**Can Consumer Survey produce a new Measure of Households’ Financial Distress?**

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**Abstract**

The goal of this paper is concentrated on the pioneer application of *Harmonized EU Consumer survey (CS)* in tracking poverty levels in Croatia. As opposed to the annual *EU Statistics on Income and Living Conditions* (EU-SILC) variables, CS offers a considerable benefit by providing monthly information on the consumers’ financial position. It is of interest to calculate a CS-based composite indicator of households’ financial distress, using factor analysis. The newly proposed indicator could serve as a timely indicator of cumulous socio-economic problems in Croatia, as well as in all other EU member states, and in that way significantly complement the EU-SILC data. The harmonized European CS offer three questions pointing to the financial situation of households (Q1: *Financial situation over last 12 months*, Q2: *Financial situation over next 12 months,* and Q12: *Statement on financial situation of household*). The main advantage of these questions is their monthly frequency, which provides more detailed information about the prevailing social trends than the annual EU-SILC data.

The factor analysis was performed to calculate the new CS composite indicator of households’ financial distress on three selected CS variables, as mentioned above. One factor was extracted, the factor scores were calculated, and they were compared with the chosen variables of EU-SILC data.

**Keywords:** *Consumer Survey (CS), EU Statistics on Income and Living Conditions (EU-SILC), Composite indicator, Factor analysis, Financial distress*

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**1. Introduction**

The recent crisis and recession in Europe, which is still strongly expressed in EU and especially in Croatia, actualizes the problem of poverty and all other social problems. The scientific and professional community deal with different aspects and consequences of poverty and financial problems. So, Ware (2015) analysed the actual problems like debt, poverty and personal financial distress from the theoretical point of view with their clear definitions. Barton, Futris and Nielsen (2015) studied how financial distress and marital quality are correlated. Starkey et al. (2013) explored the impact of financial distress on depressive symptoms among African American Women. McNair et al. (2016) investigated the individual-level factors in predicting consumer financial behaviour at a time of high pressure. Jonsson, Mood and Bihagen (2016) analysed poverty trends during two recessions and two recoveries 1991–2013. They concluded that recessions can generally be expected to suppress real incomes and increase poverty measured using a fixed poverty line, while effects on inequality and relative income poverty are more ambiguous, both theoretically and empirically. Different national economies made different reactions and different intensity on recession trend. Cotsomitis, Andy and Kwan (2006) made a first formal attempt to examine the ability of consumer confidence to forecast household spending within a multicounty framework, using CS data. Klein and Özmucur (2010) suggested that it may be better for researchers to use not just the headline index, but expectations or other indicators derived from Business and Consumer survey (BCS) if they wish to better predict referent macroeconomic variables.

It is well known that the poverty is highly correlated with the quality of life. So, in 2003, following the [Eurostat](http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary%3AEurostat) initiation, six EU Member States (Austria, Belgium, Denmark, Greece, Ireland, Luxembourg) and Norway have established the EU Statistics on Income and Living Conditions (EU-SILC) project, with the aim to quantify the poverty levels and social problems in individual EU countries. EU-SILC project started in 2004 in EU-15 (except in Germany, the Netherlands and the United Kingdom), in Estonia, Norway and Iceland. Since 2005, the new EU-SILC covers European Union member states and several non-EU countries [6]. EU-SILC is a source for comparative statistics on income, poverty, social exclusion, housing conditions, labour, education, health and other living conditions in EU. The survey is organized as a cross-sectional and longitudinal sample survey, coordinated by Eurostat [2].

In the light of creating new measures which expressed households’ financial distress, CS results were analysed. Namely, CS offers direct assessment of the otherwise intangible factors such as consumers’ perceptions and expectations. They measure the consumers’ willingness to consume/invest/save, as opposed to their ability to do the same. Hence these psychological factors are crucial to understand the underlying market forces and consumers’ behaviour.

The harmonised CS results and EU-SILC data are available at the webpages: European Commission webpage and at the Eurostat webpage.

**2. Consumer Surveys (CS) and EU Statistics on Income and Living Conditions (EU-SILC)**

CS is a part of harmonised EU Business and Consumer surveys (BCS). BCS as qualitative monthly surveys are being conducted in five sectors: manufacturing industry, services, construction and retail trade, as well as for consumers. Surveys provide managers’ and consumers´ assessments, explanations and expectations of key economic variables. Some of the variables included in Business survey (BS) are: production level, selling prices, stocks of finished products, factors limiting production, order books, export order books, capacity utilisation, firm’s employment, competitive position at the domestic market and at the EU markets etc. Variables included in CS are: consumers’ financial situation, general economic situation, consumer prices, unemployment, major purchases of durable consumer goods, savings, savings intentions etc.

The European Commission has defined *The Joint Harmonized EU Programme of Business and Consumer Surveys*, to fully synchronize BCS on the EU level. This programme was launched by the European Commission decision of 15 November 1961, and was modified through the subsequent Council and Commission decisions. The first survey was the harmonised business survey in the manufacturing industry, conducted in 1962. After that, the BCS programme was extended to other sectors. CS were included in Program in 1972. Now (July 2016) *The Joint Harmonised EU Programme* includes all 28 EU Member States and five candidate countries: Albania, Montenegro, The Former Yugoslav Republic of Macedonia, Turkey and Serbia [4]

CS is, in essence, a qualitative monthly (or quarterly) survey. Questions (variables) are dominantly of qualitative natures. The questionnaire has fifteen questions: 12 monthly questions and 3 quarterly questions. The stratified sample with a random choice is usually used for the survey sampling. The answers in CS have four, five or six options.

Answers obtained from the survey are aggregated in the form of *balance*. Balance is a difference between the percentage of respondents giving positive and negative answers [5]. So, if a question has three alternative options: positive (up, more, more than sufficient, good, to large, increase, improve etc.), neutral (unchanged, as much, sufficient, satisfactory, adequate, etc.) and negative (down, less, not sufficient, too small, decline, etc.), then P, E and M (with P+E+M=100) denote the percentages of respondents having chosen respectively the option positive, neutral, and negative. Then, the balance is B = P – M.

If questions have six alternative options (most useful in consumer survey): positive, neutral and negative, and in addition: very positive (very much higher, increase sharply etc.), very negative (very unfavourable, fall sharply, etc.) and don’t know, the balance is calculated as a weighted average. If P, E and M are the same as mentioned above, while PP denotes the percentage of respondents having chosen the option very positive, MM the percentage of respondents having chosen the option very negative and N is the percentage of respondents without any opinion (PP+P+E+M+MM+N=100), balance is calculated as B = (PP + ½P) − (½M + MM). After that, seasonally adjusted balances (for all variables of interest in survey) are used to calculate the composite confidence indicators. These indicators are produced to reflect overall perceptions and expectations at the individual sector level and on the level of consumers in a one-dimensional index. In accordance with The Joint Harmonized EU Programme of Business and Consumer Surveys*,* confidence indicators are calculated using the unique methodology. These indicators are simple arithmetic averages of the (seasonally adjusted) balances of answers (in percentage points) to the selected questions (variables). The choice of variables was conducted by the aim of achieving an as high as possible, coincident correlation of the confidence indicator with a reference series.

The goal of CS is to collect information on households’ spending and savings intentions and to assess their perception of the factors influencing these decisions. Thus the Consumer Confidence Indicator (CCI) includes four variables (derived from CS): the financial situation of households, the general economic situation, unemployment expectations (with an inverted sign) and savings, all over the next 12 months [4]. The referent series for CCI is private consumption (expressed as y-o-y percentage growth rate).

Furthermore, more complex quantification methods were developed. Nardo (2003) gave a critical review of the different quantification methods, while Goldrian, Lindlbauer and Nerb’s (2001) motto is that there is no general construction principle for a perfect composite leading indicator. New approaches and applications are welcome.

EU-SILC data, available at the Eurostat webpage, is presented as multidimensional datasets and as a list of [policy indicators](http://ec.europa.eu/eurostat/web/employment-and-social-policy/statistics-illustrated) (income and living conditions: people at risk of poverty or social exclusion, income distribution and monetary poverty, living conditions and material deprivation). Nevertheless, the comparison of EU-SILC country data produces some difficulties arising from differences in data collection approaches across countries. One of the major differences is that some countries rely entirely on household surveys, while others also use administrative or ‘register’ data [11]. It means that the differences in relationship among employment, earnings and poverty changes exist, when different data collection approaches are used.

In addition, the estimates of the indicator of poverty (at-risk-of-poverty rate) vary across countries. This is because the indicator is sensitive to the different measures used and explores the underlying patterns across the vulnerable groups and the likely causes of poverty in these countries [10].

All these things show that the EU-SILC produce important variables related to the general national poverty levels. However, the EU-SILC data is published annually and has a limited international comparability. In turbulent environment, monthly data may be used to promptly signalise a change of variables in a timely manner. Therefore, the main advantage of CS results is exactly in their monthly frequency, which provides more detailed information about the prevailing social trends than the annual EU-SILC data. Additionally, CS data is fully harmonised on EU level. With this in mind, the aim of this research is to assess the value of CS responses on households’ financial distress. This is expressed as a new monthly, inter-EU comparable, indicator by correlating them to the common measures of poverty in Croatia.

**3. Data set and methodology**

CS is qualitative survey based on questionnaire. The questionnaire has twelve questions on a monthly basis and three additional questions on a quarterly basis. This paper focuses on questions on a monthly basis. The monthly questions (variables) in CS questionnaire [4] are presented in Table 1.

|  |
| --- |
| Questions (variables)  |
| 1. How has the financial situation of your households changed over the last 12 month?
 |
| 1. How do you expect the financial position of your household to change over the next 12 months?
 |
| 1. How do you think the general economic situation in this country has changed over the past 12 months?
 |
| 1. How do you expect the general economic situation in this country to develop over the next 12 months?
 |
| 1. How do you think consumer prices have developed over the last 12 months?
 |
| 1. In comparison with the past 12 months, how do you expect consumer prices will develop in the next 12 months?
 |
| 1. How to you expect the number of people unemployment in this country will change over the next 12 months?
 |
| 1. In view of the general economic situation, do you think now is the right time for people to make major purchases such as furniture or electrical goods?
 |
| 1. Compared to the last 12 months, do you expect to spend more or less money on major purchases such as furniture or electrical goods?
 |
| 1. In view of the general economic situation, do you think that now is?
 |
| 1. Over the next 12 months, how likely will you be to save any money?
 |
| 1. Which of these statements best describes the current financial situation of your household?
 |

Table 1: Questions in CS questionnaire

Questions have a similar response pattern e.g. got a lot better, got a little better, stayed the same, got a little worse, got a lot worse, don’t know. Of all the monthly questions from the CS questionnaire given in Table 1, three of them indicate the financial condition of households: financial situation over the last 12 months (Q1 hereinafter); financial situation over the next 12 months (Q2 hereinafter); statement on financial situation of household (Q12 hereinafter). The exact wording of these questions and given answers is as follows [4]

Q1: How has the financial situation of your households changed over the last 12 month? It has… (1) got a lot better, (2) got a little better, (3) stayed the same, (4) got a little worse, (5) got a lot worse, (6) don’t know,

Q2: How do you expect the financial position of your household to change over the next 12 months? It will… (1) get a lot better, (2) get a little better, (3) stay the same, (4) get a little worse, (5) get a lot worse, (6) don’t know,

Q12: Which of these statements best describes the current financial situation of your household? (1) we are saving a lot, (2) we are saving a little, (3) we are just manging to make ends meet on our income, (4) we are having to draw on our savings, (5) we are running into debt, (6) don’t know.

The monthly CS data covers the period from 2005/5to 2016/5 and the annually EU-SILC data covers the period from 2010 to 2015. The data sources were European Commission (Directorate General for Economic and Financial Affairs) and Eurostat European Union Statistics on Income and Living Conditions.

The empirical analysis consists of two parts. In the first part, the new CS composite indicator of households’ financial distress was calculated using factor analysis. One factor was extracted out of the three mentioned variables. In the second part, this one extracted factor which represents the new CS composite indicator was compared with the selected EU-SILC variables.

Factor analysis was carried out in the several steps: verification of the adequacy of the data for the application of factor analysis, extraction of factors and calculation of factor scores. First of all, the appropriateness of factor analysis has to be evaluated (stationarity, examination of the correlations and measures of sampling adequacy – MSA values). After that it has to be decided which factor model should be applied for the extraction of factors. In this paper the principal component factor analysis was used to calculate the new CS composite indicator. It is a factor model where units are placed on the diagonal of the correlation matrix and the total variance is carried into the factor matrix. Finally, the factor scores for the retained factors have to be calculated. The calculated scores in principal component factor analysis are actual scores. Precisely because of the direct computation of factor scores this model is appropriate when these scores are used in further analyses.

Prior to the application of factor analysis the Augmented Dickey–Fuller (ADF) unit root tests were performed. Analysed variables did not meet the stationarity condition. Therefore, the first differences were used in further analysis.

By applying the factor analysis, one factor was extracted and the factor scores were calculated. Since the calculated factor scores are monthly and the EU-SILC data is annual, these factor scores were transformed into the annually data with the aim to compare CS and EU-SILC data.

**4. Research results**

Factor analysis was used on Croatian CS data to calculate the new CS composite indicator of households’ financial distress. As already mentioned, factor analysis was conducted on three variables: financial situation over the last 12 months, financial situation over the next 12 months, and statement on financial situation of household. First of all, the appropriateness of factor analysis was checked (stationarity, correlation matrix and MSA values). As already mentioned, because of the stationarity condition, the first differences were used. The correlation matrix given in Table 2 reveals that all coefficients are significant at the 5% significance level. This indicates the appropriateness of factor analysis.

|  |  |  |  |
| --- | --- | --- | --- |
| Variables  | Q1 | Q2 | Q3 |
| Q1 | 1.0000 | 0.66130.000¹ | 0.28010.001¹ |
| Q2 | 0.66130.000¹ | 1,0000 | 0.22120.011² |
| Q3 | 0.28010.001¹ | 0.22120.011² | 1.0000 |

¹correlations are significant at p <0.01000

²correlations are significant at p <0.05000

Table 2: Correlations and p-values)

Table 3 shows the values of Kaiser's measure of sampling adequacy (MSA). It can be seen that the overall MSA value and all individual MSA values are greater than 0.5 which also indicates the appropriateness of factor analysis. According to everything mentioned, it can be proceeded to the next step, i.e. to the extraction of the factors.

|  |  |
| --- | --- |
| Variables | Overall MSA = 0.55883186 |
| Individual MSA values |
| Q1 | 0.53777833 |
| Q2 | 0.54112784 |
| Q3 | 0.77976708 |

Table 3: Kaiser's Measure of Sampling Adequacy

The data was analysed by the principal component factor analysis and the eigenvalue criterion (all factors that have eigenvalues greater than one should be extracted) was used for the extraction of factors. Table 4 gives the Eigenvalues, differences, proportions and cumulative proportions. According to that criterion, only one factor was extracted. This extracted factor alone explains 60.52% of the total variance.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | Eigenvalues | Differences | Proportions | Cumulative proportions |
| 1 | 1.81555609 | 0.96680702 | 0.6052 | 0.6052 |
| 2 | 0.84874907 | 0.51305422 | 0.2829 | 0.8881 |
| 3 | 0.33569485 |   | 0.1119 | 1.0000 |

Table 4: Eigenvalues, differences, proportions and cumulative proportions

The factor matrix is given in Table 5. It can be seen that all factor loadings are greater than 0.5 which means that they are all satisfactory. The extracted factor represents the new CS composite indicator of households’ financial distress on those three chosen variables. For the purpose of further analysis the factor scores were calculated for this one retained factor.

|  |  |
| --- | --- |
| Variables | Factor1 |
| Q1 | 0.88428 |
| Q2 | 0.86281 |
| Q3 | 0.53774 |

Table 5: Factor matrix

The new CS indicator, based on first differences of time series data, presented at the Figure 1 suggests monthly changes in consumers’ assessments and expectations in their financial situation.

Figure 1: New CS indicator

These calculated factor scores were used for the comparison with the selected variables from the EU-SILC data: at-risk-of-poverty rate by poverty, people at risk of poverty or social exclusion, severe material deprivation rate, at-risk-of-poverty rate before social transfers (pensions excluded from social transfers), and at-risk-of-poverty rate before social transfers (pensions included in social transfers). Since the variables of the EU-SILC data are annual and these factor scores are based on monthly data, they were transformed into annual data. Furthermore, the first differences for the EU-SILC data were used, as they were used for the CS data in factor analysis. Figure 2 shows the comparison between the new CS indicator and selected EU-SILC variables.

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| --- | --- |
|  |  |
|  |  |

Figure 2: Comparison of new CS indicator and selected EU-SILC variables

It can be seen that the new CS indicator and the chosen EU-SILC variables share a similar pattern, except for the variable people at risk of poverty or social exclusion in 2013.

In the graphs, it can be seen that the new CS indicator has increased in 2013, while all the other variables of the EU-SILC have not increased.

One reason is the increase in optimism of Croatian citizens for entering the EU. Their optimism was present in the CS indicator because it is based on estimates and expectations of consumers, rather than on measuring the actual state of poverty.

**3. Conclusion**

One of the key targets defined in Europe 2020 Strategy (for the period 2010-2020) is stimulating social inclusion and poverty reduction. In accordance with this, Croatian Government adopted the Strategy for Combating Poverty and Social Exclusion in Croatia (2014-2020). This strategy is based on ensuring conditions for achieving three main objectives: the fight against poverty and social exclusion; preventing the emergence of new categories of the poor; and the establishment of a coordinated system of support for groups at risk of poverty and social exclusion.

Therefore, different measures (variables) of poverty levels should be available. The established EU-SILC monitors and publishes several variables related to the general national poverty levels (at risk of poverty rate, people at risk of poverty or social exclusion, etc.).

In a dynamic and turbulent macroeconomic environment, it is important to observe and measure poverty (as well as other variables) on a monthly basis. The important, but still not recognized and underutilized source of such monthly data is CS data. Monthly frequency of CS data is their advantage compared to EU-SILC.

According to everything mentioned before, it is obvious that the EU-SILC provides important variables related to national poverty. However, the EU-SILC data is annual, while the CS data is monthly, which is their major advantage. In accordance with this, the aim of this research is a new indicator of households’ financial distress.

Factor analysis was used on three selected CS variables to calculate the new CS composite indicator of households’ financial distress. Three chosen CS variables pointing to the financial situation of household are: financial situation over the last 12 months, financial situation over the next 12 months, and statement on financial situation of household. After it was determined that the data is appropriate for the application of factor analysis, one factor was retained and the factor scores were calculated. Since the obtained factor scores are on a monthly basis, they were transformed into annual and then were compared with the chosen annual variables of EU-SILC data.

The outcome of this research is a monthly, internationally comparable CS-based composite indicator of households’ financial distress which has the similar pattern as the chosen EU-SILC variables. The new indicator can be applicable in any EU member state, as well as in Croatia. Accordingly, further research on this subject should include the other EU member states.

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