Does Inflation Matter? The Influence of Perceived Price Changes on Well-being

Łukasz Below[*]

Abstract

We confirm the inflation and well-being correlation scheme while filling the gap in the literature and estimating the effects of inflation perception on well-being. We discover the significant heterogeneity in attitudes toward inflation and inflation perception among European countries. While the inflation perception influence on well-being in Eastern Europe is higher than the influence of HICP, for Western Europe, it is the opposite. Both groups differ in terms of the marginal rate of substitution between inflation and unemployment – the effects of higher unemployment are more severe in comparison to the influence of inflation in Western Europe.

Keywords: inflation, happiness, unemployment, well-being

JEL Classification: D60, E31, E5, E7, I31

[*]Warsaw School of Economics, Warsaw, Poland; e-mail: lukasz.below@gmail.com; ORCID: 0000-0002-5946-0189

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1   Introduction

The role of inflation is undoubtedly crucial in all macroeconomic analyses and models. As shown by Shiller (1997) it was the most commonly used word in comparison with other economic terms. Since then the figures have changed, but certainly, inflation continues to be in the top few economic terms in use. The same author underlines the role inflation played in the history of many nations. Ehrmann and Tzamourani (2012) showed that memories of high inflation are also a relevant factor in shaping society's preferences with regard to monetary policy. This article focuses on the relationship between inflation and the life satisfaction of people who experience price hikes in many different ways. Firstly, inflation impacts the purchasing power of a household, affecting the basket of goods they can afford and thus their consumption. Second of all, inflation influences the real value of a household's savings, shaping the demand for durable goods and future consumption. From the perspective of a single consumer, inflation cannot be analyzed without a wider macroeconomic context because the impact of price changes on people's well-being may differ depending on the unemployment rate, wage growth, or GDP expansion. Thus, in the evaluation of the inflation impact, this article controls for different sociodemographic, as well as macroeconomic factors.

There is a vast literature on life satisfaction determinants and some articles also address the issue of the role of macroeconomic variables. However, attempts to gauge this interaction in the literature have been incomplete. Several authors estimated the influence of inflation and unemployment on the reported life satisfaction – Di Tella et al. (2001), Tella et al. (2003), Blanchflower and Oswald (2011), Blanchflower et al. (2014), Ruprah and Luengas (2011) among all. However, none of these works accounted for the inflation perception aspect of this research problem. All studies have as yet incorporated only official inflation measures, such as CPI or HICP (harmonized index of consumer prices). This paper strives to fill this gap by checking whether inflation perception is important in people's everyday lives; in other words, if the price changes perceived by consumers influence their well-being. This paper intends to answer three main research questions, such as: is the HICP Index a proper measure to check how inflation affects people's well-being? Second, does the high perceived inflation have a negative impact on one's life satisfaction? Third, are there any differences in the inflation perception influence on the life satisfaction among European countries?

The literature on inflation as a whole is enormous, but this article concentrates on an aspect often underestimated by macroeconomists. Inflation is not only an economic term, but it is also part of the everyday lives of billions of people. Inflation is a burning topic of conversation predominantly amid rapid price variations, when people are complaining about fuel prices going up again, having to pay for bread twice as much as a few years back, etc. This attitude was well summarized by mentioned previously Shiller (1997). He argued that people dislike inflation because they think it erodes

their standard of living. People just see that a certain good grows more expensive, not taking into account the extent to which their wages increased in that period. Hence, inflation and, presumably, inflation perception is bound to impact their life satisfaction. Kahneman and Tversky (1982) pointed out also another psychological aspect of such a situation. People often perceive gains as something they are working towards and deem them well-deserved. On the other hand, most people perceive losses as something external that has nothing in common with their failure and, according to Putler (1992), people perceive price increases as pure losses. In line with this view, people consider a higher wage a hard-earned prize, and they do not associate it with inflation or the economy as a whole. On the other hand, Fischer (1986) argues that inflation is branded as a perceived decrease in one's economic well-being, occurring when prices are seen as increasing faster than income. It would suggest that people would evaluate price changes with reference to their income changes, not to prices of other goods. The role of wage changes also remains unexplored in empirical research on life satisfaction. Thus the idea of this article is to include a wide range of macroeconomic factors, including the salary changes, in the models estimated.

In order to be able to assess the inflation perception impact on life satisfaction, a thorough understanding of this notion is needed. A seminal paper of Ranyard et al. (2008) sheds new light on the perceived inflation topic and describes at length a wide array of approaches to this phenomenon. The main conclusion drawn from the study is that despite a limited ability to store and recall specific prices, as well as many biases in forming perceptions and expectations, people somehow have an inexplicable ability to judge and forecast inflation. What is also interesting, as raised by Traut-Mattausch et al. (2004), is that perceived inflation is contingent on both current expectations for the future and the expectations formed in the past. It is the first dimension where CPI as a measure of perceived inflation fails, due to it containing only the current dynamics of market prices. Another important issue that is present in many macroeconomic variables is the problem of heterogeneity. Needless to say, people differ in their perception of price changes. It was confirmed in the study by Svenson and Nilsson (1986) who compared inflation estimates between students of psychology and economics. They found that mental models of inflation developed by economics students were closer to the expert view, and their estimates of expected (and perceived) inflation were more concurrent with the official statistics. This signifies that people are biased in their perception because of the environment in which they function. Another factor that impacts the perceived price changes is the degree to which people are interested in the field of economics. When a person often sees or hears that the recent CPI amounts to a certain value, they conjure up an image of an interval the inflation may oscillate around.

Bates and Gabor (1986) in their paper about price perception enumerate three main aspects germane to the notion of perceived inflation. They are underlining the importance of "availability" which is referred also to Tversky and Kahneman (1974). It points out that the ease with which the price changes are noticed by the purchasers

has an influence on the perception of inflation. This argument suggests that the prices of goods acquired more recently or at a more frequent rate impact the perception of price changes more than when it comes to other goods. The second aspect is the evaluation; according to this argument, people are not assessing price changes linearly, or even continuously, and pay much more attention to large and negative changes. Most people do not care about small price changes because they do not remember the exact price from the past or, as Shiller would argue, a small amount of money is simply not eroding their standard of living. Another aspect concerns expectations – people often use them as a benchmark for their judgments and the expectations of price changes may influence the perceived inflation. A good illustration of this feature is people's attitude to price changes after joining the eurozone. To complement these three aspects one could add an argument propounded by Wärneryd (1986) who claimed that people learn about the prices not only by way of their personal experiences but also indirectly from the media and by the so-called word-of-mouth. The media influence may lead to increased attention to the negative changes, as confirmed by Soroka (2006). Analyzing the time series for the UK, he found that media were more responsive to negative developments in the economy than to positive ones.

All the abovementioned literature suggests a huge discrepancy between inflation indices and people's perception of price changes. Yet, both measures need to have something in common. Antonides (2008) in his paper determined the relation between harmonized consumer price indices and a measure of perceived inflation for 13 European countries. As an approximation of the perceived inflation index, he used survey data published by the European Commission. Firstly, Antonides confirmed the previously mentioned relation, saying that after the adoption of the euro in many countries there was a strong divergence between HICP and perceived inflation. Moreover, he found a close correlation between those two measures of inflation. He was also trying to explain perceived inflation by means of HICP subindices, and, according to his model, official price changes recorded in the categories of transportation, communication, clothing, health, and restaurants significantly influence the perceived inflation.

The aforementioned works show that inflation perception may not only diverge from the official inflation measures but can also better reflect the influence of price changes on individual households. Hence, this article uses both HICP and the perceived inflation measure to assess the influence of price changes on people's life satisfaction. This paper's findings and contributions to the literature can be summarised as follows. First of all, the article confirms the results already obtained in the literature on the significant and negative influence of inflation on reported well-being. Models, estimated using various specifications to control for the possible omitted variable bias, show that one standard deviation increase of HICP y/y (year-over-year) rate drives down the well-being by 0.024-0.026 on a 4-point scale.

A second important takeaway that fills the gap in the literature concerns the influence

of inflation perception on life satisfaction. The effect of perceived inflation changes appears to be heterogeneous among countries. In Eastern European countries a one standard deviation increase in inflation perception leads to 0.029-0.036 loss in reported life satisfaction ceteris paribus, i.e. that effect is higher than for HICP changes. On the other hand, a one standard deviation increase in inflation perception in Western European countries decreases life satisfaction by 0.014-0.017, while the effect of changes in HICP is almost two times higher.

Another finding regards a relative attitude towards inflation and unemployment. Popular in economics, the concepts of misery ratio and marginal rates of substitution between inflation and unemployment is tested using the approach based on life satisfaction. Marginal rates of substitution calculated in this article show how many standard deviations inflation has to decrease to compensate for the life satisfaction loss of one standard deviation increase in the unemployment rate in the country. Despite the inflation measure used, the MRS for Western European countries is higher than for East Europe which means that people from Western countries are more susceptible to unemployment changes.

The finding from this article also indicates that both official inflation measures and inflation perception measured via surveys have a significant negative impact on people's life satisfaction. Furthermore, the reaction pattern to different inflation measures changes is different in Western and Eastern Europe; with also attitudes towards inflation and unemployment differing among these two groups.

This article is organized as follows. Section 2 contains a data summary along with descriptive statistics of the datasets used. A detailed description of the method used in the research is included in Section 3. All regression results are described in Section 4, which contains also an additional analysis of the heterogeneity among the EU countries in terms of the influence of inflation on life satisfaction. To ensure the credibility of the results, robustness tests were performed – described in Section 5. The article is summarized and concluded in Section 6.

2 Data and descriptive statistics

2.1 Survey data – life satisfaction and socioeconomic conditions

There are two main sources of data on life satisfaction in a Europe-wide sample – the European Social Survey (ESS) and Eurobarometer (EB). The Standard Eurobarometer is the flagship public opinion survey of the European Commission. It is conducted twice a year and focuses on monitoring key trends relevant to the European Union as a whole. The survey consists of questions regarding socio-demographic characteristics, political and economic situation, as well as views on the EU policy and current situation in the countries. Eurobarometer surveys rely on a randomly selected sample of at least 1,000 people aged 15 years and more for each country

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or territory reported. The European Social Survey is an academically driven cross-national survey. It measures the attitudes, beliefs and behavior patterns of diverse populations in more than thirty nations, but the interviews are carried out every two years, significantly less often than in the EB. Since EB does not lack any important variables in comparison to ESS, and its data are released more frequently, the figures provided by Eurobarometer are used as the main data source.

The sample consists of 795 726 observations of individuals across 30 EU countries or regions (Germany is split into west and east and Northern Ireland is separated from the United Kingdom) over the period 2004 to 2019. A random sample of respondents are asked one question, among others, that is of interest with reference to this article. That is "On the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the life you lead?" The answers are measured on a four-point scale, where 1 – very satisfied, 2 – fairly satisfied, 3 – not very satisfied, 4 – not at all satisfied. To ensure a more intuitive interpretation of regression coefficients, the original encoding is reversed, i.e. higher values denote that a person is more satisfied. In this work, the terms happiness and life satisfaction are used interchangeably. While there is a significant difference between them from a linguistic or psychological perspective, it was demonstrated in the economic literature that the correlation between reported happiness and life satisfaction is very high – Tella et al. (2003). Moreover, microeconometric equations that describe both of them have almost identical forms Oswald (1997). An individual's answer to a life-satisfaction question is not reliable and cannot be interpreted, due to the lack of a reference point. The notion of happiness, satisfaction, or well-being is so abstract that there is no natural scaling to allow cross-person comparison of such terms. However, as the sample of answers becomes larger, this limitation is less acute, and a potential measurement error does little harm to the regression – Tella et al. (2003).

The mean life satisfaction in the sample equals 2.93 (with 4 being the most satisfied), but there exist significant differences among countries (Figure 1) and among people with different employment status, gender and marital status. As shown in Table 1, the unemployed are on average less happy with their lives, which is confirmed with an ANOVA test (Table 2). The same applies to people who are divorced, for whom the difference in the average life satisfaction is also high. According to the data, also married people are happier than unmarried. The difference is not high, but statically significant, as per the ANOVA test. In the sample of European countries, there is a statistically significant difference between the average life satisfaction of males and females. According to a meta-analysis by Chen et al. (2020), such a result is also present in other works. Moreover, those are preliminary results that are elaborated in the next sections.

Table 1: Share of people with different life satisfaction levels in Europe

	Life_satisfaction	All	Unemployed	Male	Female	Married	Divorced
1	Not at all satisfied	5.66	13.90	5.55	5.75	5.24	9.25
2	Not very satisfied	17.73	29.23	17.02	18.31	17.16	24.25
3	Fairly Satisfied	54.32	43.97	54.36	54.28	54.21	51.33
4	Very Satisfied	22.29	12.90	23.06	21.66	23.39	15.17

Note: All numbers are expressed as percentages.

Table 2: Differences in mean life satisfaction between groups

Characteristics	Group	Mean	ANOVA test p-value
Gender	Male	2.95	0.00
	Female	2.92	
Employment	Unemployed	2.51	0.00
	Not unemployed	2.97	
Marriage	Married	2.96	0.00
	Not married	2.91	
Divorce	Divorced	2.73	0.00
	Not divorced	2.95	

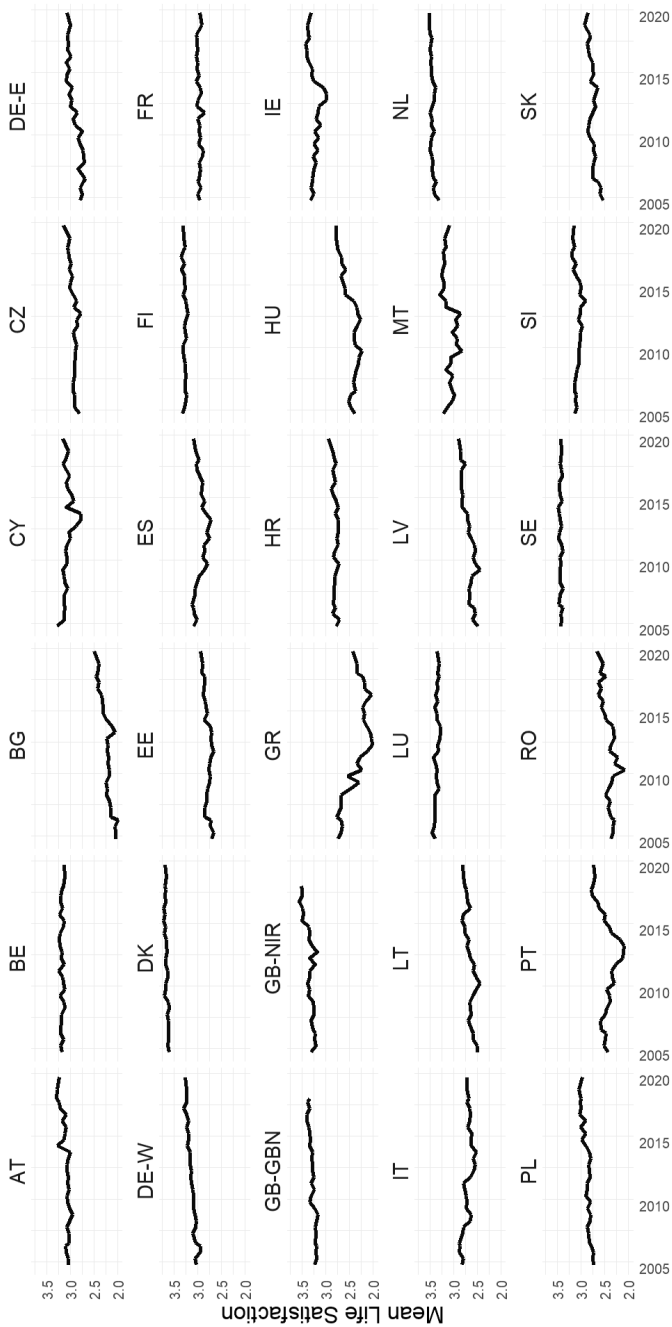## 2.2 Macroeconomic data – inflation and inflation perception

To capture the influence of price changes on people's life satisfaction, a set of macroeconomic variables is needed. The macroeconomic variables such as HICP, unemployment rate, GDP growth, wage growth, and Gini index are taken from Eurostat. The summary of the data is presented in Table 3. Additionally, to check the influence of the inflation perception measure, aggregated survey data from the European Commission and European Central Bank is used; Europeans are interviewed each month and asked two questions connected with perceived inflation. The first one is: "How do you think that consumer prices have developed over the last 12 months? They have. . . ," and the other: "By comparison with the past 12 months, how do you expect that consumer prices will develop in the next 12 months? They will... ." The possible answers include: they have risen a lot (PP), risen moderately (P), risen slightly (E), stayed about the same (M), fallen (MM), or do not know (N) (analogously to the question about future prices). For each group, a balanced measure is calculated according to the formula presented below that uses shares of each answers.

$$BPI = \left[\left(PP + \frac{1}{2}P \right) - \left(MM + \frac{1}{2}M \right) \right] * 100 \tag{1}$$

BPI (Balanced Perceived Inflation) takes values from -100 (all respondents answer

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Figure 1: Mean life satisfaction for countries in the sample

Source: Own elaboration based on Eurobarometer data.

that prices have fallen) to 100 (all respondents answer that prices have risen a lot). The variable that is derived from the aforementioned formula based on the question about past inflation will be called a perceived inflation measure and the one based on expectations of future prices will be called inflation expectation. Perceived inflation measure is thus treated as an alternative to the HICP measure of price changes and inflation expectation is used to calculate the effect of incorrect price change forecasts of households on their life satisfaction. Since the question in the European Commission's survey concerns the judgment of prices "over the last 12 month" and "in the next 12 months," its best counterpart is HICP y/y. Table 4 and Figure 2 show that both inflation measures are highly correlated.
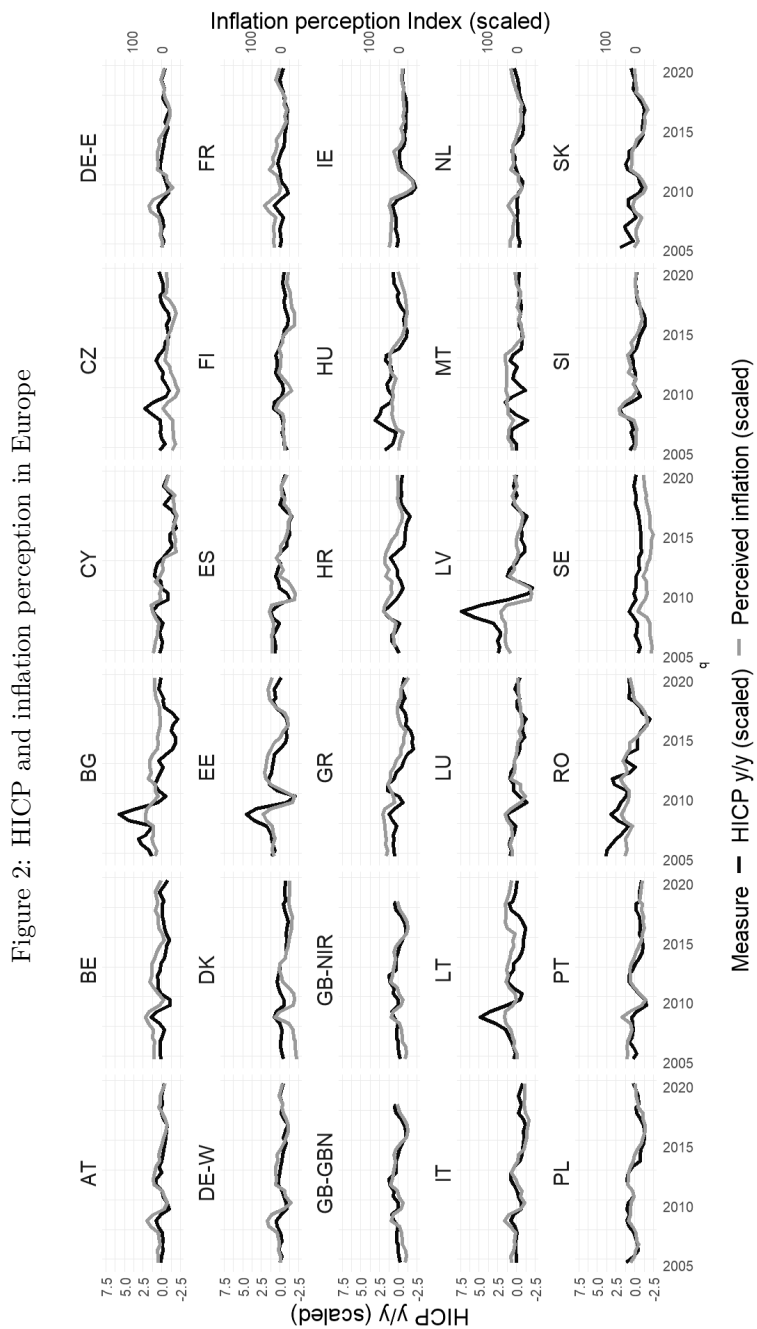
2.3 Preliminary data analysis findings

It is evident that there are significant differences in life satisfaction between countries, which is one of the rationales for using fixed effects in further analysis. Mean life satisfaction for a given country also changes over time, justifying the usage of time-fixed effects in the models (Figure 1). Those changes over time are a result of either long-term trends or fluctuations in economic or social conditions. For some countries that suffered the most severe economic consequences during the Great Financial Crisis (Cyprus, Greece, Ireland, and Portugal), a drop in life satisfaction was observed around 2010.

The analyzed sample appears to be quite heterogeneous in terms of both – life satisfaction and inflation. While it is expected that countries in such a wide panel are different, analysis of patterns that are present in the data shows that there is a significant difference between Eastern and Western Europe understood as countries that entered the EU in 2004 or later and former EU members. This important finding has a crucial influence on further modeling approaches and econometric analysis.

From a global perspective, European countries appear to be somewhat similar in terms of socio-economic conditions. However, due to the historical division of Europe in the 20th century, there exist significant disparities between Eastern and Western Europe. In most studies, this line of division is drawn based on the EU accession time and countries that entered the bloc in 2004 or later are classified as economies that are striving to catch up with other EU members. The Global Financial Crisis and the accession of several Eastern European countries shifted this boundary, but for the purpose of this research, the old division is used. The first reason to split a sample into countries that entered the EU in 2004 or later (called Eastern) and the old EU members (called Western) stems from the time series analysis. The time span of the data begins in 2004, and Eastern countries were facing socioeconomic upheaval in the first years of their presence in the European single market. Data shows that average inflation in the sample is considerably higher for Eastern countries. The average HICP y/y for the group of Eastern European countries is almost 1 p.p. higher than for Western Europe (2.63% vs. 1.65%). A similar discrepancy is also observed for inflation perception and inflation expectations.

Figure 2: HICP and inflation perception in Europe

Source: Own elaboration based on Eurostat and European Commission data.

Following the line of division drawn above it is worth mentioning that the correlation between HICP and inflation perception is also heterogeneous among countries in the sample. Since preliminary analysis showed different patterns in Eastern and Western European countries the unweighted average of HICP and inflation perception for the two groups is calculated. It appears that the correlation is higher for Western European countries (0.80) than for Eastern European countries (0.75). Both variables have different units of measurement, so the comparison displayed in Figure 2 is shown with standardized values. To ensure robustness of this relation the stationarity tests – KPSS and ADF were performed separately for each country, as well as, Nyblom-Harvey and Levin-Lin-Chu test were performed for subgroups. All test for HIPC and inflation perception confirm stationarity of the series. The relationship between these inflation measures is heterogeneous among countries, but in general they follow similar patterns, as proved by a high correlation between HICP and perceived inflation (Table 4). It is also worth noting that the average correlation for the whole sample between HICP and perceived inflation (0.778) is higher than between HICP and inflation expectations (0.613).

Moreover, the two groups (Eastern and Western Europe) differ also significantly in terms of reported life satisfaction. While the average LS on a 4-point scale equals 3.1 for Western countries the mean for Eastern countries is only 2.8. What is also important from the perspective of the thorough analysis is the time evolution of life satisfaction in research countries. Many Eastern European countries exhibit an upward trad in reported life satisfaction that is probably a result of improving economic conditions.

Table 3: Macroeconomic data summary statistics

Statistic	Min	Pctl(25)	Median	Pctl(75)	Max	Median	St. Dev.
HICP y/y	-2.77	0.80	1.90	3.00	17.53	1.90	2.10
Percevied inflation	-37.82	8.38	27.23	45.82	82.44	27.23	25.59
Unemployment rate	2.00	5.60	7.50	10.10	27.80	7.50	4.27
GDP y/y	-17.40	0.80	2.30	3.93	25.70	2.30	3.85
Wage y/y	-15.40	1.60	3.10	5.10	33.50	3.10	4.88
Gini Index	20.90	26.80	29.80	33.00	40.20	29.80	3.83

3   Empirical strategy

There are two main approaches to the regression, including micro- and macro-data ones that are popular in the literature. The former, the so-called two-step procedure, requires two regressions, whereby the first contains only microdata, and the other is performed on the clustered residuals from the first model and macro variables as regressors. In the latter approach, all variables are put into one regression, but to avoid the Moulton problem (Moulton 1990), standard errors have to be clustered.

Table 4: Correlation of official indflation measure and perceived inflation

	Country	HICP y/y Perceived infaltion	HICP y/y Inflation expectations
1	IE	0.957	0.703
2	BE	0.871	0.466
3	GR	0.871	0.850
4	PL	0.869	0.832
5	AT	0.868	0.761
6	IT	0.854	0.584
7	FR	0.850	0.543
8	FI	0.844	0.608
9	SK	0.839	0.704
10	RO	0.828	0.826
11	DE-E	0.827	0.744
12	DE-W	0.827	0.744
13	SI	0.817	0.498
14	SE	0.816	0.600
15	CY	0.812	0.753
16	LV	0.805	0.585
17	ES	0.800	0.774
18	GB-GBN	0.785	0.359
19	GB-NIR	0.785	0.359
20	LU	0.784	0.436
21	BG	0.784	0.852
22	PT	0.772	0.797
23	EE	0.746	0.547
24	NL	0.725	0.383
25	HU	0.724	0.746
26	HR	0.717	0.878
27	MT	0.617	0.620
28	CZ	0.598	0.617
29	DK	0.493	−0.173
30	LT	0.448	0.401

For a more intuitive interpretation, the one-step procedure is employed and standard errors are clustered at the level of country*year and the two-step procedure is included as a robustness check. The model used in this article is presented below. The one-step regression on a mixed dataset (individual and macroeconomic data) is estimated using the OLS panel model with country and time-fixed effects. To ensure that, despite the nature of the dataset and potential within-cluster correlation (Moulton problem) the standard errors are unbiased the clustering of the errors is applied.

$$LS_{cit} = \alpha \ P_{ct} \ + \ \beta \ Y_{ct} \ + \ \gamma \ U_{ct} \ + \ \phi \ \Omega_{ct} \ + \ \eta \ \Lambda_{cit} \ + \ \mu_c \ + \ \rho_t, \qquad (2)$$

where LS_{cit} is the reported life satisfaction of individual i in country c at time

t. P_{ct} stands for the price changes measure that will vary across specifications (HICP y/y or index of inflation perception). Both of the variables measuring price changes are stationary time series which is confirmed by unit root tests. To verify the stationarity of the panel data the generalization of KPSS test was employed – Nyblom and Harvey (2000) and pooled version of the ADF test – Levin et al. (2002). The Nyblom-Harvey test results indicated that the null hypothesis could not be rejected, suggesting that the data series are indeed stationary. The results from the Levin-Lin-Chu test uniformly indicated that the series are stationary, as the null hypothesis of non-stationarity was rejected at the conventional significance levels. The significant influence of unemployment, and more general labor market conditions, on well-being is widely confirmed in the literature – Clark et al. (2010), Mousteri et al. (2018), Malisauskaite et al. (2022) among all. Based on the aforementioned literature unemployment rate U_{ct}, as well as, the GDP growth rate Y_{ct} in the country c at time t is also included in the regression. The GDP measure is included as a year-over-year growth rate which ensures stationarity of the series. The unemployment rate presents the level of unemployment in the country and for each of the countries in the sample, the series of unemployment rates is a stationary time series which was confirmed by unit root tests. Following the step-by-step procedure the set of other macroeconomic variables was added to the regression (Ω_{ct}). It includes real wages y/y growth, Gini coefficient y/y growth and squared price changes measure. It is well documented in the literature that an individual's life satisfaction depends on a set of demographic characteristics (Blanchflower and Oswald 2004, Benjamin et al. 2012, Chen et al. 2020). The set of characteristics (Λ_{cit}) used in this article is a standard choice for many empirical papers on life satisfaction and the coefficients in the regression are similar to those obtained in the literature. It includes employment status, gender, age, age squared, education level finished, marital status (married, divorced, and widowed dummies), and number of children younger than 10 years old, as well as, younger than 14 years old. The country fixed effects (μ_c) are used because, as shown in the previous section, there is strong heterogeneity in life satisfaction among countries, and the literature also confirms that there are country-specific factors that influence an individual's well-being. While the wide set of characteristics is included in the model life satisfaction is such a complex problem that there may be some, less influential omitted variables that may influence the well-being of people. Hence, the country fixed effects are used to control for those unobserved, country-specific values such as weather, politics, and social conditions. While the mean demographic characteristics in the country do not change rapidly in time, the fluctuations in life satisfaction are recorded. Hence, time dummies (ρ_t) are also employed in the regression. Since the dependent variable is both categorical and ordered, the model could be also estimated using logit or probit. However, Ferrer-i-Carbonell and Frijters (2004) proved that it does not influence the results significantly if there are fixed effects included in the regression. They showed that assuming cardinality or ordinality of the answers to the life satisfaction questions which translates to choosing logit or OLS estimation

does not matter for the results of the model as long as the time-invariant unobserved factors are taken into account. Since the authors proved this on a similar dataset used in this article and the issue of the time-invariant unobserved factor was addressed by including country-fixed effects in the model the OLS estimation is presented in the next section. The results are also confirmed by the robustness checks in Section 5, where the model using the same variables is estimated using ordered logit, and relative coefficients are almost identical.

4 Results

This section presents the econometric results for the whole sample consisting of 31 European countries and compares the influence of two different inflation measures on life satisfaction. A similar econometric exercise was performed on two subsamples – for Eastern and Western Europe. To allow an easier comparison between inflation measures, all variables are used in a standardized form (the mean is subtracted and the resulting difference is divided by the standard deviation). Such an approach allows comparison of the values of coefficients between variables in terms of the influence of the one standard deviation change of the variable on life satisfaction. The unstandardized versions of the base regressions are provided in the Appendix – Table A7. The values presented here are not interpretable in terms of the main hypotheses presented in the paper that focus on the difference between official inflation measures and inflation perception as factors determining life satisfaction. Hence, the next section of this article contains an analysis of the results based on the regression with standardized macroeconomic variables that allows easier comparison and does not change the interpretation of the results produced by the model that uses unstandardized variables. All models presented in this section were thoroughly tested in terms of the assumptions of the error term which includes autocorrelation, heteroscedasticity, and distribution.

The variable of most interest is certainly the inflation measure. However, there are also other macroeconomic variables that may influence reported life satisfaction (Di Tella et al. 2001, Blanchflower and Oswald 2011, Welsch 2007, Perovic and Golem 2010). To check the importance of such variables and obtain results that are not affected by the omitted variable bias, seven macroeconomic indicators are included in the step-by-step procedure. All results described below and commented in conclusions are based on the rich specification including inflation, GDP, unemployment rate, real wage, inflation squared, and Gini coefficient. Tables showing the whole step-by-step procedure are included in the Appendix (Tables A1 and A2).

Both inflation measures have statistically significant (at conventional levels of statistical significance) and negative coefficients that are robust to the addition of new control variables. It suggests that higher inflation causes deterioration in reported life satisfaction among Europeans. While such a relation between official inflation measures and life satisfaction was already confirmed by several studies (Tella et al.

2003, Blanchflower et al. 2014, Ruprah and Luengas 2011), the results obtained in the course of this study also show that higher inflation perception is sufficient to lower the reported happiness.

Table 5: Influence of HICP y/y on life satisfaction – results of the OLS model estimated on 3 samples

	Dependent variable:		
	Life Satisfaction		
	Full sample	East	West
	(1)	(2)	(3)
HICP y/y	−0.025***	−0.023***	−0.037***
	(0.001)	(0.002)	(0.003)
GDP y/y	0.023***	0.025***	0.019***
	(0.001)	(0.002)	(0.002)
Unemp. rate	−0.086***	−0.061***	−0.092***
	(0.001)	(0.003)	(0.002)
Real wage y/y	0.004**	0.014***	−0.016***
	(0.001)	(0.001)	(0.003)
HICP squared	−0.001	0.001*	−0.012***
	(0.001)	(0.001)	(0.003)
Gini y/y	−0.002	−0.002*	−0.001
	(0.001)	(0.001)	(0.001)
Country fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
Demographic characteristics	Yes	Yes	Yes
Observations	719,992	293,053	426,939
R^2	0.214	0.200	0.196
Adjusted R^2	0.214	0.200	0.196

Note: *p<0.1; **p<0.05; ***p<0.01.

Since all variables are standardized, it is possible to compare the coefficients between regressions. An increase in inflation rate year-on-year calculated based on the Harmonised Index of Consumer Prices by one standard deviation (which is a 2.12 p.p. change in HICP y/y) leads to a drop in the reported life satisfaction by 0.023-0.027 on a four-point scale (depending on the sample chosen). Using perceived inflation instead of HICP changes results among all specifications. An increase in inflation perception by one standard deviation dampens life satisfaction by 0.018 to 0.021 on a four-point scale. The magnitude of the effect of the GDP change is similar to the effect of inflation, but a higher value of the GDP growth y/y entails higher life satisfaction.

Table 6: Influence of inflation perception on life satisfaction – results of the OLS model estimated on 3 samples

	Dependent variable:		
	Life Satisfaction		
	Full sample	East	West
	(1)	(2)	(3)
Inf. perception	−0.021***	−0.037***	−0.018***
	(0.001)	(0.002)	(0.002)
GDP y/y	0.023***	0.027***	0.021***
	(0.001)	(0.002)	(0.002)
Unemp. rate	−0.087***	−0.051***	−0.089***
	(0.001)	(0.003)	(0.002)
Real wage y/y	0.003**	0.010***	−0.003
	(0.001)	(0.001)	(0.003)
Infl. percep. squared	−0.010***	−0.007***	−0.010***
	(0.001)	(0.001)	(0.001)
Gini y/y	−0.001	−0.003**	0.0004
	(0.001)	(0.001)	(0.001)
Country fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
Demographic characteristics	Yes	Yes	Yes
Observations	719,992	293,053	426,939
R^2	0.214	0.200	0.196
Adjusted R^2	0.214	0.200	0.196

Unsurprisingly, the strongest effect from all macroeconomic variables used is noted for the unemployment rate. Since the employment status of the respondents was used in the regression, the model also captures the so-called dual effect of unemployment. The life satisfaction is lower among unemployed people (as shown in Section 2), but also a higher unemployment rate in the country has a negative impact on happiness because such labor market conditions on the one hand make it harder for the unemployed to find employment, and, on the other hand, cause greater fear of losing a job in people who are currently employed. The real wage growth rate and Gini coefficient growth rates have coefficients significantly different from zero, but the magnitude of the effect is very small. An even smaller coefficient for HICP y/y squared attests to the non-linearity of the relation between HICP and life satisfaction being fairly small. In addition, the coefficient is not significant at conventional levels of statistical significance in all specifications, which allows for an assumption that the relation is linear.

The results presented in the following Tables 5 and 6 show that in fact, two groups are heterogeneous in terms of the change in life satisfaction driven by altered macroeconomic conditions. Detailed step-by-step regression results on the two subsamples are presented in Tables A3–A6. It is confirmed by the statistical comparison of coefficient vectors. The z-score that equals the difference between coefficients divided by the square root of the sum of their standard errors shows that on the 0.05 confidence level, the null hypothesis on the equality of the coefficients has to be rejected. While the coefficients for the HICP y/y rate may be interpreted as similar among country groups, the differences in reactions to perceived inflation changes and unemployment rate changes differ substantially. The significance of the difference in coefficients for inflation perception and the unemployment rate is also confirmed by the additional models including east/west interaction terms (Table A8). The most important dissimilarity between the groups pertains to relative reactions of the official inflation rate and inflation perception. While in Eastern Europe the magnitude of the inflation perception influence is higher than HICP, for Western Europe it is the opposite. Another important result regards the relation between unemployment and life satisfaction. The reaction to joblessness rate changes in Western Europe is almost twice as high as in Eastern Europe.

Table 7: Marginal rates of substitution between inflation and unemployment – calculated based on results presented in Table 5 and Table 6

Unemployment	East	West	Relative MRS
HICP	2.95	4.30	0.68
Infl. perception	1.61	6.81	0.23
Infl. expectations	1.70	3.86	0.44
GDP	East	West	Relative MRS
HICP	1.05	0.51	2.06
Infl. perception	0.72	1.16	0.62
Infl. expectations	0.84	0.99	0.85

Note: Calculated in terms of standard deviations.

Considering similar coefficients for HICP, it also means that the differences between the marginal rate of substitution between the official inflation measure and unemployment are perceptibly different between the groups. Table 7 contains the marginal rate of substitution between inflation and unemployment, conditional on other explanatory variables for different inflation measures. The substitution rates are calculated using standardized coefficients, which is necessary due to fact that different measures of the same phenomenon have different units of measurement. The rates show how many standard deviations inflation has to decrease to compensate for the life satisfaction loss resulting from one standard deviation increase in the unemployment rate in the country. Moreover, it controls for the dual unemployment effect described in the previous section. It means that to calculate the well-being

loss resulting from the unemployment rate changes the coefficient for both, the Unemp. rate and unemployed variable (individual, binary variable taking value of 1 when a person is unemployed) are taken into account. The calculation of MRS was based on the regression coefficients from the simplest specification that includes only HICP, GDP, and unemployment rate. The calculations show that the effects of higher unemployment are more severe in comparison to the influence of inflation in Western Europe (despite the choice of an inflation measure). However, the relative MRS, calculated by dividing the MRS for Eastern countries by the MRS for Western countries, differs a lot between specifications. It confirms that people from Eastern Europe care more about the perceived inflation and people from Western Europe care more about the official inflation statistics.

Table 8: Influence of inflation expectations on life satisfaction – results of the OLS model estimated on 3 samples

	Dependent variable:		
	Life Satisfaction		
	Full sample	East	West
	(1)	(2)	(3)
Inf. expectations	-0.030^{***}	-0.033^{***}	-0.027^{***}
	(0.001)	(0.002)	(0.002)
GDP y/y	0.028^{***}	0.028^{***}	0.027^{***}
	(0.001)	(0.002)	(0.002)
Unemp. rate	-0.086^{***}	-0.051^{***}	-0.091^{***}
	(0.001)	(0.003)	(0.002)
Real wage y/y	0.001	0.012^{***}	-0.009^{***}
	(0.001)	(0.001)	(0.003)
Infl. expect. squared	-0.002^{**}	-0.008^{***}	0.002^{*}
	(0.001)	(0.001)	(0.001)
Gini y/y	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
Country fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
Demographic characteristics	Yes	Yes	Yes
Observations	719,992	293,053	426,939
R^2	0.214	0.200	0.197
Adjusted R^2	0.214	0.200	0.197

Inflation expectations are often discussed in the literature not only as an important factor for the market price formation in the future but also in the context of the price

change influence on households. Hence, in the third set of regressions, the reported inflation expectations are used as a price change measure (Table 8). The significance and the sign of the coefficient are in line with the intuition built based on the previous models, but the magnitude of the effect is exceptionally high when compared with the previous whole sample regressions. The explanation for such a high coefficient in the first specification lies in the quite homogenous attitude towards inflation expectations among both country groups.

5 Robustness checks

To ensure the robustness of the results and credibility of the conclusions, several exercises are conducted. Firstly, the model is estimated using a two-step methodology that is often used in the literature (Di Tella et al. 2001). Moreover, since the dependent variable is discrete and ordinal, the model is estimated using logit regression. The next step involves tests with a limited sample, i.e., an estimation with the exclusion of each country aimed at verifying whether one country does not pull results for the whole sample or region.

5.1 Two-step regression

The first step of the procedure presented in Table 9 consists of an OLS regression of life satisfaction on demographic characteristics, with time and country fixed effects. The residuals from the first-step regression can be interpreted as a life satisfaction that is not explained by personal characteristics. The means of the residuals are calculated on the country levels and the variable transformed in such a way is used in the second step as a dependent variable.

The results from the two-step procedure confirm the findings discussed in the previous section. Table 10 shows results for the second step of the regression and includes bootstrapped standard errors. The influence of HICP changes is similar for the West and East, whilst inflation perception has a greater influence on life satisfaction in Eastern European countries. The distinct difference in the unemployment coefficient between the two groups is also corroborated in the two-step regression.

5.2 Logit regression

There is a debate in the literature on how to treat reported life satisfaction data obtained from surveys. The first view deems satisfaction to be interpersonally cardinally comparable, which means that the difference between, for instance, a 1 and a 2 is the same as the difference between a 3 and a 4 (Ng 1996, Ng 1997). Such a cardinalisation suggests that answers are evenly spaced, so OLS would be a proper method to regress such a variable. The other approach assumes ordinal comparability, implying that individuals share a common opinion of what happiness

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Table 9: 2-step estimation procedure – 1st step regression results: OLS estimation on the survey data

	Dependent variable:
	Life Satisfaction
unemployed	−0.317***
	(0.003)
employed	0.065***
	(0.002)
gender	0.019***
	(0.002)
age	−0.031***
	(0.0003)
age squared	0.0003***
	(0.00000)
education	0.016***
	(0.0002)
married	0.131***
	(0.002)
divorced	−0.133***
	(0.003)
widowed	−0.088***
	(0.004)
child <10y	−0.005***
	(0.001)
child <14y	−0.007***
	(0.002)
Constant	3.433***
	(0.009)
Country fixed effects	Yes
Time fixed effects	Yes
Observations	781,075
R^2	0.210
Adjusted R^2	0.210
Residual Std. Error	0.004 (df = 781001)
F Statistic	3,016.470*** (df = 69; 781001)

is and people from the same groups assign similar values of satisfaction to similar feelings. Such an assumption implies non-linear estimation methods, i.e. logit or probit. Although Ferrer-i-Carbonell and Frijters (2004) pointed out that assuming cardinality or ordinality of the answers to general satisfaction questions is relatively unimportant to results, the logit estimation is included as a robustness check.

The results from logit estimation presented in Table 11, confirm the results obtained using OLS. Consequently, relative coefficients and marginal effects (partial derivatives

Table 10: West/East – HICP & Inflation perception – comparison of the results from OLS models

| | Dependent variable: | | | |
| | Unexplained life satisfaction | | | |
	West (1)	West (2)	East (1)	East (2)
HICP y/y	−0.031***		−0.024***	
	(0.0034)		(0.0063)	
Inf. perception		−0.025***		−0.029***
		(0.0049)		(0.0053)
GDP y/y	0.013***	0.012***	0.010***	0.009***
	(0.0036)	(0.0037)	(0.0047)	(0.0046)
Unemp. rate	−0.072***	−0.072***	−0.064***	−0.062***
	(0.0066)	(0.0069)	(0.008)	(0.0079)
Observations	390	390	420	419
R^2	0.940	0.941	0.948	0.948
Adjusted R^2	0.937	0.938	0.946	0.945

Note: Different numbers of observations are result of missing data in some periods for different variables.

Table 11: Logit regressions on full sample

| | Dependent variable: | |
| | Life satisfaction | |
	(1)	(2)
HICP y/y	−0.061***	
	(0.000)	
Inflation perception		−0.039***
		(0.000)
GDP y/y	0.056	0.050
	(0.103)	(0.109)
Unemp. rate	−0.232***	−0.228***
	(0.000)	(0.000)
Real wage y/y	0.004*	0.010*
	(0.051)	(0.072)
Country fixed effects	Yes	Yes
Time fixed effects	Yes	Yes
Demographic characteristics	Yes	Yes
Observations	769898	769898

of the regression equation with respect to variables of interest) are similar in both one-step and two-step procedures.

5.3   Robustness for observations exclusion

The model is estimated on a large group of European countries, and the results should be stable for the whole sample, as well as for groups that were identified in the previous section. Figure 3 depicts the deviation of coefficients in models with one country excluded from the sample (the reference is a model estimated on the full sample).
Except for Greece and Estonia, all deviations lie within the 5% deviation band. The deviation of the HICP coefficient in the sample, with Estonia, excluded, equals 5.5%, therefore, it is also not of concern. However, the deviation of the unemployment coefficient for Greece is 15.6%, marking a significant change from the model estimated on the whole sample. On the other hand, the coefficient for HICP is also lower, so the difference in the marginal rate of substitution between unemployment and inflation does not change that much. Also, relative differences between HICP and inflation perception are not high and they do not affect the findings of the research.
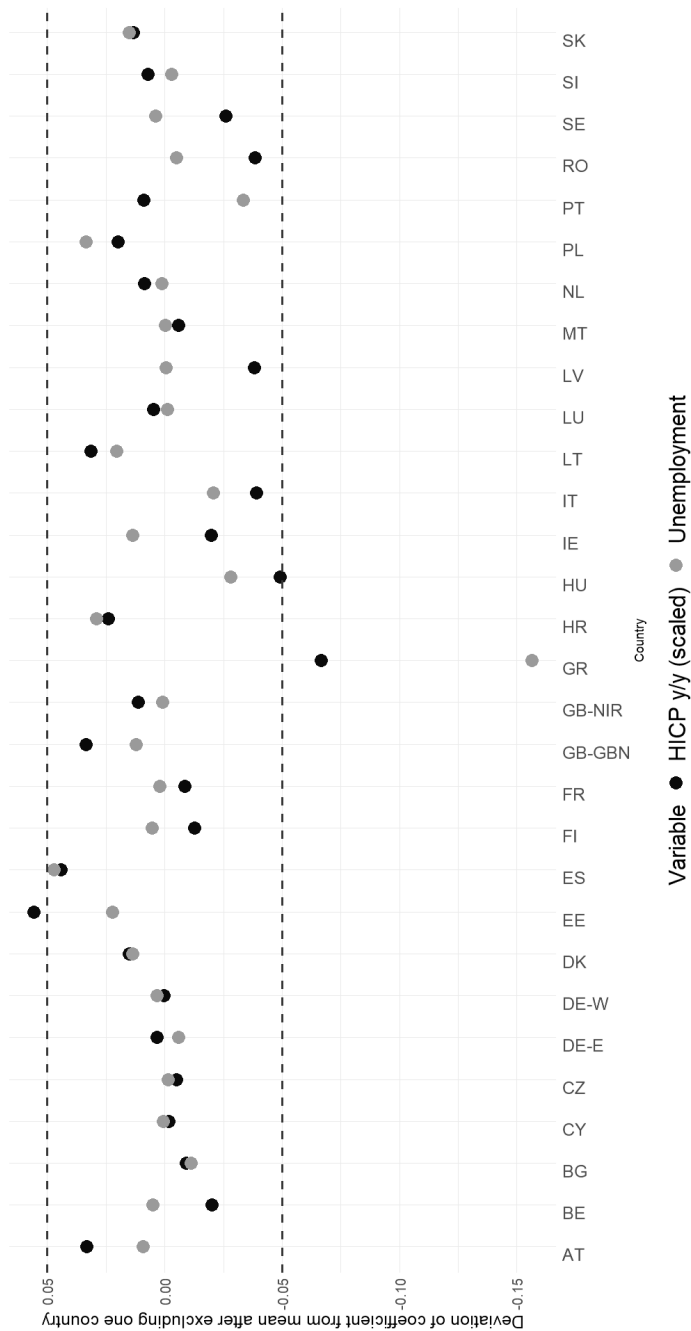
6   Conclusions

In view of the analysis, this paper shows that changes to macroeconomic conditions have implications for the reported life satisfaction of people in Europe. It also indicates that the influence of official inflation measures and inflation reported by people in surveys on life satisfaction is different and not homogeneous across the continent.
The article investigates data pertinent to almost 800,000 respondents across 30 EU countries over the period 2004-2019, and its findings are based on the panel models estimated using OLS. The results from the first model that incorporates HICP as an inflation measure confirm the results obtained in other research on this topic and give similar marginal rates of substitutions between unemployment and inflation, as calculated in the other articles that explored that relation. It reinforces the credibility of the method used in this paper which was also employed to check the influence of inflation perception and inflation expectations on people's well-being. The results obtained in this article fill the gap in the literature, which focused more on the influence of the official inflation measure on life satisfaction, not accounting for the inflation perception.
The pivotal result from the analysis concerns heterogeneity among European countries in both, attitudes towards inflation and inflation perception, as well as, the relative influence of unemployment and inflation changes on well-being. While in Eastern Europe the magnitude of the influence of inflation perception is higher than HICP, for Western Europe it is quite the opposite. There are also significant differences in the magnitude of unemployment rate changes in relation to life satisfaction between

Figure 3: Robustness check – countries excluding

Source: Own elaboration based on Eurobarometer, Eurostat and European Commission data.

the two groups of countries. Thus, the marginal rates of substitution between unemployment and inflation differ among the groups, reflecting different attitudes towards those two important economic phenomena in European countries. The life-satisfaction loss resulting from the increase in the unemployment rate has to be compensated by a relatively small decline in inflation perception in Eastern Europe, while in Western Europe the inflation perception decrease has to be very large. Moreover, for Eastern Europe, it is easier to backfill the well-being loss caused by the unemployment rise by decreasing inflation perception than decreasing HICP, while in Western Europe falls in HICP are more effective than inflation perception.

The results obtained by means of this paper show that Western Europeans are more vulnerable to unemployment changes that cripple their life satisfaction more than inflation rate hikes. Such a conclusion may constitute a guideline for the economic policy geared at the maximization of citizens' well-being. On the other hand, people living in Eastern European countries tend to suffer more from the rise in the inflation perception than from surges in joblessness. The marked discrepancy between the official inflation measure and inflation perception along with inflation expectations may suggest that policies should place a premium on increasing the credibility of the central bank, government, and statistical agency. Additionally, the comparison of coefficients for the unemployment rate between the two groups indicates that Eastern Europe should pay more attention to taming inflation, as compared to Western Europe's states.

Declaration of interest statement

The author reports there are no competing interests to declare.

Data availability statement

The data on inflation perception are openly available in `https://www.ecb.europa.eu/stats/ecb_surveys/consumer_exp_survey/html/data_methodological.en.html`.
The Eurobarometer survey data are openly available in at `https://doi.org/10.4232`.
Macroeconomic data are sourced from the Eurostat database.

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A Appendix

Table A1: OLS estimation on the full sample – HICP as an inflation measure

| | Dependent variable: | | | |
| | Life Satisfaction | | | |
	(1)	(2)	(3)	(4)
HICP y/y	−0.027***	−0.026***	−0.024***	−0.025***
	(0.001)	(0.001)	(0.001)	(0.001)
GDP y/y	0.022***	0.021***	0.021***	0.023***
	(0.001)	(0.001)	(0.001)	(0.001)
Unemp. rate	−0.083***	−0.082***	−0.081***	−0.086***
	(0.001)	(0.001)	(0.001)	(0.001)
Real wage y/y		0.005***	0.005***	0.004**
		(0.001)	(0.001)	(0.001)
HICP squared			−0.001*	−0.001
			(0.001)	(0.001)
Gini y/y				−0.002
				(0.001)
Country fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
Demographic characteristics	Yes	Yes	Yes	Yes
Observations	793,728	785,787	785,787	719,992
R^2	0.218	0.218	0.218	0.214
Adjusted R^2	0.218	0.218	0.218	0.214

Note: *p<0.1; **p<0.05; ***p<0.01
Different numbers of observations are result of missing data in some periods for different variables.

Table A2: OLS estimation on the full sample – perceived inflation as an inflation measure

	Dependent variable:			
	Life Satisfaction			
	(1)	(2)	(3)	(4)
Inf. perception	-0.026^{***}	-0.023^{***}	-0.026^{***}	-0.029^{***}
	(0.001)	(0.001)	(0.001)	(0.001)
GDP y/y	0.018^{***}	0.017^{***}	0.017^{***}	0.022^{***}
	(0.001)	(0.001)	(0.001)	(0.001)
Unemp. rate	-0.071^{***}	-0.068^{***}	-0.070^{***}	-0.074^{***}
	(0.001)	(0.001)	(0.001)	(0.001)
Real wage y/y		0.012^{***}	0.011^{***}	0.009^{***}
		(0.001)	(0.001)	(0.002)
Infl. percep. squared			-0.014^{***}	-0.016^{***}
			(0.001)	(0.001)
Gini y/y				0.001
				(0.001)
Country fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
Demographic characteristics	Yes	Yes	Yes	Yes
Observations	728,079	720,671	720,671	655,584
R^2	0.208	0.208	0.209	0.204
Adjusted R^2	0.208	0.208	0.209	0.204

Table A3: OLS estimation on the Eastern Europe – HICP as an inflation measure

| | Dependent variable: | | | |
| | Life Satisfaction | | | |
	(1)	(2)	(3)	(4)
HICP y/y	−0.023***	−0.020***	−0.022***	−0.024***
	(0.001)	(0.001)	(0.002)	(0.002)
GDP y/y	0.028***	0.019***	0.018***	0.025***
	(0.001)	(0.001)	(0.001)	(0.002)
Unemp. rate	−0.047***	−0.036***	−0.036***	−0.055***
	(0.002)	(0.002)	(0.002)	(0.003)
Real wage y/y		0.018***	0.018***	0.014***
		(0.001)	(0.001)	(0.001)
HICP squared			0.001***	0.001*
			(0.0005)	(0.001)
Gini y/y				−0.002*
				(0.001)
Country fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
Demographic characteristics	Yes	Yes	Yes	Yes
Observations	364,797	356,856	356,856	293,053
R^2	0.198	0.200	0.200	0.200
Adjusted R^2	0.198	0.200	0.200	0.200

Table A4: OLS estimation on the Western Europe – HICP as an inflation measure

| | Dependent variable: | | | |
| | Life Satisfaction | | | |
	(1)	(2)	(3)	(4)
HICP y/y	−0.036***	−0.033***	−0.052***	−0.052***
	(0.003)	(0.003)	(0.004)	(0.004)
GDP y/y	0.021***	0.022***	0.019***	0.019***
	(0.002)	(0.002)	(0.002)	(0.002)
Unemp. rate	−0.075***	−0.074***	−0.077***	−0.078***
	(0.002)	(0.002)	(0.002)	(0.002)
Real wage y/y		0.007	0.002	0.002
		(0.004)	(0.004)	(0.004)
HICP squared			−0.031***	−0.031***
			(0.003)	(0.003)
Gini y/y				0.001
				(0.002)
Country fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
Demographic characteristics	Yes	Yes	Yes	Yes
Observations	363,815	363,815	363,815	362,531
R^2	0.183	0.183	0.183	0.183
Adjusted R^2	0.183	0.183	0.183	0.183

Table A5: OLS estimation on the Eastern Europe – perceived inflation as an inflation measure

	Dependent variable:			
	Life Satisfaction			
	(1)	(2)	(3)	(4)
Inf. perception	−0.034***	−0.029***	−0.030***	−0.037***
	(0.002)	(0.002)	(0.002)	(0.002)
GDP y/y	0.025***	0.017***	0.017***	0.027***
	(0.001)	(0.001)	(0.001)	(0.002)
Unemp. rate	−0.038***	−0.029***	−0.029***	−0.046***
	(0.002)	(0.002)	(0.002)	(0.003)
Real wage y/y		0.017***	0.016***	0.010***
		(0.001)	(0.001)	(0.001)
Infl. percep. squared			−0.003**	−0.007***
			(0.001)	(0.001)
Gini y/y				−0.003**
				(0.001)
Country fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
Demographic characteristics	Yes	Yes	Yes	Yes
Observations	364,264	356,856	356,856	293,053
R^2	0.199	0.200	0.200	0.200
Adjusted R^2	0.199	0.200	0.200	0.200

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Table A6: OLS estimation on the Western Europe – perceived inflation as an inflation measure

	Dependent variable:			
	Life Satisfaction			
	(1)	(2)	(3)	(4)
Inf. perception	−0.024***	−0.021***	−0.025***	−0.025***
	(0.002)	(0.002)	(0.002)	(0.002)
GDP y/y	0.019***	0.022***	0.022***	0.022***
	(0.002)	(0.002)	(0.002)	(0.002)
Unemp. rate	−0.075***	−0.072***	−0.073***	−0.075***
	(0.002)	(0.002)	(0.002)	(0.002)
Real wage y/y		0.018***	0.018***	0.020***
		(0.004)	(0.004)	(0.004)
Infl. percep. squared			−0.018***	−0.018***
			(0.001)	(0.001)
Gini y/y				0.007***
				(0.002)
Country fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
Demographic characteristics	Yes	Yes	Yes	Yes
Observations	363,815	363,815	363,815	362,531
R^2	0.183	0.183	0.183	0.184
Adjusted R^2	0.183	0.183	0.183	0.184

Table A7: Regressions without a standarization of variables

	Dependent variable:	
	Life Satisfaction	
	(1)	(2)
HICP y/y	−0.015***	
	(0.001)	
Inf. perception		−0.001***
		(0.00005)
GDP y/y	0.006***	0.005***
	(0.0003)	(0.0003)
Unemp. rate	−0.018***	−0.019***
	(0.0003)	(0.0003)
Country fixed effects	Yes	Yes
Time fixed effects	Yes	Yes
Demographic characteristics	Yes	Yes
Observations	728,612	728,079
R^2	0.208	0.208
Adjusted R^2	0.208	0.208

Table A8: Models with east/west interaction terms

	Dependent variable:	
	Life Satisfaction	
	(1)	(2)
Inf. perception	−0.044***	
	(0.002)	
HICP y/y		−0.031***
		(0.001)
west	0.257***	0.227***
	(0.009)	(0.009)
GDP y/y	0.018***	0.023***
	(0.002)	(0.002)
Unemp. rate	−0.054***	−0.059***
	(0.002)	(0.002)
Inf. perception:west	0.024***	
	(0.002)	
HICP y/y:west		−0.003
		(0.002)
GDP y/y:west	0.001	−0.003
	(0.002)	(0.002)
Unemp. rate:west	−0.021	−0.017***
	(0.003)	(0.003)
Constant	−7.429***	−6.895***
	(0.447)	(0.436)
Demographic characteristics	Yes	Yes
Observations	728,079	728,612
R^2	0.208	0.208
Adjusted R^2	0.208	0.208