

## Which Survey Indicators Are Useful for Monitoring Consumption? Evidence from European Countries

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This paper assesses the information content of two survey indicators for consumption developments in the near future for eight European countries in the period 1985-1998. Empirical work on this topic typically focuses on consumer confidence, the perceptions of buyers of consumption goods. This paper examines whether perceptions of sellers of consumption goods, measured by retail trade surveys, may also improve short-term monitoring of consumption. We find that both consumer confidence and retailer confidence embody valuable information, when analyzed in isolation. For France, Italy and Spain we conclude that adding retail confidence does not improve the indicator model once consumer confidence has been included. For the UK the reverse case is obtained. For the remaining four countries we show that combining consumer sentiment and retail trade confidence into a composite indicator leads to optimal results. Our results suggest that incorporating information from retail trade surveys may offer significant benefits for the analysis of short-term prospects of consumption.

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Key words: consumption; consumer confidence; retail trade confidence; composite indicators.

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The monetary policy strategies of present-day central banks require monitoring a wide range of potential inflation indicators such as wage developments, the exchange rate, the yield curve and the level of economic activity (Bernanke *et al.*, 1999). Given the forward looking nature of monetary policy strategies, leading indicators play an important role in monitoring relevant economic developments. Presently, the majority of the available indicators of economic activity relates to the manufacturing sector (Zarnowitz, 1992 and Berk and Bikker, 1995). However, developments in this sector need not always be perfectly indicative of macroeconomic developments. Manufacturing constitutes only a limited part of the economy, in Europe between 15% and 30% of GDP. Moreover, this sector is especially sensitive to external developments, whereas the largest euro area economies, and especially the euro area itself, are relatively closed. A large weight of sheltered sectors, whose production is driven by domestic demand, will tend to dampen macroeconomic fluctuations.<sup>1</sup>

Economic theory suggests that consumption is more stable than income and production in the short run. Both the Permanent Income Hypothesis and the Life Cycle Hypothesis posit that individuals only alter their consumption behaviour when they expect income changes to be permanent. Temporary drops and gains in income will leave consumption behaviour unchanged, resulting in less volatile short-run fluctuations of aggregate demand. As private consumption represents 50 to 60 percent of GDP, monitoring consumption developments is crucial for policy makers and businesses. Due to the substantial delay in the release of National Accounts data, leading indicators are necessary for effective monitoring.

The empirical literature on monitoring and forecasting consumption mainly focuses on one indicator, namely consumer confidence. Eppright *et al.* (1998) discuss arguments from the economic psychology literature why consumer sentiment may influence consumption behaviour (Katona, 1951). Sentiment might be especially important in the presence of unforeseen and extraordinary events. Consumer sentiment then works as a self-fulfilling phenomenon: the more pessimistic consumers are, the worse a recession becomes, which, in turn, worsens consumers' opinions about the future.

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<sup>1</sup> Diverging developments of industrial production and real GDP can be regularly observed. In the aftermath of the Asian crisis in 1997-98 manufacturing production fell steeply in Europe due to declining exports, but robust domestic demand stimulated production in the sheltered sectors and the crisis' overall effect on the economy was limited.

Although sentiment has no effects on the level of consumption in the long run, it could affect aggregate economic fluctuations in the short run. Many studies demonstrate that consumer confidence can be used to improve short-term forecasts of domestic demand. For example, Fuhrer (1993), Carroll *et al.* (1994), Bram and Ludvigson (1998) and Eppright *et al.* (1998) all conclude for the US that consumer expectations have predictive power for aggregate consumer expenditure in addition to other economic indicators.<sup>2</sup> Batchelor and Dua (1998) find for the US that consumer confidence improves consensus forecasts of real GDP growth in particular during recessions. Research for other countries, which is much rarer, generally confirms the results found for the US.<sup>3</sup>

This paper makes the following contributions to the literature. First, our analysis is not limited to the sentiment of buyers of consumer goods, but also includes a confidence measure of the sellers of consumption goods, which is based on retail trade surveys. To our knowledge, we are the first to investigate the usefulness of the latter indicator. Second, our sample comprises eight European countries, including France, Italy, Germany and the UK. Apart from the study by Praet (1984), which is now quite outdated, comprehensive empirical work on this topic for European countries is rare. Finally, we address the question how to make optimal use of the information in the consumer and retail trade surveys. We construct a composite indicator and examine whether this indicator outperforms its individual components.

The remainder of this paper is structured as follows. After a brief discussion of the data, we first analyze the information content of both confidence measures separately. We then investigate the properties of a composite indicator. The paper ends with a short concluding section.

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<sup>2</sup> For example, Carroll *et al.* (1994) show that the Michigan Index of consumer sentiment on its own explains about 14 percent of the variation of consumption growth. Combined with other available information, the Index explains less, but it still improves the adjusted  $R^2$  by three percentage points.

<sup>3</sup> See Parigi and Schlitzer (1997) for Italy, Boehm and McDonnell (1995) for Australia, Djerf and Takala (1997) for Finland, and Ågren and Jonsson (1991) for Sweden.

## DATA

We employ two survey indicators for consumption growth: consumer confidence and the retail trade confidence. Furthermore, we construct a third indicator, which is a weighted average of the two. Both indicators are derived from monthly surveys conducted by national statistical offices on behalf of the European Commission. The survey results are published about two months before the first estimate of aggregate consumption (National Accounts definition) becomes available. Moreover, the latter are subject to significant and repeated revisions. The high frequency and the short publication lag of the surveys make these indicators potentially useful for monitoring consumption over short horizons. We investigate which indicator has the closest short-run relationship with consumption for eight European countries (Belgium, France, Germany, Italy, the Netherlands, Portugal, Spain and the UK). As data for the retail sales survey are only available from 1985 onwards, the sample spans the period 1985Q1–1998Q4 for most countries.<sup>4</sup>

In both the consumer and the retailer survey, the results are reported as differences between positive and negative answers (net balances), which are then aggregated into a single confidence index, with each net balance receiving the same weight. Consumer confidence is derived from five questions. Consumers are asked about their opinion of the future and past general economic situation and their future and past financial situation, and whether it is a good time to make major purchases now. This indicator contains two elements. The questions on the economic situation measure the ‘feel good factor’ of consumers, while the other questions deal with factors that directly influence the demand for goods, such as consumers’ purchasing power and their willingness to buy.

The retail trade indicator is based on a survey among retail traders, the sellers of consumption goods. This indicator is the average of the responses to three questions about the present situation, expected sales and an assessment of inventories. Although the retail trade sector accounts for only a part of total consumer expenditures (about 30% in the Netherlands), its share of the cyclical part of

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<sup>4</sup> The Spanish and Portuguese retailer surveys started in 1988 and 1989, respectively. Appendix 1 presents the availability of the data in detail and also discusses the questions of the two surveys. See European Commission (1997) for a full description of the surveys.

consumption is much bigger. The retail trade survey encompasses both durable and nondurable goods, but excludes services. Of these three components of consumer expenditures, durable goods are the most sensitive to cyclical conditions, whereas services are least affected (Zarnowitz, 1992). Therefore, we expect this indicator to correlate well with the cyclical component of consumption.

## THE INFORMATION CONTENT OF THE INDIVIDUAL CONFIDENCE INDICES

### **Methodology**

An important criterion for candidate indicators is a plausible economic relationship with consumption growth, because then it would be reasonable to expect a robust relationship to apply in the future as well. We use a simple autoregressive model, which is also used by Carroll *et al.* (1994), to assess the predictive ability of the survey indicators. We prefer this method because our primary interest is whether the indicators alone contain information. Short-term monitoring (such as quick interpretation of new events and/or a timely detection of turning points in key economic variables) requires quickly available indicators such as survey results. Other approaches, such as structural models or VAR models, would also require information on other variables (such as current and expected income and wealth) which are published with a considerably longer lag. Furthermore, the nature of the survey questions makes it likely that the survey indicators also partly contain information captured by other macroeconomic variables. Recall that the surveys enquire about consumers' (future) financial situation, which in fact deals with the wealth and income position of households, and after the general economic situation, which is influenced by the employment outlook. Our baseline equation is:<sup>5</sup>

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<sup>5</sup> As a preliminary analysis we determined the order of integration for all variables using augmented Dickey-Fuller tests. Since for all countries the indexes were found to be  $I(0)$  and the level of consumption  $I(1)$ , we employ in our models first (log) differences of consumption and levels of the confidence measures. Furthermore, we include a constant and a time trend (when significant) into the baseline model. The choice of the number of lags of consumption growth is guided by the Akaike criterion and the Breusch-Godfrey Lagrange Multiplier test on serial correlation. First, a single lag is introduced and, if necessary, more lags are added until the error term exhibits no first and fourth order serial correlation. Subsequently, the Akaike criterion is used to determine whether more lags improve the baseline model.

$$\Delta c_t = \alpha + \sum_{i=1}^n \beta_i \Delta c_{t-i} + \varepsilon_t \quad (1)$$

where  $\Delta c$  denotes the growth rate of consumption and  $\varepsilon$  is a well-behaved error term. Subsequently, we add the consumer confidence index ( $CC$ ) and the retail trade confidence index ( $RT$ ) to eq. (1), separately. We restrict the number of lags for the indicators to two quarters. Longer lags would seem implausible, because the survey questions mainly deal with the present and the near future. We also include the contemporaneous value of the indicators, because of the publication lag of National Accounts data. Hence, we estimate the following two confidence-augmented equations:

$$\Delta c_t = \alpha + \sum_{i=1}^n \beta_i \Delta c_{t-i} + \sum_{i=0}^2 \gamma_i CC_{t-i} + \varepsilon_t \quad (2)$$

$$\Delta c_t = \alpha + \sum_{i=1}^n \beta_i \Delta c_{t-i} + \sum_{i=0}^2 \varphi_i RT_{t-i} + \varepsilon_t \quad (3)$$

To investigate whether incorporating consumer confidence or retailer confidence improves the model, we calculate the relative reduction in the unexplained variance of eqs. (3) and (4) compared to that of the baseline model (1). This measure shows the survey indicator's relative contribution to the explanation of consumption growth besides lagged values of consumption growth itself. Moreover, we compute the  $F$ -statistic testing whether the coefficients of an indicator are jointly zero. This test thus shows whether the relative reduction in unexplained variance is statistically significant.

Since expectations of sellers and buyers of goods should be equal in equilibrium, the information embodied in the two indicators is expected to overlap to a certain degree. Indeed, for four out of our eight countries the contemporaneous correlation between both indicators is rather high. In France, Italy and Portugal and the UK it ranges from 0.7 to 0.8, while confidence of sellers and buyers diverge to a greater extent in the other four countries. Because the correlation is not perfect, both indicators could provide valuable information that is not already contained in the other indicator. To

assess the value of the extra information we add both indicators to the baseline equation, which yields eq. (4)

$$\Delta c_t = \alpha + \sum_{i=1}^n \beta_i \Delta c_{t-i} + \sum_{i=0}^2 \gamma_i CC_{t-i} + \sum_{i=0}^2 \varphi_i RT_{t-i} + \varepsilon_t \quad (4)$$

## Empirical results

< INSERT TABLE I >

Table I summarises all relevant results. As expected, both confidence indicators contain valuable information about changes in consumption in the near future. In most countries the inclusion of an indicator improves the baseline model substantially. In the case of consumer confidence, the traditional indicator, the reduction in the unexplained variance varies between 12% (Italy and the UK) and 54% (Spain). Surprisingly, the relatively unknown retail trade indicator also explains consumption growth rather well. In most countries this indicator seems at least as helpful for forecasting consumption as consumer confidence. Only in Italy, the sellers of goods appear to be unable to forecast consumption growth.

The last four columns of Table I report the results for eq. (4). This exercise confirms our earlier results: both indicators are useful for monitoring consumption growth. Only in Italy eq. (4) does not perform significantly better than the baseline equation. The  $F$ -tests pitting eq. (4) against eqs. (2) and (3) show that in most countries both indicators share the same information to some extent. Only for the UK do the results indicate the superiority of the retail trade indicator, whereas in Germany both indicators should be utilized for monitoring consumption growth. For the other six countries, we are not able to draw firm conclusions on which indicator to use.

## CONSTRUCTING A COMPOSITE INDICATOR

### Methodology

For the six countries for which the analysis above yielded inconclusive results an interesting question is whether it may be useful to combine the two confidence indicators into a single composite indicator. As is well-known, a composite indicator has several advantages over individual indicators, because aggregation may diminish white noise, measurement errors and uncorrelated variations in leads (Zarnowitz, 1992). Using a composite indicator, rather than selecting one of the two original indicators, may be the optimal strategy for monitoring purposes. The composite indicator  $CI$  can be written as

$$CI = \omega CC + (1 - \omega)RT$$

where  $\omega$  and  $1 - \omega$  are the weights attached to consumer confidence and retail trade confidence, respectively.

An important issue is the determination of the weighting scheme. If an indicator is only weakly correlated with the reference index, giving too much weight to it may actually worsen the performance of the composite indicator. Such an indicator should get a small or even a zero weight. Principal components analysis is a widely used method for determining aggregation schemes. However, in the case of two variables this method is inappropriate, because it would assign each indicator a weight of 50% by construction. For this reason we obtain the weights by estimating eq. (5),

$$\Delta c_t = \alpha + \sum_{i=1}^n \beta_i \Delta c_{t-i} + \sum_{i=0}^2 \omega \gamma_i CC_{t-i} + \sum_{i=0}^2 (1 - \omega) \gamma_i RT_{t-i} + \varepsilon_t \quad (5)$$

Eq. (5) can be derived from eq. (4) by putting two nonlinear parameter restrictions on it. We apply a Likelihood Ratio test to evaluate whether these restrictions are statistically valid. Rejection of the restrictions is strong evidence that consumer confidence and retail trade confidence should be used



together for monitoring consumption. Eq. (4) is then the best indicator model. In case the restrictions cannot be rejected, we have to check whether the estimate of  $\omega$  is insignificantly different from either zero or one. If that is the case, then the optimal indicator model features only one of the two confidence indices. Finally, if the estimate of  $\omega$  differs significantly from both zero and one, we may use the estimated weights to construct the composite indicator. Using a composite indicator is then an efficient way to use the information incorporated by the two confidence measures, and eq. (5) is the optimal model.

### **Empirical results**

First we determine the weights by estimating equation (5) by non-linear least squares. Table II reports the results.

<INSERT TABLE II>

For no country can we reject the two parameter restrictions implied by eq. (5), even at the 10% level. Hence, there are no objections to aggregating the two confidence measures into a single one. However, for France, Italy and Spain we find that consumer confidence alone is sufficient for monitoring consumption in the short run. In these countries, the estimate of  $w$  does not differ significantly from one. For the UK we arrive at the opposite conclusion: only the retail trade confidence indicator appears to contain valuable information. These results mainly confirm our earlier findings. For Belgium, Germany, the Netherlands and Portugal we conclude that working with a composite index is the best way to utilize the information in both indicators. The last column of Table II summarizes our findings with respect to the optimal indicator.

<INSERT TABLE III>

Table III illustrates the gains of using the optimal indicator instead of the widely used consumer confidence. First, we compute the contemporaneous correlation between the reference index

(consumption growth) and the optimal indicator (as defined in Table II). This measure indicates how closely the indicator exhibits the cyclical pattern of consumption growth. We also calculate the correlation coefficients of consumption growth with the indicator lagging by one and two quarters to demonstrate its leading indicator properties. The first three columns of Table III present the results from this exercise. We obtain rather high correlation coefficients at all three lags with the exception of the Netherlands. Ignoring the Dutch results, the maximum correlation coefficients for each country lie between 0.71 (France) and 0.90 (Spain). The last three columns of Table III report the improvement in each correlation coefficient by using the optimal indicator instead of the consumer confidence index alone. With one minor exception, the correlation coefficients are always higher when the optimal indicator is used. The improvements in the correlation coefficients range from 8 to 29 percentage points. Consequently, substantial efficiency gains can be achieved by incorporating retail trade survey data in addition to consumer confidence survey data into monitoring exercises of the short-term prospects for consumption.

## CONCLUSIONS

Both in the literature and in practice, consumer sentiment is used as the main short-run indicator for consumption. However, our results show that this is only optimal for three (France, Italy and Spain) of the eight European countries investigated in this paper. In the other countries retail trade confidence surveys, which measure the sentiment of retail sellers, also contain important information about (future) consumption growth. Monitoring this indicator alone is even sufficient in the case of the UK. For Belgium, Germany, the Netherlands and Portugal we find that both confidence measures contain valuable, survey-specific information. For these countries some significant efficiency gains can be achieved by using composite indicators in the monitoring of the short-term development of consumption.

## APPENDIX 1: CONSTRUCTION AND AVAILABILITY OF THE SURVEY INDICATORS

The consumer confidence and retail trade confidence indicators are derived from monthly surveys published by the European Commission. The surveys are harmonized, so the questionnaires are identical in all countries.

Consumer confidence is based on the following five questions from the consumer survey:

1. How does the financial situation of your household now compare with what it was 12 months ago?  
Answers: a lot better (++); a little better (+); the same (=); a little worse (-); a lot worse (--); don't know (N).
2. How do you think the financial position of your household will change over the next 12 months?  
Answers: a lot better (++); a little better (+); the same (=); a little worse (-); a lot worse (--); don't know (N).
3. How do you think the general economic situation in this country has changed over the last 12 months? Answers: a lot better (++); a little better (+); the same (=); a little worse (-); a lot worse (- -); don't know (N).
4. How do you think the general economic situation in this country will develop over the next 12 months? Answers: a lot better (++); a little better (+); the same (=); a little worse (-); a lot worse (- -); don't know (N).
5. Do you think that there is an advantage for people to make major purchases (furniture, washing machines, TV sets, etc.) at the present time? Answers: yes, now is the right time (+); it is neither the right nor the wrong time (=); no, it is the wrong time, the purchase should be postponed (-); don't know (N).

The score for each question is calculated as the difference between the percentages positive and negative answers, where for questions (1)–(4) ‘a lot’-answers get a weight of 1 and ‘a little’-answers

get a weight of 1/2. The consumer confidence index is calculated as the unweighted average of the scores for the five questions.

The retail trade confidence indicator is based on the following three questions from the retail trade survey:

- 1. We consider our present business (sales) position to be: good (+); satisfactory (normal for the season) (=); bad (-).
- 2. We consider our present stock to be: too small (+); adequate (normal for the season) (=); too large (-).
- 3. Our business trend over the next six months, excluding purely seasonal variation, will: improve (+); remain unchanged (=); deteriorate (-).

The score for each question is calculated as the difference between the percentages positive and negative answers. The retail trade confidence index is calculated as the unweighted average of the scores for the three questions.

Table A1 presents the starting dates of each survey.

<INSERT TABLE A1>

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TABLES

**Table I. The information content of individual indicators**

	<i>Baseline</i> <sup>a</sup>	<i>Baseline equation augmented by</i>							
	(eq.1) 1-R <sup>2</sup>	Consumer confidence (eq.2)		Retail trade indicator (eq.3)		Consumer confidence and retail trade indicator (eq.4)			
		<i>F</i> -statistic	Percent	<i>F</i> -statistic	Percent	<i>F</i> -statistic	Percent	<i>F</i> -statistic	<i>F</i> -statistic
		eq. 2 vs eq. 1	reduction in 1-R <sup>2</sup>	eq. 3 vs eq. 1	reduction in 1-R <sup>2</sup>	eq. 4 vs eq. 1	reduction in 1-R <sup>2</sup>	eq. 4 vs eq. 2	eq. 4 vs eq. 3
Belgium	0.24	3.4*	14	4.5**	20	2.8*	20	2.0	1.1
Germany	0.53	3.9*	15	4.9**	19	4.5**	30	4.2*	3.3*
France	0.42	4.7**	28	3.0*	12	3.1*	23	1.3	2.8
Italy	0.18	3.0*	12	1.1	1	1.5	6	0.2	1.9
Netherlands	0.80	4.2*	17	3.5*	14	3.3**	23	2.3	2.7
Portugal	0.45	4.6**	23	5.3**	26	3.6**	31	2.2	1.7
Spain	0.03	14.5**	54	11.5**	48	6.9**	51	0.2	1.6
UK	0.15	3.3*	12	12.5**	41	7.0**	42	8.9**	1.3

\* and \*\* denotes significance at the 5% and 1% level, respectively.

a) Breusch-Godfrey Lagrange Multiplier test indicates no presence of fourth order autocorrelation.

**Table II. Determining the optimal indicator (estimation results for eq. 5)**

	$\omega$	Standard error	Percent reduction in 1-R <sup>2</sup>	LR-test <sup>a</sup> eq.(5) vs eq.(4)	<i>p</i> -value	<i>Conclusion</i>
Belgium	0.44	0.22	22	1.4	0.49	Composite indicator
Germany	0.42	0.11	33	0.2	0.90	Composite indicator
France	0.82	0.27	20	4.0	0.13	Consumer confidence
Italy	1.27	0.51	10	0.5	0.79	Consumer confidence
Netherlands	0.51	0.21	18	5.7	0.06	Composite indicator
Portugal	0.59	0.13	34	0.5	0.79	Composite indicator
Spain	0.78	0.22	54	0.1	0.96	Consumer confidence
UK	0.13	0.11	42	2.8	0.25	Retail trade indicator

a) Critical values: 9.2 for the 1% level and 6.0 for the 5% level of significance.



**Table III. A comparison between the optimal indicator and consumer confidence**

(Correlation coefficients between consumption growth and indicators for various leads)

	Optimal indicator			Difference with consumer confidence		
	$\rho(0)$	$\rho(1)$	$\rho(2)$	Percent gain in $\rho(0)$	Percent gain in $\rho(1)$	Percent gain in $\rho(2)$
Belgium	0.76	0.62	0.43	13	15	19
Germany	0.80	0.82	0.80	29	20	14
France	0.71	0.69	0.66	-	-	-
Italy	0.73	0.64	0.55	-	-	-
Netherlands	0.50	0.56	0.55	16	8	-1
Portugal	0.79	0.72	0.52	9	10	8
Spain	0.90	0.85	0.73	-	-	-
UK	0.87	0.86	0.80	27	20	9

**Table A1 Starting dates of surveys**

	<i>Consumer survey</i>		<i>Retail trade survey</i>	
	Year	Month	Year	Month
Belgium	1973	January	1985	January
Germany	1973	January	1985	January
France	1973	January	1986	July
Italy	1973	January	1985	November
Netherlands	1973	January	1986	January
Portugal	1986	June	1989	January
Spain	1986	June	1988	September
UK	1974	January	1985	January