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Alternative roles of consumer confidence in forecasting consumption: Evidence from European countries

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Abstract

The predictive power of the consumer sentiment indicator to forecast consumption spending has already been accepted, but the theoretical explanation is still vague. Moreover, some studies have shown that, after adding other macroeconomic variables to the forecasting model, the predictive power of the consumer confidence indicator becomes limited. This paper proposes to distinguish between two predictive channels of confidence data for consumption spending. The first, the income channel, should represent the ability of confidence data to predict the expected future income of consumers. The predictive power of confidence through the second channel should serve for the approximation of consumers' intentions to consume. According to this distinction, I propose to use the data from initial survey questions separately rather than using one composite consumer confidence indicator. In this way the predictive power of confidence data can be better clarified. I use the data from the European Commission Consumer Survey and, using a sample of 27 countries, confirm that higher predictive power of confidence data could be achieved by using separate confidence data rather than a composite indicator.

Keywords

Consumer confidence, consumer confidence indicator, forecasting, precautionary savings.

JEL Classification: C53, E21

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1. Introduction

The predictive power of sentiment indicators for short-term predictions of consumption spending has already been investigated for several decades. Still, the results are slightly multivalent. On the basis of Michigan's Index of Consumer Sentiment (ICS), Carrol et al. (1994) confirmed the statistical significance of the sentiment indicator for forecasting consumption spending in the USA. The same results have also been confirmed, for example, by Acemoglu and Scott (1994), Bram and Ludvigson (1998), Souleles (2001) and Throop (1992). Al-Eyd et al. (2009) and Cotsomitis and Kwan (2006) reached the conclusion that the role of the consumer sentiment indicator in the prediction of future consumption spending is, after controlling for other measurable macroeconomic variables, at least limited. However, Dees and Brinca (2013) stated that, *while the evidence is overall rather mixed, most authors seem to, at least, find a significant statistical relationship between confidence measures and economic variables, current and future*. Lahiri et al. (2012) re-examined the existing empirical models of consumption and consumer confidence, obtaining a result in favour of consumer confidence's significance.

A possible explanation for the rather multivalent results about the significance of consumer confidence in predicting consumption spending could be that this significance varies with time or the business cycle. This idea was supported by Batchelor and Dua (1998), who stated that using the confidence indicator would have been helpful in forecasting the recession in 1991, but otherwise the predictive power is weak. Dees and Brinca (2013) used threshold models and argued that the importance of confidence increased when only large changes in confidence were considered. Haugh (2005) and Howrey (2001) stated that the confidence indicator was significant in predicting recessions or recoveries. According to Taylor and McNabb (2007), the consumer

sentiment is procyclical and could be used to determine the turning points of the business cycle.

The importance of the confidence indicator in modelling consumption spending is also decreased by the fact that strong theoretical support for it is lacking. The studies investigating the predictive power of confidence indicators have mainly been empirical. One of the attempts to explain the significance of consumer sentiment for the prediction of consumer spending was made by Carrol et al. (1994), who used consumer sentiment as a proxy for consumers' expectations about their future income stream. In line with the life cycle hypothesis, Carrol et al. (1994) rejected the idea that the predictive power of consumer confidence for consumption spending was based only on income expectations. They obtained the same result by allowing for rule-of-thumb consumers consistent with the Campbell–Mankiw model. The interpretation of predictive power of confidence indicators thus remains mainly intuitive.

The main goal of this article is to try to extend the theoretical interpretation of the predictive power of the consumer confidence indicator. In accordance with Carrol et al. (1994), I attribute part of the predictive power of consumer confidence to expectations about a future income stream. In addition, I introduce the second possible channel of the influence of confidence on consumption spending, called *willingness to spend*.¹ This channel represents the motivation of consumers to spend or rather save their income according to the actual and expected economic conditions. I investigated the prediction power of the confidence indicator with respect to these two different channels using the data of the Joint Harmonised EU Programme of Business and Consumer Surveys. Consistent with Dreger and Kholodilin (2013), I did not use the constructed consumer indicator but rather the data from the initial survey questions (hereinafter referred to as confidence questions). Differently from Dreger and

¹ This is de facto an analogy to the marginal propensity to consume but is estimated by confidence indicators.

Kholodilin (2013), I did not choose confidence questions or their weights in the model purely based on the empirical analysis but rather proposed to distinguish among confidence questions with respect to different predictive channels. To support this approach, I estimated first the predictive power of the consumer confidence indicator constructed by the European Commission in the model and then the predictive power of the combined data from the chosen confidence questions. On the basis of the empirical estimations, I concluded in line with Dreger and Kholodilin (2013) that the predictive power of confidence data for consumption spending could be increased by a suitable choice of confidence questions and their weights in the model.

The article is organized as follows. In Section 2 I introduce two possible channels of confidence predictive power and describe the econometric models for empirical testing. The data and empirical results are presented in Section 3. In Section 4 I conclude. See the Appendix for a more detailed description of the survey methodology of confidence data.

2. Methodology

Firstly, I will introduce and theoretically explain the two possible channels of confidence's predictive power. Further, the model solution for these channels is presented.

2.1 Two channels of the predictive power of confidence

I formulated the consumption spending equation in line with the rational expectation permanent income hypothesis (Hall, 1978). This hypothesis is based on the implementation of the concept of rational expectations into the permanent income hypothesis (Friedman, 1957). The permanent income theory postulates that only changes in income that are perceived by the consumer as permanent lead to consumption spending adjustments in the long term. The lifetime stream of incomes is estimated by rational expectations. These expectations should be formed not only according to the past levels of estimated variables but also with respect to all the achievable information on the part of a consumer. In this sense the consumption spending could be formed as the level of previous consumption spending adjusted for the changes in consumer income expectations. If these changes were unexpected, then the consumption spending would be a random-walk process (random-walk hypothesis (Hall, 1978)). However, Flavin (1993) found significant excess

sensitivity of consumption spending to current changes in income; the changes in consumption seemed to be larger than the expected changes in lifetime income. Thus, the random-walk hypothesis was shaken.

Here the role of consumer confidence in providing information about consumers' expectations arises. Carrol et al. (1994) confirmed using the University of Michigan's Index of Consumer Sentiment that this indicator has predictive power for forecasting future consumption spending while controlling for past values of consumption spending. In this way the random-walk hypothesis was rejected. Further, using the Campbell–Mankiw model, they rejected in most cases that the predictive power of confidence would act only through the income channel. They proposed that consumer confidence could also be considered as a measure of uncertainty. Accordingly, changes in consumer confidence could reflect the precautionary savings proposed by Carroll et al. (1992). The confidence indicator would be correlated positively with past values of consumption growth but negatively with its current value. Thus, the second channel for the predictive power of confidence indicator was introduced.

I would like to emphasize the difference between these two channels. I propose to divide the process of decision making about consumption spending into two steps. In the first step, the consumer will better or worse try to estimate his/her current and future income. In the second step, according to his/her expected financial possibilities, the consumer will decide about his consumption and savings.² The studies that explained consumption according to expected future income built the expectations about consumption only according to the first step, assuming that a higher expected income implies higher consumption spending. However, as Carrol et al. (1994) already mentioned, even a positive future expectation does not necessarily mean equal consumption growth (precautionary motives). This idea is in fact the consideration of the second step in the consumer decision.

Let me call this second channel, through which the consumption decision is formed in the second step, the *willingness to spend*. In this step the decision about consumption spending is influenced by all the other additional factors except the expected future income. One of these factors, uncertainty, has already been introduced by Carrol et al. (1994), motivating consumers to engage in precautionary saving. As another factor I can consider the neighbourhood, presented by Duesenberry (1949). According to his

² I can start to polemize the extent to which the consumer is able to maintain his financial plan, with the influence of

his/her neighbourhood and supply-side incentives, but for simplicity I will not consider this impact.

hypothesis, the consumption spending of an individual is influenced by the consumption spending of his neighbours. I imagine that there could be additional factors influencing consumer decisions about consumption, such as the family background, risk awareness, the life situation and so on, which have a positive or negative impact on consumption. Although I do not know all the factors and their impacts on consumer spending, I do not in fact necessarily need to know them. It is enough for me to know what the final decision of a consumer will be regarding consumption spending with respect to these factors. In the survey data, there are also confidence questions asking consumers about their intentions relating to major purchases or savings. Hence, the confidence data could be used not only for approximating consumer expectations but also for predicting consumer intentions.

2.2 The consumption growth equation

On the basis of these two channels, I can model the consumption growth \dot{c}_t as

$$\dot{c}_t = \alpha_0 + \alpha_1 E_t \dot{y}_{t+1} + \alpha_2 WS_t + \varepsilon_t^c, \quad (1)$$

where $\alpha_0, \alpha_1, \alpha_2$ are constants, $E_t \dot{y}_{t+1}$ is an expectation of future income growth, WS_t is the *willingness to spend*, representing consumer intentions, and ε_t^c is an error term. I further propose the model according to the confidence questions from the Joint Harmonised EU Programme of Business and Consumer Surveys (EC, 2016) published by the European Commission.³

The first two questions from the survey focus on the financial situation of the consumer. Because the first question asks about the change with respect to a past period, I decided to use as a proxy for consumers' expectations about the future stream of incomes the data from survey question 2, which is *How do you expect the financial position of your household to change over the next 12 months?* Because the data about consumption are available with a quarterly frequency and the survey question is asking for a comparison with the last year, I also include in the equation the last four values of income growth and define the expected growth of future income

$$E_t \dot{y}_{t+1} = \sum_{i=1}^4 \eta_i^{y^2} cci2_{t-i} + \sum_{i=1}^4 \eta_i^{yy} \dot{y}_{t-i} + \varepsilon_t^y, \quad (2)$$

where $\eta_i^{y^2}, \eta_i^{yy}$ are model parameters, \dot{y}_{t-i} is the growth of income, $cci2_{t-i}$ is the average value of the response to confidence question 2 at time $t-i$ and ε_t^y is an error term.

The willingness to spend should represent the intentions of consumers to spend their income. There are more questions in the survey that could be considered in this case. In confidence question 8, consumers are asked if they think that it is the right moment for people to make major purchases. Although a consumer may answer that it is the right moment (because the prices for furniture, electronic devices, etc. are low or it is the period of sales), he/she may not actually be planning to make major purchases. Thus, the answers do not necessarily reflect the consumers' intentions. I propose to use the data from survey question 9, which is *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?* Analogous to question 2, the question asks the consumer about the comparison with the level in a previous year. For that reason I take into account the previous levels of consumption growth and define the willingness to spend:

$$WS_t = \sum_{i=1}^4 \eta_i^{c09} cci9_{t-i} + \sum_{i=1}^4 \eta_i^{c0c} \dot{c}_{t-i} + \varepsilon_t^{c0}. \quad (3)$$

$\eta_i^{c09}, \eta_i^{c0c}$ are parameters, $cci9_{t-i}$ is the weighted average response to question 9 at time $t-i$ and ε_t^{c0} is an error term.

I can further consider using more confidence questions for this channel. In question 10 consumers are asked about the right moment to save; here a similar reasoning to question 8 could be applied. Another possible option is question 11, in which the consumers are asked how likely they are to save money in the next 12 months. This question is very similar to question 12, when they are asked if they are now saving any money. I tried to perform the estimations for both questions and the results were very similar; hence, I preferred question 12, which could be more realistic as the consumers are asked how they really behave now. Therefore, I would like to present an alternative version of the definition of WS_t , by adding the data from survey question 12, which is *Which of these statements best describes the current financial situation of your household?* The possible answers to this question are: we are saving a lot (+ +), we are saving a little (+), we are just managing to make ends meet on our income (=), we are having to draw on our savings (-), we are running into debt (- -) and don't know (N). This confidence question should represent consumers' motivation for saving.

³ All the confidence questions with their possible answers are in the Appendix.

$$WS_t = \sum_{i=1}^4 \eta_i^{CO9} cci9_{t-i} + \sum_{i=1}^4 \eta_i^{CO12} cci12_{t-i} + \sum_{i=1}^4 \eta_i^{COC} \dot{c}_{t-i} + \varepsilon_t^{CO}. \tag{4}$$

η_i^{CO12} are parameters and $cci12_{t-i}$ is the weighted average response to question 12 at time $t - i$. It would also be possible to consider the quarterly confidence questions 13–15, but these questions are focused on more expensive purchases, like cars, houses, home improvements and so on. These purchases are very often financed by loans or mortgages and from the economic point of view are often considered as an investment. I was worried about various interpretations of the answers; hence, I leave these questions for future investigation.

By substituting (2) and (3) into equation (1), I obtained

$$\dot{c}_t = \beta_0 + \sum_{i=1}^4 \beta_i^{CO9} cci9_{t-i} + \sum_{i=1}^4 \beta_i^{COC} \dot{c}_{t-i} + \sum_{i=1}^4 \beta_i^{Y2} cci2_{t-i} + \sum_{i=1}^4 \beta_i^{YY} \dot{y}_{t-i} + \varepsilon_t, \tag{5}$$

where ε_t is an error term. I used this equation as model M1 for testing the predictive power of confidence indicators for forecasting consumption spending. By analogy, I substituted (2) and (4) into equation (1) and obtained the second model, M2:

$$\dot{c}_t = \beta_0 + \sum_{i=1}^4 \beta_i^{CO9} cci9_{t-i} + \sum_{i=1}^4 \eta_i^{CO12} cci12_{t-i} + \sum_{i=1}^4 \beta_i^{COC} \dot{c}_{t-i} + \sum_{i=1}^4 \beta_i^{Y2} cci2_{t-i} + \sum_{i=1}^4 \beta_i^{YY} \dot{y}_{t-i} + \varepsilon_t. \tag{6}$$

Both model M1 (5) and M2 (6) are very similar to the models that were tested for example by Al-Eyd et al. (2009) and Carrol et al. (1994) for the predictive power of consumer confidence indicator. Al-Eyd et al. (2009) and Carrol et al. (1994) used in their models the log-difference of consumption, which is an approximation of consumption growth. The European Commission within the Joint Harmonised EU Programme of Business and Consumer Surveys has also published a proposed indicator for consumer confidence called the consumer confidence indicator. This indicator is the average response from questions 2, 4, 7 and 11⁴ and is usually used in studies conducted using EU data. To compare the effectiveness of the data from specific survey questions rather than the consumer confidence indicator, I also estimated the generally used model M0 in the form

$$\dot{c}_t = \beta_0 + \sum_{i=1}^4 \beta_i^{COF} cof_{t-i} + \sum_{i=1}^4 \beta_i^{COC} \dot{c}_{t-i} + \sum_{i=1}^4 \beta_i^{YY} \dot{y}_{t-i} + \varepsilon_t. \tag{7}$$

β_i^{COF} are model parameters and cof_{t-i} is the consumer confidence indicator at time $t - i$.

The common predictive power of confidence indicators in the initial models is calculated by comparison with their common sub-model:

$$\dot{c}_t = \beta_0 + \sum_{i=1}^4 \beta_i^{COF} cof_{t-i} + \sum_{i=1}^4 \beta_i^{YY} \dot{y}_{t-i} + \varepsilon_t. \tag{8}$$

The predictive power is expressed as an increase in the coefficient of determination R^2 (incremental R^2) caused by adding confidence indicators to the model with respect to the coefficient of determination R^2 from the baseline model (9).

3. Empirical results

The predictive power of confidence indicators is first considered within the correlation analysis and then by the model estimations.

3.1 Data

For the main macroeconomic variables I used the quarterly data from the National Accounts published by Eurostat. I counted the consumption growth \dot{c}_t and income growth \dot{y}_t from the final consumption expenditure of households and the gross domestic product (GDP) at market prices. Both series were chain linked volumes (2005) expressed in million units of national currency, adjusted seasonally and by working days. The confidence data were from the Joint Harmonised EU Programme of Business and Consumer Surveys published by the European Commission. Due to harmonization, the data are comparable within the EU countries. The data for confidence questions $cci2_t, cci9_t, cci12_t$, and the confidence indicator cof_t were transformed from monthly to quarterly data by average. A detailed description about the methodology of the consumer survey data can be found in the Appendix. Due to the different lengths of available time series for EU member countries, I decided to use the data of 27 EU member countries: Austria (1996Q2–2015Q4), Belgium (1995Q2–2015Q4), Bulgaria (2001Q2–2015Q4), Croatia (2005Q2–2015Q4), Cyprus (2001Q2–2015Q4), the Czech Republic (1996Q2–2015Q4), Denmark (1995Q2–2015Q4), Estonia (1995Q2–2015Q4), Finland (1995Q4–

⁴ The exact definition of this indicator can be found at the end of the Appendix.

2015Q4), France (1995Q2–2015Q4), Germany (1995Q2–2014Q3), Greece (1995Q2–2015Q4), Hungary (1995Q2–2015Q4), Italy (1996Q2–2015Q4), Latvia (2001Q2–2015Q4), Lithuania (2001Q2–2015Q4), Luxembourg (2002Q1–2015Q4), Malta (2002Q4–2015Q4), the Netherlands (1996Q2–2016Q1), Poland (2002Q2–2015Q4), Portugal (1995Q2–2015Q4), Romania (2001Q2–2015Q4), Slovakia (1999Q2–2015Q4), Slovenia (1996Q1–2015Q4), Spain (1995Q2–2015Q4), Sweden (1995Q4–2015Q4) and the United Kingdom (1995Q2–2015Q4). Like Al-Eyd et al. (2009) and Dreger and Kholodilin (2013), the estimations were performed for each country separately.

3.2 Correlation analysis

For the beginning of the investigation of the possible predictive power of confidence questions for consumption spending, I conducted a correlation analysis. I estimated the correlation coefficients among the model variables in the logic of the two channels introduced in (1). For the income channel, $E_t \dot{y}_{t+1}$, the correlation among income growth \dot{y}_t , confidence question $cci2_t$ and confidence indicator cof_t was estimated. The results are displayed in Table 1.

I can observe from the estimations that the correlation between income growth and the consumer confidence indicator as well as the correlation between income growth and confidence question 2 are in some cases lower; however, they are significant at the 10% level in 25 of 27 countries. The correlation in most cases is slightly higher with consumer confidence indicator cof_t , which could be explained by two points. Firstly, this indicator as an aggregate already contains data from $cci2_t$, focusing on the consumers' expectations about their future financial position. Secondly, the growth of income is approximated in the model by the growth of the GDP and the consumer indicator cof_t also contains the data about the confidence of consumers in the general economic situation in the country in the next year (question 4), which is oriented towards the aggregate level. Therefore, the slightly bigger difference in the correlation coefficient could also be explained by the better matching with the growth of the GDP.

However, in the case of the income channel, we are actually interested not in the growth of the GDP but in the growth of consumer incomes. We can see that the differences in the estimations of these two correlation coefficients are mainly small. Thus, I proposed to use for the approximation of the income channel the data from $cci2_t$, which are, according to the formulation of question 2, directly focused on consumers' expectations about their future financial situation.

Although the correlation coefficient is smaller, using data from $cci2_t$ for the income channel and data from other confidence questions focused on the predictive power through the second channel separately could increase the predictive power of confidence data in the model.

Table 1 Contemporaneous correlation between income growth and confidence data

Country	<i>cof</i>	<i>cci2</i>
Austria	0.391 (0.000)	0.212 (0.061)
Belgium	0.400 (0.000)	0.312 (0.004)
Bulgaria	0.593 (0.000)	0.495 (0.000)
Croatia	0.467 (0.002)	0.492 (0.001)
Cyprus	0.539 (0.000)	0.305 (0.019)
Czech Republic	0.481 (0.000)	0.327 (0.003)
Denmark	0.327 (0.003)	0.185 (0.095)
Estonia	0.218 (0.048)	0.183 (0.098)
Finland	0.632 (0.000)	0.506 (0.000)
France	0.504 (0.000)	0.494 (0.000)
Germany	0.370 (0.001)	0.233 (0.034)
Greece	0.640 (0.000)	0.629 (0.000)
Hungary	0.630 (0.000)	0.528 (0.000)
Italy	0.448 (0.000)	0.466 (0.000)
Latvia	0.623 (0.000)	0.620 (0.000)
Lithuania	0.565 (0.000)	0.604 (0.000)
Luxembourg	0.241 (0.074)	0.150 (0.269)
Malta	0.221 (0.111)	0.231 (0.097)
Netherlands	0.654 (0.000)	0.483 (0.000)
Poland	0.222 (0.104)	0.266 (0.049)
Portugal	0.621 (0.000)	0.617 (0.000)
Romania	0.448 (0.000)	0.393 (0.002)
Slovakia	0.405 (0.001)	0.259 (0.034)
Slovenia	0.519 (0.000)	0.440 (0.000)
Spain	0.861 (0.000)	0.858 (0.000)
Sweden	0.448 (0.000)	0.102 (0.364)
United Kingdom	0.615 (0.000)	0.517 (0.000)

p-values are reported in the parentheses; boldface indicates significance at the 10% level.

The estimations of correlation coefficients for the second channel WS_t between consumption growth, confidence questions 9 and 12 and the confidence indicator are presented in Table 2. I can see that the correlation is significant at the 10% level in 25 of 27 countries in the case of consumer confidence indicator cof_t , in 22 countries for the confidence question $cci9_t$ and in 11 countries for the confidence question $cci12_t$. In every country, except for Austria and Luxembourg, there is at least one of these correlations with

confidence question *cci9*, or *cci12*, that is statistically significant (10% level).

Table 2 Contemporaneous correlation between growth of consumption and confidence data

Country	<i>cof</i>	<i>cci9</i>	<i>cci12</i>
Austria	0.112 (0.328)	0.047 (0.681)	-0.084 (0.463)
Belgium	0.247 (0.024)	-0.038 (0.736)	0.051 (0.646)
Bulgaria	0.552 (0.000)	-0.103 (0.438)	0.149 (0.260)
Croatia	0.566 (0.000)	0.521 (0.000)	0.193 (0.215)
Cyprus	0.225 (0.087)	0.467 (0.000)	-0.324 (0.012)
Czech Republic	0.394 (0.000)	0.238 (0.035)	0.195 (0.085)
Denmark	0.283 (0.010)	0.287 (0.008)	0.134 (0.228)
Estonia	0.230 (0.036)	0.370 (0.001)	-0.304 (0.005)
Finland	0.267 (0.016)	0.338 (0.002)	-0.145 (0.197)
France	0.368 (0.001)	0.315 (0.004)	0.107 (0.337)
Germany	0.197 (0.074)	0.234 (0.033)	0.005 (0.966)
Greece	0.617 (0.000)	0.566 (0.000)	0.283 (0.009)
Hungary	0.720 (0.000)	0.615 (0.000)	0.699 (0.000)
Italy	0.526 (0.000)	0.243 (0.031)	0.457 (0.000)
Latvia	0.496 (0.000)	0.387 (0.003)	0.098 (0.458)
Lithuania	0.672 (0.000)	0.316 (0.015)	0.350 (0.007)
Luxembourg	0.173 (0.202)	0.065 (0.637)	0.015 (0.914)
Malta	0.253 (0.067)	0.156 (0.264)	0.332 (0.015)
Netherlands	0.623 (0.000)	0.484 (0.000)	0.347 (0.002)
Poland	0.560 (0.000)	0.256 (0.059)	-0.028 (0.840)
Portugal	0.575 (0.000)	0.410 (0.000)	0.033 (0.764)
Romania	0.331 (0.011)	0.376 (0.003)	-0.029 (0.827)
Slovakia	0.449 (0.000)	0.435 (0.000)	-0.136 (0.273)
Slovenia	0.261 (0.020)	0.345 (0.002)	0.160 (0.156)
Spain	0.689 (0.000)	0.689 (0.000)	0.516 (0.000)
Sweden	0.262 (0.018)	0.432 (0.000)	-0.048 (0.669)
United Kingdom	0.555 (0.000)	0.625 (0.000)	0.239 (0.030)

p-values are reported in the parentheses; boldface indicates significance at the 10% level.

Although the correlation coefficient is more often statistically significant in the case of the confidence indicator *cof*, it is not always higher. The explanation for this could be similar to the case of the correlation with the growth of income. Again, the confidence indicator by itself is an aggregation of the data from four confidence questions, which was proposed to have predictive power for consumption growth. Thus, the predictive power of this aggregate is bigger than the predictive power from the data of only one question. Nonetheless, we can see from Table 2 that the correlation is also high for *cci9*, and *cci12*. We can

therefore use the combination of the data from these two questions to approximate the influence through the second channel and separate the confidence information into these two channels.

3.3 Regression results

Because of the possible autocorrelation among the residuals, I used the robust method to estimate all the models, M0 (7), M1 (5) and M2 (6). I calculated the increase in R^2 (incremental R^2) caused by adding confidence questions or the confidence indicator to the model in the form of M0, M1 and M2. Further, I tested the joint significance of the confidence questions or the confidence indicator in the model with the F-test (this corresponds to the statistical significance of the incremental R^2). The regression results are reported in Table 3. We can see from the results that the incremental R^2 from the models M1 and M2 are in most cases (for M1 all except Hungary, Latvia and Sweden; for M2 all cases) higher than the incremental R^2 from M0. This means that the predictive power of confidence data is greater when using the data from the confidence questions separately than when using the aggregated consumer confidence indicator *cof*. This is in line with the results that Dreger and Kholodilin (2013) obtained on an empirical basis. According to the joint statistical significance, it is more appropriate to use M0 than M1 or M2 only in the case of Hungary. The spurious results about the predictive power of confidence indicators for forecasting consumption could be supported by the fact that the confidence indicators were, in the case of model M0, jointly statistically significant at the 10% level only in 7 of the 27 countries. This could be increased to 13 of the 27 countries by using model M1 and to 16 by using model M2. Firstly, this supports the hypothesis that confidence data have predictive power to forecast consumption spending. Secondly, it supports the idea that the data from confidence questions could be separated into two influence channels – the income channel and the *willingness-to-spend* channel – in the model. By this separation not only can higher predictive power of confidence data be achieved but also the theoretical explanation of their use in the model can be more understandable.

Table 3 Predictive power of confidence data: incremental R^2

Country	M0	M1	M2
Austria	0.029 (0.684)	0.071 (0.417)	0.157 (0.247)
Belgium	0.025 (0.544)	0.068 (0.230)	0.091 (0.386)
Bulgaria	0.011 (0.687)	0.058 (0.453)	0.060 (0.472)
Croatia	0.074 (0.122)	0.176 (0.084)	0.215 (0.029)
Cyprus	0.007 (0.944)	0.076 (0.082)	0.157 (0.060)
Czech Republic	0.072 (0.102)	(0.102) 0.085	(0.225) 0.120
Denmark	0.135 (0.009)	0.200 (0.031)	0.217 (0.059)
Estonia	0.055 (0.056)	0.059 (0.149)	0.130 (0.006)
Finland	0.054 (0.467)	0.261 (0.000)	0.304 (0.000)
France	0.083 (0.160)	0.166 (0.049)	0.178 (0.067)
Germany	0.065 (0.319)	0.122 (0.041)	0.188 (0.081)
Greece	0.053 (0.568)	0.128 (0.620)	0.140 (0.782)
Hungary	0.064 (0.009)	0.031 (0.649)	0.076 (0.220)
Italy	0.035 (0.216)	0.070 (0.126)	0.096 (0.144)
Latvia	0.040 (0.330)	0.019 (0.959)	0.065 (0.920)
Lithuania	0.306 (0.260)	0.351 (0.322)	0.363 (0.222)
Luxembourg	0.034 (0.727)	0.179 (0.101)	0.251 (0.006)
Malta	0.033 (0.616)	0.135 (0.206)	0.160 (0.090)
Netherlands	0.071 (0.149)	0.154 (0.008)	0.186 (0.011)
Poland	0.061 (0.868)	0.267 (0.008)	0.320 (0.006)
Portugal	0.104 (0.005)	0.156 (0.002)	0.191 (0.000)
Romania	0.098 (0.198)	0.293 (0.209)	0.345 (0.329)
Slovakia	0.085 (0.152)	0.135 (0.020)	0.233 (0.003)
Slovenia	0.060 (0.393)	0.107 (0.136)	0.177 (0.121)
Spain	0.104 (0.004)	0.226 (0.000)	0.231 (0.000)
Sweden	0.213 (0.010)	0.176 (0.075)	0.229 (0.097)
United Kingdom	0.062 (0.041)	0.193 (0.000)	0.218 (0.000)

p -values of the joint significance of all confidence indicators in the model (from F-test) are reported in the parentheses. The boldface indicates significance at the 10% level. Robust estimations were used.

4. Conclusion

The main goal of this article was to extend the theoretical support for using confidence data to forecast consumption spending and to propose an alternative use of confidence data to increase their predictive power for consumption spending. I state that consumers' decision about their consumption is determined not only by their expected future income but also by other factors like uncertainty about the future, the influence from their neighbours and so on. In this way I distinguish between two channels for the predictive power of confidence data for consumption. The first, the income channel, represents the ability of

confidence data to predict the expectations about future income. The second channel is called *willingness to spend* and represents the motivation of consumers to spend this expected income. Through this channel the confidence data are used for the approximation of consumers' intentions regarding consumption.

By emphasizing the difference between these two channels, I proposed a model for consumption growth based on the data from various confidence questions rather than one aggregated confidence indicator. By using the data from the Joint Harmonised EU Programme of Business and Consumer Surveys, I chose the data from separate survey questions for both domains and estimated the growth of consumption. For comparison, I also estimated the model of consumption growth based only on past values of consumption growth and income growth and another extended to include the consumer confidence indicator (the official aggregated indicator for confidence). Using the data from 27 EU member countries, I confirmed the predictive power of confidence data in 17 countries. This predictive power was increased by using separate confidence questions with the exception of one case.

The alternative use of confidence data not only could improve consumption growth prediction but could also serve to investigate the impact of other factors on consumption spending or explain the excess sensitivity of consumption to income growth in some periods. In addition, using confidence questions separately rather than in their aggregated form could increase the theoretical interpretation for its use. The confidence data could be distinguished further among those that represent information about consumers' expectations (about their future income, the general economic situation, the future price or unemployment involvement) and indicators that are more informative about consumers' intentions and behaviour (planned major purchases, savings, building a house, etc.). A future more detailed study of these confidence data could be considered.

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Appendix

The Joint Harmonized Consumer Survey

The measurement of confidence indices in the EU follows the Joint Harmonised EU Programme of Business and Consumer Surveys (2016) designed by the European Commission. The consumer survey is based on 12 monthly questions and 3 quarterly questions, organized around 4 topics: the households' financial situation, the general economic situation, savings and intentions with regard to major purchases. All the questions are qualitative, usually with 6 answer alternatives (+ +, +, =, -, --, N). For each question the aggregate balance is calculated. The aggregate balance is the difference between positive and negative answers expressed in the percentage points of the total answers, with double weights on the extremes (weight 1: + +, -

-; weight 1/2: +, -; weight 0: =, N). The data are also available in a seasonally adjusted form.

Monthly questions:

- Q1: How has the financial situation of your household changed over the last 12 months? It has ...
 - + + got a lot better; + got a little better; = stayed the same; - got a little worse; -- got a lot worse; N don't know.
- Q2: How do you expect the financial position of your household to change over the next 12 months? It will ...
 - + + get a lot better; + get a little better; = stay the same; - get a little worse; -- get a lot worse; N don't know.

- Q3: How do you think the general economic situation in the country has changed over the past 12 months? It has ...
 - + + got a lot better; + got a little better; = stayed the same; – got a little worse; – – got a lot worse; N don't know.
 - Q4: How do you expect the general economic situation in this country to develop over the next 12 months? It will ...
 - + + get a lot better; + get a little better; = stay the same; – get a little worse; – – get a lot worse; N don't know.
 - Q5: How do you think that consumer prices have developed over the last 12 months? They have ...
 - + + risen a lot; + risen moderately; = risen slightly; – stayed about the same; – – fallen; N don't know.
 - Q51: If question 5 was answered by 1, 2, 3 or 5: By how many per cent do you think that consumer prices have gone up/down over the past 12 months? (Please give a single figure estimate).

Consumer prices have increased by ... % / decreased by ... %.
 - Q6: By comparison with the past 12 months, how do you expect that consumer prices will develop in the next 12 months? They will ...
 - + + increase more rapidly; + increase at the same rate; = increase at a slower rate; – stay about the same; – – fall; N don't know.
 - Q61: If question 6 was answered by 1, 2, 3 or 5: By how many per cent do you expect consumer prices to go up/down change in the next 12 months? (Please give a single figure estimate).

Consumer prices will increase by ... % / decrease by ... %.
 - Q7: How do you expect the number of people unemployed in this country to change over the next 12 months? The number will ...
 - + + increase sharply; + increase slightly; = remain the same; – fall slightly; – – fall sharply; N don't know.
 - Q8: In view of the general economic situation, do you think that now it is the right moment for people to make major purchases, such as furniture, electrical/electronic devices, etc.?
 - + + yes, it is the right moment now; = it is neither the right moment nor the wrong moment; – – no, it is not the right moment now; N don't know.
 - Q9: 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? I will spend ...
 - + + much more; + a little more; = about the same; – a little less; – – much less; N don't know.
 - Q10: In view of the general economic situation, do you think that now is ...?
 - + + a very good moment to save; + a fairly good moment to save; – not a good moment to save; – – a very bad moment to save; N don't know.
 - Q11: Over the next 12 months, how likely is it that you will save any money?
 - + + very likely; + fairly likely; – not likely; – – not at all likely; N don't know.
 - Q12: Which of these statements best describes the current financial situation of your household?
 - + + we are saving a lot; + we are saving a little; = we are just managing to make ends meet on our income; – we are having to draw on our savings; – – we are running into debt; N don't know.
- Quarterly questions (January, April, July and October):**
- Q13: How likely are you to buy a car over the next 12 months?
 - + + very likely; + fairly likely; – not likely; – – not at all likely; N don't know.
 - Q14: Are you planning to buy or build a home over the next 12 months (to live in yourself, for a member of your family, as a holiday home, to let, etc.)?
 - + + yes, definitely; + possibly; – probably not; – – no; N don't know.
 - Q15: How likely are you to spend any large sums of money on home improvements or renovations over the next 12 months?
 - + + very likely; + fairly likely; – not likely; – – not at all likely; N don't know.
- The European Commission also publishes a monthly composite indicator – the consumer confidence indicator. This indicator is calculated as a simple arithmetic average of seasonally adjusted balances (expressed in percentage points) of the answers to question Q2, Q4, Q7 and Q11.