A REVISED CONSUMER CONFIDENCE INDICATOR (21 DECEMBER 2018)

Introduction

The European Commission has published Consumer Confidence Indicators (CCI) since the 1970s. It is good practice to evaluate composite indicators periodically. The current CCI, based on four questions of the Harmonised EU-wide Consumer Survey, was designed in 2001[1]. Since then, significant structural and geographical changes have taken place in the EU economy. While the current CCI continues to track private consumption in the euro area rather well, some improvements are conceivable. In particular, the current CCI has been criticised both on conceptual grounds in terms of its composition and for tracking private consumption in some member states comparably poorly.[2]

This article describes five possible alternatives to the current CCI and evaluates their relative strengths and weaknesses. The choice of questions to be included in the alternative composite indicators is based on two criteria: their performance in tracking private consumption growth at EU, euro-area and Member States levels, and a solid theoretical foundation. In terms of methodology, the comparison relies on six analytical blocks: correlation analysis, ability to track directional change, two simple in-sample models, an out-of-sample forecasting exercise and a volatility analysis. Finally, the impact of changing the composition of the CCI on the European Commission's Economic Sentiment Indicator (ESI) is tested.

The analysis shows that an indicator combining survey questions about consumers' personal finances with their expectations in respect of macro-economic developments (subsequently referred to as 'Micro-and-Expectations-Mix') clearly outperforms all alternatives tested, including the current CCI. The 'Micro-and-Expectations-Mix' indicator is therefore chosen as the European Commission's new, official CCI, replacing the current CCI as of January 2019. In concrete terms, the new CCI is the arithmetic mean of the balance series (i.e. the percentage of positive minus the percentage of negative replies) to the following four survey questions:

- How has the financial situation of your household changed over the last 12 months?

- How do you expect the financial position of your household to change over the next 12 months?

- How do you expect the general economic situation in this country to develop over the next 12 months?

- Compared to the past 12 months, do you expect to spend more or less money on major purchases (furniture, electrical/electronic devices, etc.) over the next 12 months?

Theoretical and conceptual considerations

The wealth of information captured by the European Commission's consumer survey can be categorised in two ways. First, one can distinguish between household-specific (micro) and macro-oriented questions. Household-specific questions refer to households' past and expected financial situation, intentions to spend on major purposes, current savings and intentions to save. Macro-oriented questions cover perceptions of past and expected future changes in the general economic situation, inflation perceptions and expectations as well as

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[1]   See European Economy Supplement B, 8-9/2001, http://ec.europa.eu/archives/economy_finance/publications/archives/pdf/publication2498_en.pdf

[2]   See, for example, KBC (2017) Economic Opinions, 20 September 2017. Consumer confidence not always a reliable predictor of consumer spending https://multimediafiles.kbcgroup.eu/uploadpdf/EO20170920E.pdf, and DI Analysis (2017) Historical Optimism among EU Consumers. November 2017. https://di.dk/SiteCollectionDocuments/Historical%20Optimism%20Amongst%20EU%20Consumers.pdf.

unemployment expectations. Two questions lie in between micro- and macro-based questions, asking if in view of the general economic situation it is now the right moment to make major purchases or to save.[3] Second, one can regroup these questions by differentiating between forward-looking questions and those referring to past developments or the current situation.

It has to be noted that the relationship between inflation as well as savings and private consumption is ambiguous. As regards savings, intentions to save can derive from increases in income, which would equally produce a positive impact on consumption. At the same time, higher savings can reflect households' precautionary savings, which would negatively affect consumption. Therefore, in conceptual terms it does not seem warranted to include these questions in the CCI.[4]

As previous work on consumer confidence has shown, in theoretical terms micro-oriented questions seem to be better suited as predictors of private consumption compared to macro-oriented questions.[5] This is because, due to, among others, time and ability constraints, consumers can be expected to have better knowledge of their own economic situation than of the general economic environment. Moreover, provided that survey samples are representative, questions on households' financial situation and spending intentions should aggregate into an indicator mirroring consumption. For macro-oriented questions such an aggregation is somewhat more ambiguous in conceptual terms. Moreover, it can be argued that micro-based questions have a higher degree of complementarity to the information contained in 'hard-data' series,

which is an advantage when using the CCI in forecasting models for private consumption.[6]

At the same time, when constructing a survey-based indicator, one has to bear in mind that an exclusive focus on micro-oriented questions might entail a risk of missing out on important information on consumer sentiment transmitted through macro-oriented questions in the BCS questionnaire. Therefore one should also rely on a second theoretical pillar, positing that the CCI should reflect expectations about the future. This is based on the basic insight of economic theory that consumer behaviour is guided by expectations about the future. While this role is primarily attributed to income expectations, it can arguably be maintained that expectations about major economic developments cannot be decoupled from consumers' confidence about their economic position in the future.[7]

Departing from these considerations, questions in an alternative CCI should be either expectation-based or micro-oriented or – ideally – fulfil both criteria. In this article, five alternative indicators are analysed and compared to the current, official CCI. In all of them, the questions are attributed equal weights, as there is no *a priori* reason to proceed otherwise. As such, the decision to stick to the simple and transparent methodology used to construct the current CCI relies on the insight from previous work that indicators derived from more complex data-driven statistical techniques (e.g. principal component analysis and ridge regression models) do not necessarily deliver significant improvements of the indicator's performance.[8]

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[3] The question whether it is now the right moment to save (Q10) is not fully harmonised across the EU and is therefore not used in the analysis.

[4] In addition, BCS consumer survey questions on inflation are those most weakly correlated with private consumption.

[5] See Jonsson and Lindén 2009 (op. cit.).

[6] See Gayer, C., Girardi, A. and Reuter, A. (2016) Replacing Judgment by Statistics: Constructing Consumer Confidence Indicators on the Basis of Data-driven Techniques. European Commission Discussion Paper 034, July 2016. https://ec.europa.eu/info/sites/info/files/dp034_en_0.pdf.

[7] Acemoglu, D. and Scott, A. (1994) Consumer Confidence and Rational Expectations: Are Agents' Beliefs Consistent with the Theory? The Economic Journal 104 (422), pp. 1 19.

[8] See Gayer, Girardi and Reuter 2016 (op. cit.)

The first alternative indicator proposed consists of **Q2** (expected financial situation of the household over the next 12 months) and **Q9** (intended spending on major purchases). Being expectations- and micro-based, these two questions fulfil both theoretical criteria at the same time and thus appear as an ideal choice from a purely theoretical point of view. Moreover, Q2 and Q9 have high correlations with private consumption (see the annex to this section). This alternative indicator is called the **'Minimal-indicator'**.

The second alternative indicator, called the **'Reduced Micro-indicator'**, is a micro-based indicator composed of **Q1** (financial situation of the household over the past 12 months), **Q2** and **Q9**.[9]

The third alternative, called the **'Reduced Expectations-indicator'**, is an expectations-based indicator with **Q2**, **Q4** (expected general economic situation in the country over the next 12 months) and **Q9**. It does not include the question on unemployment expectations (Q7) – which is forward-looking and part of the current CCI – for two reasons. First, Q7 has a lower correlation with private consumption compared to Q2, Q4 and Q9 (see the annex to this section). Second, in conceptual terms, Q7 would partly overlap with the information transmitted by Q4, as unemployment can arguably be considered part of the general economic situation.

The fourth alternative indicator is composed of **Q1**, **Q2**, **Q4** and **Q9** and called the **'Micro-and-Expectations-Mix'**. The idea behind it is to mainly rely on micro-based questions as included in the Reduced Micro-indicator, while complementing them with consumers' expectations in respect of general economic developments.

Finally, the current CCI and these four alternatives are compared to a benchmark based on macro-oriented questions only (forward- and backward-looking) – **Q3** (assessment of the general economic situation over the past 12 months), **Q4**, **Q7** and **Q8** (in view of the general economic situation, is it the right moment to make major purchases?) – in order to assess if the comparison with this **'Macro-benchmark'** corroborates the theory-based preference for micro-oriented and expectations-based questions.

Correlation analysis

The reference series for private consumption is Eurostat's Household & NPISH Final Consumption Expenditure, chain-linked volumes, reference year 2010, seasonally and calendar-adjusted. As the reference series is available with a quarterly frequency, the monthly BCS survey data are transformed into a quarterly frequency by calculating the average balance of the three months in each quarter.[10]

The correlations are computed for the euro area, the EU, the EU27 (without the UK) and individual Member States. The correlations are calculated for two time periods. The first time period goes from 1995-q1 until 2017-q4, which reflects the availability of private consumption and survey data for most countries as well as the EA19 and EU27 aggregates. As the analysis takes into consideration the y-o-y changes in the reference series, the first value entering the calculation is from 1996-q1. The second time period starts after the financial crisis, i.e. 2010-q1 until 2017-q4. 2010-q1 is chosen as it is the first quarter with euro-area GDP growing after the financial crisis. It is important to analyse the performance of the different CCIs in this more recent time period, as during the financial crisis correlation values of several questions deteriorated, which cannot be assumed to represent a new normal. Moreover, recent correlations between the CCIs and private consumption are likely to be more indicative of a future statistical relationship than the values before the financial crisis.

Both coincident and one-quarter leading correlations are calculated. The correlation

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[9] The decision not to include the equally micro-oriented question Q12 is based on its low correlation with private consumption (see the annex to this section).

[10] The choice to proceed in this way is based on the fact that transforming quarterly data into monthly requires more, and stronger, assumptions.

analysis is performed both on the aggregate euro area and EU27 and the country level. On the country level, a special focus is on the performance of indicators across the largest countries in the EU27 (i.e. Germany, Spain, France, Italy, the Netherlands and Poland), but results for all 27 countries are taken into account.

Table 1 provides an overview of results on the aggregate (i.e. EU and euro-area) level. Most indicators – Minimal, Reduced Expectations, Reduced Micro and Micro-and Expectations-Mix – consistently perform better than the current CCI, i.e. there are no instances where the current CCI is better than any of these four indicators, yet there are cases where its correlation values are equal. The differences between these four indicators and the current CCI are significant for the coincident and the leading correlations in 1996-q1 – 2017-q4. In contrast, for the shorter period from 2010-q1 until 2017-q4, only small or no differences between the current CCI and these four indicators can be observed.

Table 1: Correlations for the euro area and EU27

|	Current (Q2, Q4, Q7, Q11)	Macro (Q3, Q4, Q7, Q8)	Minimal (Q2, Q9)	Reduced Expectations (Q2, Q4, Q9)	Reduced Micro (Q1, Q2, Q9)	Micro-and-Expectations-Mix (Q1, Q2, Q4, Q9)
Coincident correlation in 1996-q1 – 2017-q4						
EA	0.81	0.76	0.90	0.88	0.88	0.88
EU27	0.81	0.76	0.90	0.87	0.87	0.87
Coincident correlation 2010-q1 – 2017-q4						
EA	0.92	0.91	0.92	0.94	0.92	0.95
EU27	0.94	0.94	0.94	0.95	0.94	0.96
Leading correlations 1996-q1 – 2017-q4						
EA	0.78	0.72	0.89	0.88	0.86	0.87
EU27	0.80	0.74	0.89	0.89	0.86	0.88
Leading correlations 2010-q1 – 2017-q4						
EA	0.91	0.88	0.92	0.95	0.91	0.95
EU27	0.88	0.85	0.90	0.93	0.88	0.93

Source: European Commission calculations.

Interestingly, all alternative CCIs as well as the current CCI consistently outperform the Macro-indicator, which corroborates the reservations against relying on macro-oriented and backward-looking questions. It has to be acknowledged, however, that the performance of the Macro-indicator has considerably improved after the financial crisis.

Next to comparing the numerical results of the correlation analysis, it is useful to look at a graphical representation of the reference series and alternative CCIs over time. Plotting all indicators in one graph (Graph1), it is striking

that the Macro-benchmark is characterised by a much larger amplitude compared to, especially, the Minimal-, Reduced Expectations-, Reduced Micro- and Micro-and-Expectations-Mix-indicators. The amplitude of these four indicators is also somewhat smaller than that of the current CCI.

Graph 1: Private consumption and alternative CCIs (1996-q1 – 2017-q1, euro area)
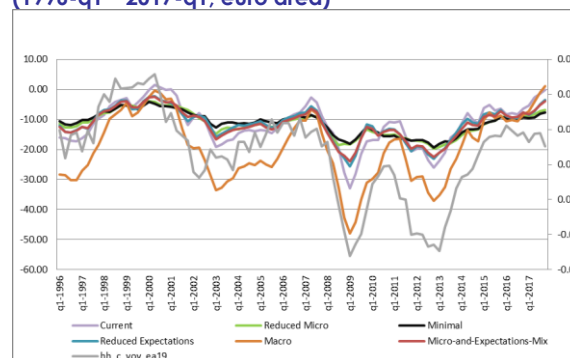
Source: European Commission.

On the country level, a much more heterogeneous picture emerges. Focusing on the six largest EU27 economies, one can see that, apart from Spain, correlations for all the other countries are much lower compared to the aggregate level (Table 2).

In Germany, Spain, France and Poland the current CCI performs worse compared to all other alternatives. Although this is not the case for Italy, this means that there is scope to improve the performance of the CCI across the largest EU economies.

Table 2: Coincident correlations in the largest EU27 economies in 1996-q1 – 2017-q4

	Coincident correlations in 1996-q1 - 2017-q4					
	Current (Q2, Q4, Q7, Q11)	Macro (Q3, Q4, Q7, Q8)	Minimal (Q2, Q9)	Reduced Expectations (Q2, Q4, Q9)	Reduced Micro (Q1, Q2, Q9)	Micro-and-Expectations-Mix (Q1, Q2, Q4, Q9)
DE	0.42	0.48	0.54	0.44	0.53	0.48
ES	0.81	0.86	0.89	0.85	0.91	0.89
FR	0.67	0.76	0.74	0.76	0.74	0.77
IT	0.69	0.66	0.51	0.64	0.61	0.68
NL	0.71	0.72	0.78	0.56	0.80	0.70
PL	0.69	0.74	0.72	0.69	0.71	0.70
AVG corr	0.67	0.70	0.70	0.66	0.72	0.70

Sources: European Commission calculations.

Comparing the indicators among each other, Reduced Micro and Minimal perform better than the current CCI in all largest countries apart from Italy. Conversely, the Micro-and-Expectations-Mix performs well in the case of

Italy, but is marginally weaker than the current CCI in the Netherlands, where its performance is, however, still mid-range. The Macro-benchmark has the highest correlation in the case of Poland and performs well or mid-range in the other countries. The current CCI and Reduced Expectations show the weakest results. Both have low correlations for Germany and comparatively low ones for Poland; the former is the weakest indicator for France, the latter for the Netherlands. This pattern is reflected in average correlations across the six countries, where Reduced Micro is the best (0.72) and Minimal, Micro-and-Expectations-Mix and Macro follow with 0.7.

Table 3 provides an overview of the percentage of countries in the EU27 in which their (coincident) correlation is higher compared to the current CCI. This is done for the periods 1996-q4 – 2017-q4 and 2010 – 2017-q4.

**Table 3: Improvement or no change in country-level correlations in EU27 compared to current CCI**

	Macro (Q3, Q4, Q7, Q8)	Minimal (Q2, Q9)	Reduced Expectations (Q2, Q4, Q9)	Reduced Micro (Q1, Q2, Q9)	Micro-and-Expectations-Mix (Q1, Q2, Q4, Q9)
Coincident correlation in 1996-q1 - 2017-q4					
No. of countries with a higher correlation	22	12	13	14	15
% of EU27	81.48%	44.44%	48.15%	51.85%	55.56%
No. of countries with the equal correlation	1	1	1	1	1
% of EU27	3.70%	3.70%	3.70%	3.70%	3.70%
% of countries with a higher or equal correlation	85.19%	48.15%	51.85%	55.56%	59.26%
Coincident correlation in 2010-q1 - 2017-q4					
No. of countries with a higher correlation	20	14	7	16	18
% of EU27	74.07%	51.85%	25.93%	59.26%	66.67%
No. of countries with the equal correlation	1	1	3	2	3
% of EU27	3.70%	3.70%	11.11%	7.41%	11.11%
% of countries with a higher or equal correlation	77.78%	55.56%	37.04%	66.67%	77.78%

Sources: European Commission calculations.

Table 3 shows that two indicators would bring about a deterioration of the performance of the CCI across countries: the Minimal-indicator in 1996-q1 – 2017-q4 and the Reduced-Expectations indicator in 2010-q1 – 2017-q4. Overall, the Macro-indicator would bring the highest improvement in terms of correlations across the EU Member States: 81.48% in 1996-q1 – 2017-q4 and 74.07% in 2010-q1 – 2017-q4. It is followed by the Micro- and-Expectations-Mix, which brings an improvement in 55.56% of EU Member States

in 1996-q1 – 2017-q4 and in 66.67% of Member States in 2010-q1 – 2017-q4.

Graph 2: EA19: Moving correlation (5y-period)
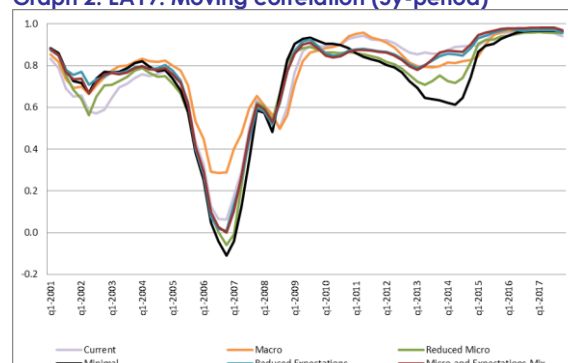
Source: European Commission.

Graph 2 presents all indicators' moving correlations over a period of five years, which show a similar pattern. In between 2001 and 2004, the current CCI and Reduced Micro show slightly lower correlations than the other CCIs. In 2011-2014 the Minimal-indicator and Reduced Micro perform comparatively weaker. Starting from 2015-q1 all indicators stabilise at a high level.

Tracking of directional change

Another criterion for the quality of a CCI is the frequency of periods in which it correctly indicates the direction of change (+ / - / 0) in the reference series. In this part of the analysis the focus is placed on the euro area and the analysis is performed with monthly indicator values.

As the reference series for private consumption consists of quarterly data, for each indicator, in a given quarter t the percentage change in month 1, month 2 and month 3 of quarter t with respect to month 3 of the previous quarter t-1 is calculated. For the reference series the q-o-q percentage changes in each quarter t with respect to t-1 is calculated.

For all indicators the percentage of correct indications of change in 1996-q4 – 2017-q4 is between 54% and 62%. According to the analysis the best-performing indicator is Reduced Micro (61.32% of correct indications of change) with a negligibly small distance to the Minimal-indicator (61.16%). Macro is the

worst-performing indicator, while the result of the current CCI is mid-range.

	Current (Q2, Q4, Q7, Q11)	Macro (Q3, Q4, Q7, Q8)	Minimal (Q2, Q9)	Reduced Expectations (Q2, Q4, Q9)	Reduced Micro (Q1, Q2, Q9)	Micro-and-Expectations-Mix (Q1, Q2, Q4, Q9)
% correct indications of change	58.43%	54.76%	61.16%	60.16%	61.32%	56.50%

Sources: European Commission calculations.

In-sample modelling and out-of-sample forecasting exercise

Two simple linear models are run in order to compare the forecast/nowcast performance of each alternative CCIs: (1) a model with quarterly indicator values and (2) a model with indicator values for the first month of each quarter as the independent variable.

$$(1) \quad c_t = \alpha + \beta \cdot CCI_t + \varepsilon_t$$

$$(2) \quad c_t = \alpha + \beta \cdot CCI_{tm1} + \varepsilon_t$$

where c_t is the q-o-q change in private consumption, CCI_t is the quarterly value of a given CCI, CCI_{tm1} is the first-month-of-a-quarter value of a given CCI, α is the constant and ε_t the error term.[11] To assess the in-sample fit, the adjusted R^2 values are used.

To assess the forecasting power of the different CCIs, their performance in an out-of-sample scenario based on model (1) is also tested. The first estimation sample is 1995-q2 – 2005-q2, on the basis of which the forecast for 2005-q3 is made. The model is then re-calculated by extending the sample by one quarter and forecasting one quarter ahead, with the beginning of the estimation sample being fixed to 1995-q2. Subsequently, the root mean squared errors (RMSE) are calculated.

Table 5 provides an overview of results of the in-sample and out-of-sample analyses. The results of the two in-sample models follow a similar pattern. In both models, Reduced Expectations and Reduced Micro yield the highest adjusted R^2 – 0.5 and 0.5 in model (1) and 0.48 and 0.49 respectively in model (2). Micro-and-Expectations-Mix follows with a minor distance (0.48 in model (1) and 0.46 in model (2)). The Macro-indicator has the lowest adjusted R^2 in both models. Overall, one can see that model (1) offers a slightly better fit across all indicators.[12]

	(1) $c_t=\alpha+\beta\cdot CCI_t+\varepsilon_t$			(2) $c_t=\alpha+\beta\cdot CCI_{tm1}+\varepsilon_t$	
	Adjusted R^2	t-stat	Out-of-sample RMSE	Adjusted R^2	t-stat
Current (Q2, Q4, Q7, Q11)	0.36	6.21	0.32	0.33	5.76
Macro (Q3, Q4, Q7, Q8)	0.28	4.81	0.35	0.26	4.68
Minimal (Q2, Q9)	0.45	6.41	0.25	0.44	6.06
Reduced Expectations (Q2, Q4, Q9)	0.5	7.56	0.25	0.48	7.24
Reduced Micro (Q1, Q2, Q9)	0.5	9.51	0.27	0.49	8.84
Micro-and-Expectations-Mix (Q1, Q2, Q4, Q9)	0.48	8.08	0.26	0.46	7.76

Sources: European Commission calculations.

The out-of-sample forecasting exercise based on model (1) produces results comparable to the in-sample analysis. Reduced Expectations and the Minimal-indicator yield the lowest RMSE of 0.25. Micro-and-Expectations-Mix and Reduced Micro follow with an RMSE of 0.26 and 0.27 respectively. The current CCI performs in the lower mid-range in both in-sample variants and the out-of-sample exercise.

Months-for-cyclical dominance (MCD)

To devise a good CCI, it is important to avoid that it suffers from high short-term volatility and disturbing noise signals. The MCD measure

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[11] For the q-o-q series for private consumption, the current CCI and alternative CCIs stationarity tests were conducted using the Augmented Dickey-Fuller (ADF) unit root test. The series were found to be stationary.

[12] For all models the goodness of fit using the Akaike information criterion (AIC), the Schwartz criterion and the Durbin-Watson statistic consistently confirm the pattern yielded by the Adjusted R^2 values. A model with a one-quarter lead of the CCIs (quarterly values) was also run. Its fit in terms of R^2 is somewhat worse compared to the 'coincident' models, yet the performance of the different indicators relative to each other follows the same pattern.

helps to distinguish between cyclical movements and noise in a time series. It indicates the time length over which a change in a series needs to be observed in order to determine whether it represents a cyclical development rather than noise[13]. In a volatile series, the change in the irregular component dominates the cyclical component. To assess the relative importance of the two components, noise-to-signal ratios are calculated:

$$(3) \quad r_s = \frac{i_s}{a_s}$$

where r_s is the noise-to-signal ratio for a given span of months s, beginning with one month, i_s is the irregular component and a_s the cyclical component of the series. The MCD measure is defined as the number of months which it takes until r_s gets below one. A high MCD value indicates a higher degree of noise, Therefore, an indicator with a low MCD value is preferable to one with a high MCD.

Table 6 presents the MCD values and the noise-to-signal ratios for the time span of one month for the euro area, EU27, Germany, Spain, France, Italy, the Netherlands and Poland. In general, it can be observed that MCD values on the euro area and the EU27 level tend to be lower, i.e. better, across all indicators compared to the country level.

Both on the aggregate level and across countries the Macro-benchmark outperforms the other indicators. Especially for the euro area and the EU27, the MCD of 1 that it demonstrates is a very good result. Macro also has the lowest average MCD (2.67) across countries.

The current CCI also has an MCD of 1 on the EU27 level. While showing an MCD of 2 in the euro area, its noise-to-signal ratio for the time span of one month is only slightly higher than 1 (1.01), which means that it is very close to achieving an MCD of 1. The current CCI's

average MCD across Germany, Spain, France, Italy, the Netherlands and Poland is 3.00.

Table 6: Overview of MCD results

		Current (Q2, Q4, Q7, Q11)	Macro (Q3, Q4, Q7, Q8)	Minimal (Q2, Q9)	Reduced Expectations (Q2, Q4, Q9)	Reduced Micro (Q1, Q2, Q9)	Micro-and-Expectations-Mix (Q1, Q2, Q4, Q9)
EA19	MCD	2	1	3	2	2	2
	r_1	1.01	0.92	2.03	1.13	1.5	1.07
EU27	MCD	1	1	3	2	2	2
	r_1	0.97	0.87	2.02	1.13	1.5	1.09
DE	MCD	2	2	3	2	3	2
	r_1	1.27	1.18	2.49	1.34	2.15	1.33
ES	MCD	3	3	3	3	3	3
	r_1	1.96	1.82	2.64	2.12	2.45	2.1
FR	MCD	3	3	4	3	3	3
	r_1	1.82	1.79	2.7	2.16	2.23	2.06
IT	MCD	3	3	5	3	4	3
	r_1	2.53	2.1	4.2	2.45	3.68	2.44
NL	MCD	3	2	5	3	4	3
	r_1	2.05	1.33	4.18	2.31	3.39	2.32
PL	MCD	4	3	5	4	4	4
	r_1	2.8	2.34	5.95	3.48	4.75	3.47
Average MCD across countries		3.00	2.67	4.17	3.00	3.50	3.00

Sources: European Commission calculations.

The average MCD of 3.00 on the country level is equally shown by Reduced Expectations and the Micro-and-Expectations-Mix. While having an MCD of 2 in the euro area and EU27, the latter is also characterised by a noise-to-signal-ratio that is very close to 1 for both aggregates.

The Minimal-indicator yields the highest MCD values across the euro area, EU27 and the countries analysed, i.e. it is characterised by a particularly strong presence of short-term volatility. This higher volatility derives from question Q9 which is characterised by very high MCD values on the aggregate and the country level. As the Minimal-indicator consists only of two question series, the impact of short-term volatility in Q9 is not mitigated to a sufficient extent by other series. Conversely, in the case of Reduced Expectations, Reduced Micro and Micro-and-Expectations-Mix, complementing Q9 with, respectively, 2 and 3 other questions mitigates its short-term volatility to a sufficient extent.

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[13] For a detailed explanation, see ECB (2012) ECB Monthly Bulletin, May 2012, pp. 72-76. https://www.ecb.europa.eu/pub/pdf/mobu/mb201205en.pdf.

Impact on the Economic Sentiment Indicator (ESI)

The consumer sector has a weight of 20% in the computation of the Economic Sentiment Indicator (ESI), and, theoretically, the replacement of the current confidence indicator with a more performing one (at least at the corresponding sector level) should also improve the performance of the ESI.[14]

To check if that is the case, the current ESI is recalculated by replacing the current questions coming from the consumer sector with the questions included in the alternative CCIs. Subsequently, the coincident correlation between the alternative ESIs and the real GDP growth (in q-o-q and y-o-y terms) is calculated at EU, euro-area and Member State levels.

Table 7 shows the coincident correlation coefficients between GDP growth and the different ESIs calculated using the alternative CCI indicators for euro area and EU27 over the period 1996-q1 – 2017-q4. The differences between the ESI indicators are very minor and can in most cases be considered insignificant. The Macro-benchmark, where for both aggregates a consistent albeit small worsening can be observed, could be considered as the only exception.

Table 7: Coincident correlations between ESI and GDP growth for the euro area and EU27

	Current CCI (Q2,Q4,Q7,Q11)	Macro (Q3, Q4, Q7, Q8)	Minimal (Q2, Q9)	Reduced Expectations (Q2, Q4, Q9)	Reduced Micro (Q1, Q2, Q9)	Micro-and-Expectations-Mix (Q1, Q2, Q4, Q9)
Coincident correlations with y-o-y GDP growth - 1996Q1 - 2017Q4						
EU27	0.91	0.90	0.92	0.92	0.91	0.92
EA19	0.92	0.91	0.93	0.93	0.92	0.92
Coincident correlations with q-o-q GDP growth - 1996Q1 - 2017Q4						
EU27	0.71	0.69	0.71	0.72	0.70	0.71
EA19	0.70	0.69	0.71	0.71	0.70	0.71

Sources: European Commission calculations.

Table 8 presents the share of EU countries where the coincident correlation between the alternative ESIs and real GDP growth (in q-o-q and y-o-y terms) improved, remained unchanged or worsened. For all indicators, in the analysis with q-o-q GDP growth, the correlation with ESI improves or remains unchanged in at least two third of Member States; for y-o-y GDP growth this is the case for at least 73% of

countries. Moreover, in most of the cases where the ESI's correlation worsens, the decrease is of an insignificant magnitude of -0.01 or -0.02.

Table 7: Changes (improvements, status quo or worsening) at country-level of correlations between ESI and GDP growth in EU27 compared to current CCI

	Macro (Q3, Q4, Q7, Q8)	Minimal (Q2, Q9)	Reduced Expectations (Q2, Q4, Q9)	Reduced Micro (Q1, Q2, Q9)	Micro-and-Expectations-Mix (Q1, Q2, Q4, Q9)
Coincident correlations with y-o-y GDP growth - 1996Q1 - 2017Q4					
% of EU27 Member States where correlation improves	42.3%	50.0%	50.0%	42.3%	50.0%
% of EU27 Member States where correlation remains unchanged	38.5%	19.2%	26.9%	23.1%	19.2%
% of EU27 Member States where correlation worsens	19.2%	30.8%	23.1%	34.6%	30.8%
Coincident correlations with q-o-q GDP growth - 1996Q1 - 2017Q4					
% of EU27 Member States where correlation improves	53.8%	50.0%	50.0%	53.8%	61.5%
% of EU27 Member States where correlation remains unchanged	23.1%	23.1%	26.9%	23.1%	15.4%
% of EU27 Member States where correlation worsens	23.1%	26.9%	23.1%	23.1%	23.1%

Sources: European Commission calculations.

Conclusions

This article described five possible alternatives to the European Commission's official CCI and evaluated their relative strengths and weaknesses at euro-area and EU-level, as well as across Member States.

The design of the five alternatives was based on theoretical/conceptual considerations (privileging micro- and expectations-oriented questions), while taking into account the correlation of individual survey questions with private consumption in the euro area. Furthermore, in contrast to the current CCI, the alternative indicators did not include the survey question on consumers' savings expectations, whose relationship with private consumption is ambiguous from a theoretical point of view.

Overall, the 'Micro-and-Expectations-Mix' indicator appears to be the best "package". It combines comparatively high correlations with private consumption growth at EU/euro-area, as well as Member State level with a good ability to nowcast the latter. At the same time, those merits do not go at the expense of the series' smoothness – its level of volatility is comparable to that of the current CCI. Finally, the 'Micro-and-Expectations-Mix' is the most convincing of all alternative indicators when it comes to its theoretical foundation. It abides by

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[14] However, it has to be pointed out that the purpose of this analysis is not to optimise the ESI performance on tracking the GDP growth but rather to prevent a worsening in the performance of the ESI due to a change in the CCI.

the principles that (i) questions inquiring consumers' personal finances (three out of four questions are from that category) and (ii) questions focussing on consumers' expectations rather than their assessments of the past (all four questions fall in that category) are particularly useful for tracking private consumption. At the same time, the indicator includes one macro-economic question, serving as some sort of a 'life-insurance' against missing out on important macro-economic developments with a bearing on private consumption.

Coincident correlations over the period 2010-q1 – 2017-q4

	Current (Q2, Q4, Q7, Q11)	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q11	Q12	Macro (Q3, Q4, Q7, Q8)	Minimal (Q2, Q9)	Reduced Expectations (Q2, Q4, Q9)	Reduced Micro (Q1, Q2, Q9)	Micro-and-Expectations-Mix (Q1, Q2, Q4, Q9)
EA	0.81	0.79	0.87	0.75	0.76	-0.32	0.13	-0.70	0.60	0.85	0.69	0.42	0.76	0.90	0.88	0.88	0.88
EU_2019	0.81	0.79	0.86	0.76	0.76	-0.30	0.09	-0.72	0.60	0.86	0.68	0.48	0.76	0.90	0.87	0.87	0.87
EU28	0.83	0.83	0.87	0.81	0.74	-0.38	0.15	-0.76	0.72	0.91	0.77	0.56	0.81	0.91	0.88	0.90	0.88
BE	0.42	0.22	0.21	0.30	0.17	-0.28	-0.06	-0.37	0.16	-0.04	0.44	0.17	0.34	0.11	0.18	0.17	0.2
BG	0.69	0.46	0.60	0.70	0.61	-0.08	0.24	-0.79	-0.05	0.10	-0.22	0.10	0.75	0.50	0.63	0.51	0.62
CZ	0.64	0.73	0.48	0.72	0.55	-0.20	-0.05	-0.54	0.79	0.50	0.61	0.34	0.74	0.55	0.57	0.63	0.62
DK	0.36	0.56	0.23	0.62	-0.03	-0.34	0.15	-0.43	0.43	0.55	0.40	0.30	0.51	0.47	0.16	0.55	0.34
DE	0.42	0.50	0.48	0.50	0.31	-0.38	0.26	-0.35	0.52	0.57	0.57	0.13	0.48	0.54	0.44	0.53	0.48
EE	0.25	0.49	0.26	0.81	0.56	0.20	0.67	-0.33	0.24	0.54	-0.20	-0.30	0.58	0.47	0.54	0.49	0.55
IE	0.68	0.80	0.81	0.64	0.57	0.21	0.39	-0.57	0.69	0.65	0.51	0.26	0.74	0.70	0.75	0.68	0.73
EL	0.77	0.77	0.76	0.78	0.72	0.03	0.25	-0.80	0.52	0.76	0.59	0.49	0.78	0.79	0.78	0.79	0.78
ES	0.81	0.91	0.81	0.91	0.73	0.10	0.24	-0.76	0.63	0.90	0.68	0.70	0.86	0.89	0.85	0.91	0.89
FR	0.67	0.71	0.75	0.74	0.71	-0.43	-0.31	-0.64	0.75	0.51	-0.26	0.22	0.76	0.74	0.76	0.74	0.77
HR	0.86	0.79	0.84	0.80	0.84	-0.49	-0.21	-0.85	0.79	0.81	0.67	0.40	0.86	0.84	0.79	0.83	0.84
IT	0.69	0.64	0.73	0.66	0.53	-0.31	0.02	-0.55	0.53	0.31	0.69	0.63	0.66	0.51	0.64	0.61	0.68
CY	0.39	0.39	0.18	0.56	0.38	0.32	0.44	-0.40	0.67	0.68	0.42	-0.27	0.59	0.67	0.65	0.62	0.61
LV	0.76	0.70	0.74	0.79	0.82	0.33	0.67	-0.72	0.74	0.70	0.21	0.27	0.88	0.80	0.84	0.78	0.81
LT	0.86	0.73	0.90	0.86	0.86	-0.19	0.49	-0.87	0.63	0.63	0.31	0.43	0.89	0.83	0.89	0.81	0.88
LU	0.23	0.21	0.16	0.26	0.13	-0.06	0.16	-0.28	0.13	0.18	-0.02	-0.24	0.24	0.18	0.17	0.19	0.18
HU	0.78	0.76	0.71	0.86	0.77	-0.60	-0.27	-0.64	0.46	0.74	0.78	0.83	0.82	0.73	0.77	0.75	0.78
MT	0.35	0.43	0.36	0.38	0.32	-0.48	-0.46	-0.29	0.41	0.06	0.37	0.35	0.37	0.32	0.32	0.39	0.37
NL	0.71	0.76	0.79	0.71	0.33	-0.17	0.44	-0.72	0.76	0.53	0.69	0.47	0.72	0.78	0.56	0.8	0.7
AT	0.29	0.12	0.09	0.28	0.24	-0.25	-0.16	-0.19	0.01	0.19	0.34	0.04	0.24	0.16	0.24	0.15	0.23
PL	0.69	0.67	0.67	0.66	0.64	-0.02	0.11	-0.75	0.77	0.51	0.20	0.15	0.74	0.72	0.69	0.71	0.7
PT	0.77	0.74	0.79	0.74	0.80	-0.22	-0.31	-0.64	0.65	0.62	0.47	0.18	0.76	0.77	0.83	0.78	0.82
RO	0.80	0.64	0.75	0.79	0.80	-0.08	-0.02	-0.78	0.81	0.78	0.54	0.31	0.85	0.79	0.81	0.74	0.78
SI	0.54	0.50	0.47	0.60	0.60	-0.02	0.05	-0.47	0.53	0.40	-0.04	0.35	0.62	0.52	0.59	0.57	0.6
SK	0.47	0.40	0.29	0.62	0.56	-0.02	0.08	-0.61	0.26	0.61	-0.06	0.06	0.62	0.45	0.52	0.44	0.49
FI	0.47	0.56	0.54	0.66	0.24	-0.15	0.075	-0.57	0.32	0.69	-0.32	-0.34	0.59	0.65	0.43	0.64	0.49
SE	0.58	0.26	0.18	0.7	0.52	-0.44	0.1	-0.7	0.68	0.61	-0.076	-0.086	0.77	0.41	0.56	0.36	0.54
UK	0.7	0.7	0.64	0.83	0.51	-0.62	0.25	-0.78	0.78	0.83	-0.028	0.39	0.82	0.82	0.78	0.79	0.79