also studied **monetary policy relevant preferences based on our model estimations**. Comparing our results with previous studies we found that both inflation and employment have a significant effect on life satisfaction. However model estimations suggest that the effect of employment in absolute values is larger.

# 5.Key findings

We used the results of the fixed effect panel models, first difference models and the cross section analysis for approving or rejecting the four hypotheses we chose.

## 5.1 Econometric models

All the methodological difficulties and the general problems with other types of models suggest that fixed effect panel models may be one of the best choice for model calculations. The general idea is that EU27 member states differ in country features and social values and this has a direct impact on the basic level of life satisfaction country averages. Plainly speaking these differences may cover cultural, historical, identical or value-based differences that cannot be observed by data. The advantage of fixed effect models is that these regressions can estimate an unobserved constant for all countries that can represent these country differences.

Above these ideas the panel model test also suggests that fixed effects are needed for the right regression in our models. According to the test result of the Hausman test (correlated random effects test) we have to reject using cross section random effects instead of fixed effects.[10] Thus, fixed cross section effects are needed.

A general form of a fixed effect model is:

$$Y_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it}$$

where $\alpha_i$ is a random variable that captures unobserved heterogenity. In our case such unobserved variables might be cultural differences or general mood differences among EU member states. (See appendix 4 for the fixed effect model results in the whole EU27.)

**Table 11**

*Fixed effect model estimations regressing LS in the EU12 (italic numbers below the coefficients are the p-values)*

| Variables | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| C | 0.675998 | 0.736774 | 0.691012 | 0.753424 | 0.815573 |

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[10] See Appendix 5 for the result of the Hausman test.

| | | | | | |
|---|---|---|---|---|---|
| | *0.0000* | *0.0000* | *0.0000* | *0.0000* | *0.0000* |
| RGDP | 0.001245 | 0.000923 | 0.001099 | - | - |
| | *0.0002* | *0.0041* | *0.0004* | - | - |
| INF | -0.000325 | - | - | - | - |
| | *0.6652* | - | - | - | - |
| EMP_C | 0.000151 | - | - | - | - |
| | *0.8147* | - | - | - | - |
| EDU | - | 0.0514 | - | - | - |
| | - | *0.137* | - | - | - |
| AGRI_LAB | - | - | 0.030164 | - | - |
| | - | - | *0.1097* | - | - |
| LIFE_EX | - | - | -0.00303 | -0.00587 | -0.00466 |
| | - | - | *0.1437* | *0.0314* | *0.2187* |
| PPS_GDP | - | - | - | 0.000213 | - |
| | - | - | - | *0.4401* | - |
| WORKING_YEARS | - | - | - | - | -0.00207 |
| | - | - | - | - | *0.2746* |
| EUAC_DUM | - | - | - | - | -0.000739 |
| | - | - | - | - | *0.8542* |
| IMFDUM | - | - | - | -0.01378 | |
| | - | - | - | *0.0367* | |
| | | | | | |
| **Fixed effect** | **Country** | **Country** | **Country** | **Country** | **Country** |
| R-squared | 0.9555 | 0.9611 | 0.9502 | 0.9590 | 0.9573 |
| Prob(F-statistic) | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total panel (unbalanced) observations: | 165 | 161 | 159 | 144 | 132 |

Table 11 summarizes the fixed country effect panel model estimations from the dataset of the EU12. Due to the relatively low number of observations (for the new member states Eurobarometer conducted surveys from 1998) we couldn't include too much variables in our models. On the other hand the earlier 1990s would have been interesting for the analysis because of the transformational depression, but the big volatility of macroeconomic data during those years might have been troublous for estimations. According to model 1, an extra one percentage point increase in real GDP growth rate raises the probability of answering being satisfied with life by 0.125 percentage points. Inflation rate and employment growth rate were statistically insignificant. These variables would have less effect on life satisfaction. The coefficient of participation in education (among 15-24 year population) was not statistically significant at any standard significance levels. Its effect seems relatively large, but as it is a participation rate, the coefficient has to be divided by 100 to get the comparable effect on life satisfaction. Model 3 suggest that life expectancy at the age of 65 decreases life

satisfaction. This contradicts our ideas. Even though the coefficient was not significant statistically in model 3, it was in model 4 and 5 and the sign of the coefficient did not change.

We find that pps per capita GDP has a positive effect on life satisfaction. A one percentage point increase in pps per capita GDP result in a 0.02 percentage points increase in the probability of replying being satisfied with life. Meanwhile, model 4 portrays the effect of a stand by agreement type IMF/EU bail-out programme. The estimation suggests that such a programme decreases the probability of answering being satisfied with life by 1.4 percentage points. We have to note that an economic adjustment yields in the longer run, thus it is possible that the positive effects of such a program may be realized on the longer run. Furthermore, we also have to be cautious with this result as we do not know the counterfactual effect: what would have happened with life satisfaction if a default had happened.

Model 5 has further findings. Firstly, the number working years seems to trend negatively with life satisfaction. This result contradicts some of the basic findings of the literature. For instance Scitovsky (1974) argued that boredom has a negative effect on subjective well-being. Our general assumption would be that working is less boring than being at home without work, thus this result is surprising. On the other hand it might be important that the labor market uncertainties are larger in the new member states, thus people would like to be pensioners as early as possible, in line with the finding of Molnár and Kapitány (2006). As the estimated coefficient is statistically not significant we can have concerns about the result. However, we believe that in this case insignificance is also a result. Just like the case of the EU accession dummy. The regression suggests that in new member states EU accession did not have a significant effect on life satisfaction. This also contradicts our hypothesis. By the way, we have to add that migration to EU15 countries from EU12 might be important, as the EU membership gave the opportunity to work abroad for more million citizens in CEE countries, who might became more satisfied with life, but their replies do not count to EU12 answers.

*1. EU accession in 2004 and 2007 has not increased the life satisfaction on average in new EU member states.*

According to the estimations using the data of EU12 we can approve this hypothesis. We found that EU accession (or membership) do not have any statistically significant effect on life satisfaction in the new member states.

*2. Adopting the euro increased the life satisfaction in the participating countries.*

**Table 2**

*Fixed effect model estimations regressing LS in the EU27 (italic numbers below the coefficients are the p-values)*

| Variables | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| C | 0.537848 | 0.546106 | 0.523543 | 0.516784 | 0.546238 |
| | *0.0000* | *0.0000* | *0.0000* | *0.0000* | *0.0000* |
| RGDP | 0.000614 | 0.000679 | - | - | - |
| | *0.0354* | *0.0127* | - | - | - |
| LOG(price_lev) | -0.007121 | - | -0.032115 | -0.021587 | -0.021521 |
| | *0.5326* | - | *0.0010* | *0.0610* | *0.0401* |
| EMP | 0.003128 | 0.002993 | 0.003406 | 0.003527 | 0.003057 |
| | *0.0000* | *0.0000* | *0.0000* | *0.0000* | *0.0000* |
| IMFDUM | - | - | - | - | -0.016137 |
| | - | - | - | - | *0.0104* |
| EUR_DUM | - | - | - | -0.004717 | - |
| | - | - | - | *0.0930* | - |
| **Fixed effect** | **Country** | **Country** | **Country** | **Country** | **Country** |
| R-squared | 0.959819 | 0.959784 | 0.956042 | 0.956298 | 0.956636 |
| Prob(F-statistic) | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| Total panel observations: | 468 | 468 | 513 | 513 | 513 |

According to the regression for the whole data set we found that adopting the euro decreased the probability of being satisfied with life by 0.472 percentage points. The result is statistically significant at a 10 percentage level. We have to reject hypothesis number 2.

*3. Real GDP growth has a significant effect on life satisfaction in the new member states (EU12).*

According to model estimations real GDP growth has a statistically significant effect on life satisfaction in the new member states. A one percentage point increase in real GDP growth rate raises the probability of being satisfied with life by approximately 0.09 to 0.12 percentage points in EU12. We have to approve the hypothesis, but our results show a less strong effect than other findings did in the literature (see chapter 4).

4.  *Employment in absolute value is more relevant for life satisfaction than inflation.*

**Table 3**

*Fixed effect difference models regressing life satisfaction (d(LS)).*

| Variables | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
|---|---|---|---|---|---|---|
| C | -0.00028 | -0.01599 | 0.00329 | 0.001787 | -0.00082 | 0.001384 |
|  | *0.0986* | *0.0122* | *0.0102* | *0.113* | *0.0023* | *0.2851* |
| EMP_C | 0.001444 | 0.001352 | 0.001326 | 0.001395 | 0.001281 | 0.001406 |
|  | *0.0176* | *0.0123* | *0.0297* | *0.0196* | *0.0726* | *0.0516* |
| D(DIVORCE) | -0.00727 |  |  |  |  |  |
|  | *0.0614* |  |  |  |  |  |
| DMARRIAGE(-1) |  | 0.01589 |  |  |  |  |
|  |  | *0.0133* |  |  |  |  |
| RGDP(-1) |  |  | -0.00035 |  |  |  |
|  |  |  | *0.2922* |  |  |  |
| INF |  |  | -0.00139 | -0.00129 |  | -0.001386 |
|  |  |  | *0.0848* | *0.0686* |  | *0.0948* |
| D(GERD) |  |  |  |  | 0.022141 | 0.021379 |
|  |  |  |  |  | *0.031* | *0.0351* |
| **Fixed effects** | **CS, Per** | **CS, Per** | **CS, Per** | **CS, Per** | **CS, Per** | **CS, Per** |
| R-squared | 0.229427 | 0.212543 | 0.240678 | 0.227549 | 0.26596 | 0.271729 |
| Prob(F-statistic) | 0.0000 | 0.000009 | 0.0000 | 0.0000 | 0.000001 | 0.000001 |
| Total panel observations: | 489 | 448 | 441 | 486 | 387 | 380 |

\* For fixed effects CS stands for cross section (country) and per stands for period (years).

According to cross section analysis, we found that on average a one percentage point rise in inflation decreases the probability of answering being satisfied with life by 0.13 percentage points. Meanwhile the effect of a one percentage point increase of employment rate raises the probability of replying being satisfied with life by 0.86 percentage points. Thus, in the long run in a monetary policy relevant comparison, the same change in employment is 6.8 times more relevant on life satisfaction than that of inflation. Using fixed effect first difference panel model estimations the positive effect of a one percentage point increase of the employment rate has a relatively similar effect on life satisfaction that the same level increase of inflation has with a different sign. As we got one model estimation in which the effect of inflation was larger than that of employment we cannot decide about the hypothesis without doubts. However, most of the model estimations suggest that employment in absolute value has a larger effect on life satisfaction than inflation.

Besides our main hypothesis, first difference models suggested that real GDP growth has not got a significant positive effect on life satisfaction within the EU 27. Participation in education also did not have a significant effect on life satisfaction in the whole EU.

Fixed effect models suggested that IMF programmes decreased life satisfaction remarkably. The number of working years also trends negatively with life satisfaction.

However, life expectancy at the age of 65 increases the probability of being very satisfied with life within the whole EU27. Crude divorce rate had a strong negative effect on being very satisfied with life. Euro adaptation increased the probability of being very satisfied with life.

Moreover, real GDP growth rate decreased the probability of being not at all satisfied with life, while inflation increased it. In absolute values the effect of inflation was larger. Divorce rate increased the probability of being not at all satisfied with life, while marriages decreased it. None of the models suggested that pps per capita GDP level had a significant effect on life satisfaction. This means that the European Union is not realized as a single region and citizens do not compare their income within the integration.

## 5.2 Backward testing of subjective data

The 69th standard Eurobarometer survey (2008) contained questions about human preferences on happiness.[11] European Union citizens were asked which values had they associated the most important in connection with their idea of happiness.[12] According to the answers of citizens they had a very clear preference on happiness. Health the most important value (73%), well ahead of love (44%), followed by work (37%), peace (35%) and money (32%). We decided to avoid peace from this framework due to two arguments. Firstly, the analyzed countries were not dangered by wars, except terror actions during the period we focused on. Secondly, peace is a relevant value but not directly related to socioeconomic analysis. Thus, we normalized the other four most important values (health, love, work, money) and by choosing similar indicators (life expectancy, marriage rate, employment, per capita pps GDP in share of the EU average) tried to test the answers backwards to win an estimated life satisfaction level and compare these results with the general survey based life satisfaction levels of Eurobarometer.

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[11] Due to the timing of the survey (fieldwork between April-May 2008) we were lucky, as these values could have been effected by the media due to the immediate effects of the crisis.

[12] It is important to note that these calculations assume that values for being happy and being satisfied with life are the same.
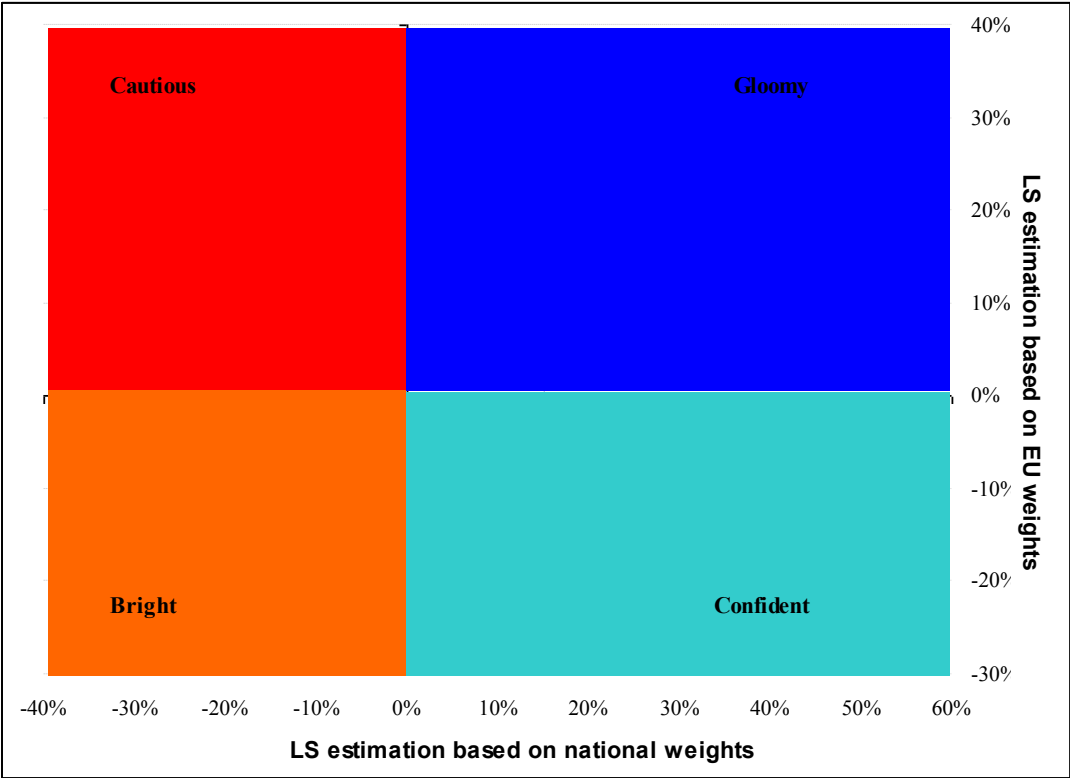
Estimated LS was calculated by the country weights of the four values being the most important for happiness. Using these weights we used the average (over time) of the four chosen indicators (life expectancy, marriage rate, employment, per capita pps GDP in share of the EU average). The results were recalculated on a 0 to 1 scale based on the methodology of the HDI calculation.

$$ILS = \frac{\max(X_j) - X_j}{\max(X_j) - \min(X_j)}$$

We took the average of these recalculated life satisfaction indices and multiplied the estimated results with a constant to get the same average of the new estimated life satisfaction indices as LS had. After this multiplication we got the estimated LS percentages. 'Estimated LS' evaluates the percentage of people who should be satisfied with their life based on the four most important socioeconomic variables and on the country value weights. The other column (WB_EU) represents a similar calculation method, but results came from using constant weights. For the four values (health, money, love, work) we used the average weights of the whole European Union. Based on these deviations we classified all the 27 European Union member states into four groups.

**Figure 2**

*Classification of countries based on the differences of the two estimated life satisfaction indices from Eurobarometer life satisfactions*

The classification of figure 2 is based on the LS estimations comparison to Eurobarometer. If the difference[13] is positive that means the estimation is larger than the reported Eurobarometer survey value. This means that based on the chose weights and socioeconomic indicators the country should have reported a higher life satisfaction level. If the difference was negative, it means that the citizens of the given country are happier than they should be based on the value weights and the values of indicators. The four groups are the following based on the relative positions.

The largest country group is for 'bright' countries. A country is in the group of 'brights' if the differences are negative for national value weight estimations and EU constant weight estimations as well. Denmark, Malta, Cyprus, Poland and Slovenia are the most optimistic countries from this group. In these 12 countries reported life satisfaction should be lower by using not only the national weights on values, but also by using constant EU average weights.

The second largest country group contains 'confident' countries. We called a country confident if its national weight based LS estimation is higher than the reported Eurobarometer LS value, and the EU weight based estimation of LS is lower than the Eurobarometer LS value. This means that using the common EU weights the citizens of such a country should be less satisfied with their life than the reported level, while based on their own weights they should be more satisfied than their reported Eurobarometer value. Baltic countries, Hungary and Spain are the most confident countries.

The third largest group covers 'gloomy' countries with four members. These countries should be more satisfied with their life calculating even with national value weights and with the EU constant value weights as well. Thus the reported subjective life satisfaction value (Eurobarometer) underestimates the level, which can be calculated by their socioeconomic indicators. Luxemburg is the only country, which has got an extremely high estimated life satisfaction level with both calculations. This can be attributed to its very high level of per capita pps GDP. The other three pessimistic countries are Austria, Germany and Ireland.

The group of 'cautious' countries has only one member. A country is cautious if its citizens should be more satisfied with their life based on EU value weights, but it should be less satisfied if we calculate with the national value weights. The only country in this group is the Netherlands.

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[13] Difference = Estimated LS value – Eurobarometer (reported) LS value.

# 6. Conclusions

Our dissertation focused on a relatively little part of the well-being problem of social sciences, on subjective well-being. This tool is a relatively new one for economists and it can be used for several types of analysis. We tried to summarize some of the most interesting findings and attempted to give some new application of the life satisfaction dataset. We believe subjective well-being is a great tool to show some limitations of standard economics.

People's final goal is experiencing positive emotions and for many people happiness is an ultimate goal. As Frey (2010, p. 17.) drew up "that is not the case for other things we may want, such as job security, status, power, and especially money (income)." If we reject the application of subjective well-being, we can not collect direct feedback from the society. Yet, due to the imperfection of happiness measurement neither rejection nor building solely upon subjective data would be a good idea.

Besides, combining economics with psychology may be also useful to understand why rising income and higher level of living standards do not necessarily increase the level of individual's life-satisfaction. As Csikszentmihalyi (1990) argues in capitalist systems materialistic values have brought an erosion of social capital, which may explain stagnating happiness despite the material opulence. The tools of economics are insufficient to analyze changes in social life and to evaluate the human consequences of these transformations. Happiness approach may also give us the needed tools for such research. To sum up we believe that the happiness approach is relevant and useful for analysis.

Our dissertation aimed at explaining some details about the subjective well-being within the European Union. In the literature there is a strong contradiction regarding the life satisfaction effect of many socioeconomic indicators. We examined several variables to get a clear view about the correlations within the European Union. We estimated models for the former European Union members and the new member states. Despite the fact that in CEE countries real income rose, the quality of life improved in terms of national averages, subjective well-being has not increased in all countries during the past 20 years. Tools of economics can't represent and model all the socioeconomic processes like the transition in CEE. To understand such developments better we think it is necessary to give insights into the major findings of subjective well-being research and also to show its consequences on economics. As transition resulted in not only economic growth but also unemployment, many people suffered a large life satisfaction loss. Standard economics does not deal with the negative effects of unemployment, however many findings show that it has a relatively strong effect on subjective well-being. This is only one example, but without studying these effects we cannot analyze the effects of a measure perfectly.

Findings about the effects of income, rivalry and adaptation on life satisfaction are crucial to understand how complex is the valuation of income by individuals. Furthermore the effect of macroeconomic variables and sociologic variables is also crucial for understanding life satisfaction and also socioeconomic developments.

Our main findings based on model estimations may be useful for decision making. The statistical results that EU accession or euro adaptation did not affect life satisfaction positively are important to notice. The findings about monetary policy related preferences are very important not only for monetary authorities, but also for fiscal decision makers, as they suggest that employment has a larger effect on life satisfaction than that of inflation. However the present crisis management in Europe strongly focuses on price stability instead of dealing with the incredibly high unemployment in peripheral countries.

Based on backward testing we found that most of the EU countries are bright. This means they should have reported lower level of life satisfaction based on constant EU value weights and also based on country specific value weights. This means that citizens of most of the countries are not at all pessimistic during reporting about their life satisfaction level. Hungary is a confident country, meaning that based on fixed EU weights its reported life satisfaction average should be lower, but based on national weights reported life satisfaction should be higher.

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