A comparison of consumer and retail trade confidence indicators for predicting household expenditure in the UK

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Abstract

The objective of this paper is to compare the usefulness of two confidence indicators for the purpose of predicting spending by households in the UK. Concern is with six different types of consumption expenditure. In contrast to earlier studies, conclusions are founded upon a post-sample, as well as a within-sample, analysis. The fundamental result which is obtained is that the GfK measure of consumer confidence generally outperforms the European Commission's indicator of confidence within the retail sector.

Keywords: Consumption; Consumer confidence; Forecast encompassing

JEL classification: C53; E21

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1. Introduction

Over the past twenty years or so, a literature has become established on the subject of the usefulness of confidence indicators for the purpose of predicting household consumption expenditure. Noteworthy contributions include the papers by Carroll *et al*. (2004) and Cotsomitis and Kwan (2006). Typically, for the major industrialised countries, different measures of sentiment are available. Hence, a key issue, which must be addressed, is which of these is of the greatest relevance. Indeed, Nahuis and Jansen (2004) conducted a multi-country investigation for the purpose of contrasting the capabilities of indicators of consumer and retail trade confidence in explaining the variation in aggregate household expenditure. Their results showed that, for the UK, it was beneficial to consult merely the indicator of confidence within the retail sector.

The objective of the current paper is to perform, with respect to the UK, a more thorough comparison of the merits of the measures of consumer and retail trade confidence. In contrast to the study of Nahuis and Jansen, consideration is given to not only total consumption expenditure but also five of its components. Furthermore, the conclusions which are reached are derived from a post-sample, as well as a within-sample, analysis of the data.

The paper proceeds in the following manner. In section 2, the empirical methodology is outlined and the findings are reported of a within-sample investigation. Section 3 acquaints the reader with a test of forecast encompassing which has been proposed by Clark and McCracken (2001), and presents the results of its application. Finally, in section 4, there are offered some brief conclusions.

2. Data, methodology, and the results of a within-sample analysis

This study utilises quarterly data on six consumption variables, in addition to two confidence indicators. The consumption variables consist of aggregate household final consumption expenditure (domestic concept) (TOTAL), as well as, spending on durable goods (DURABLE), semi-durable goods (SEMI), non-durable goods (NOND), services (SERVICES) and vehicles (VEHICLES). Each consumption series is seasonally adjusted and expressed in constant (2006) prices. For all six of these variables, the data source is the UK government publication, *Consumer Trends*.

The chosen indicator of consumer sentiment (CCI) is the measure which is compiled by the Martin Hamblin GfK organisation, on behalf of the European Commission. Monthly data on this variable are obtained from HM Treasury. Also, monthly, seasonally-adjusted data on the level of confidence within the retail sector (RTI) are available from the European Commission (Economic and Financial Affairs). In both cases, a quarterly series is achieved by calculating respective three monthly averages.

Data are assembled on each of the eight variables over a period which extends from 1985Q1 to 2010Q4. Guided by the results of unit root tests, each of the consumption variables is contained in the form of the first-difference of a logarithm. In contrast, no transformation is applied to either CCI or RTI.[1]

The methodology that is favoured in this study is heavily influenced by the approach which was adopted by Nahuis and Jansen (2004). Initially, the aim is to describe the data on each of the consumption variables using an autoregressive process. Choosing as a starting point an equation which includes no lags on the dependent variable, but simply a constant term, the order of the model is selected with the objective of minimising the value of the Akaike Information Criterion, while ensuring that there is no evidence of autocorrelation in the error terms.

To this baseline equation, there are added, as regressors, the current value and the values in the previous two quarters of CCI. The result is equation (1), below.

$$\Delta log.Cons_t = a + \sum_{i=1}^{4} b_i \Delta log.Cons_{t-i} + \sum_{i=0}^{2} c_i CCI_{t-i} + \varepsilon_t,$$

(t = 1986Q2, 1986Q3, ……, 2010Q4). (1)

[1] By virtue of their design, the series on CCI and RTI should be stationary. Results of unit root tests are available from the authors, upon request.

Also, the baseline equation is augmented by accommodating, as right-hand-side variables, the current value and the values in the previous two quarters of RTI. This extension succeeds in producing equation (2).[2]

$$\Delta log.Cons_t = a + \sum_{i=1}^{4} b_i \Delta log.Cons_{t-i} + \sum_{i=0}^{2} d_i RTI_{t-i} + \varepsilon_t,$$

(t = 1986Q2, 1986Q3, ……, 2010Q4). (2)

Regarding equations (1) and (2), *Cons* denotes the consumption variable, while ε represents a stochastic error term. For both NOND and VEHICLES, the restrictions, $b_i = 0$ (i = 1, 2, 3, 4), are supported by the data. Also, for both TOTAL and DURABLE, the constraints, $b_i = 0$ (i = 3, 4), are empirically justified.

Equations (1) and (2) are estimated, using Ordinary Least Squares, following which exclusion F tests are performed in relation to to CCI_{t-i} (i = 0, 1, 2) and RTI_{t-i} (i = 0, 1, 2). The results which are obtained are presented in Table 1 and Table 2.

[2] The argument for incorporating in the equations the current values of CCI and RTI is the earlier release date of values of the confidence measures.

Table 1: Results obtained following estimation of equation (1)

Consumption Variable	Adjusted R-squared		F Statistic (Probability Value)
	Excluding CCI	Including CCI	
Δlog.(TOTAL)	0.2529	0.4481	F(3, 93) = 12.319 (0.0000)
Δlog.(DURABLE)	0.0394	0.2251	F(3, 93) = 8.6682 (0.0000)
Δlog.(SEMI)	0.0063	0.1315	F(3, 91) = 5.5138 (0.0016)
Δlog.(NOND)	0.0000	0.0638	F(3, 95) = 3.2252 (0.0260)
Δlog.(SERVICES)	0.1715	0.2414	F(3, 91) = 3.8894 (0.0115)
Δlog.(VEHICLES)	0.0000	0.1035	F(3, 95) = 4.7720 (0.0038)

The F statistic corresponds to the null hypothesis, Ho: $c_i = 0$ (i = 0, 1, 2).

Table 2: Results obtained following estimation of equation (2)

Consumption Variable	Adjusted R-squared		F Statistic (Probability Value)
	Excluding RTI	Including RTI	
Δlog.(TOTAL)	0.2529	0.3241	F(3, 93) = 4.3707 (0.0063)
Δlog.(DURABLE)	0.0394	0.1007	F(3, 93) = 3.1820 (0.0275)
Δlog.(SEMI)	0.0063	-0.0115	F(3, 91) = 0.4486 (0.7189)
Δlog.(NOND)	0.0000	0.0799	F(3, 95) = 3.8363 (0.0122)
Δlog.(SERVICES)	0.1715	0.2255	F(3, 91) = 3.1855 (0.0275)
Δlog.(VEHICLES)	0.0000	0.0822	F(3, 95) = 3.9252 (0.0109)

The F statistic corresponds to the null hypothesis, Ho: $d_i = 0$ (i = 0, 1, 2).

A comparison of the values of the adjusted R-squared statistics reveals that, for only one of the six consumption variables, does the RTI contribute towards a superior fit of the sample data. Indeed, for each of TOTAL, DURABLE and SEMI, the excess which is achieved by equation (1) is at least 12.4 percentage points. Also, from inspecting the probability values which are contained in the final columns of the two tables, it is evident that the only instance in which the null hypothesis cannot be rejected at a conventional level of significance is when equation (2) is employed to explain the growth of expenditure on semi-durable goods.

For each of the consumption variables, a third equation is constructed, which features both CCI and RTI on its right-hand side.

$$\Delta log.Cons_t = a + \sum_{i=1}^{4} b_i \Delta log.Cons_{t-i} + \sum_{i=0}^{2} c_i CCI_{t-i} + \sum_{i=0}^{2} d_i RTI_{t-i} + \varepsilon_t,$$

(t = 1986Q2, 1986Q3, ……, 2010Q4). (3)

Again, the technique of Ordinary Least Squares estimation is applied to the equation, following which the same F tests are performed as earlier. The results which are obtained are reported in Table 3.

Table 3: Results obtained following estimation of equation (3)

Consumption Variable	Adjusted R-squared		F Statistic (Probability Value)	
	Excluding CCI and RTI	Including CCI and RTI	Exclusion of CCI[a]	Exclusion of RTI[b]
Δlog.(TOTAL)	0.2529	0.4465	F(3, 90) = 7.8556 (0.0001)	F(3, 90) = 0.9095 (0.4398)
Δlog.(DURABLE)	0.0394	0.2270	F(3, 90) = 6.0655 (0.0008)	F(3, 90) = 1.0775 (0.3628)
Δlog.(SEMI)	0.0063	0.1329	F(3, 88) = 6.0505 (0.0009)	F(3, 88) = 1.0508 (0.3743)
Δlog.(NOND)	0.0000	0.0739	F(3, 92) = 0.7942 (0.5002)	F(3, 92) = 1.3452 (0.2646)
Δlog.(SERVICES)	0.1715	0.2405	F(3, 88) = 1.5977 (0.1957)	F(3, 88) = 0.9615 (0.4147)
Δlog.(VEHICLES)	0.0000	0.1155	F(3, 92) = 2.1921 (0.0943)	F(3, 92) = 1.4285 (0.2395)

[a] The F statistic corresponds to the null hypothesis, Ho: $c_i = 0$ (i = 0, 1, 2).
[b] The F statistic corresponds to the null hypothesis, Ho: $d_i = 0$ (i = 0, 1, 2).

The values of the adjusted R-squared statistic suggest that, in general, there is little benefit to be gained from representing both of the confidence measures in an equation. Indeed, the probability values which are listed in the final column indicate that, for all six consumption variables, given the presence of CCI_{t-i} (i = 0, 1, 2) in the respective equation, RTI_{t-i} (i = 0, 1, 2) provides no additional explanatory power.

3. Results of a post-sample analysis

On the basis of the within-sample analysis, it would seem that, on the whole, CCI is superior to RTI in terms of predicting the behaviour of different categories of consumption expenditure. Within this section, an attempt is made to determine whether or not this general finding is reinforced by the results of a post-sample investigation.

For the purpose of inferring whether or not RTI contains information that is additional to CCI, which serves to improve the quality of forecasts, a comparison is performed of the predictive performances of equations (1) and (3). For each of the consumption variables and each of the two equations, recursive estimation is undertaken, resulting in one-period-ahead forecasts being produced over the period, 2006Q1 – 2010Q4.

In order to test the null hypothesis that the forecasts which are generated by equation (1) encompass those which are obtained from equation (3), the value of the ENC-NEW statistic, which was devised by Clark and McCracken (2001), is computed:

$$ENC - NEW = n\left[\left(\frac{1}{n}\sum_{T+1}^{T+n} e_{it}(e_{it} - e_{jt})\right)/\left(\frac{1}{n}\sum_{T+1}^{T+n} e_{jt}^{2}\right)\right].$$

Regarding the above formula, n denotes the number of forecasts, T + 1 indicates the start date of the post-sample period, and e_i and e_j constitute the prediction errors corresponding to equations (1) and (3), respectively.

Table 4: Results obtained from post-sample analysis

Consumption Variable	Root Mean Square Prediction Error (2006Q1 – 2010Q4)		ENC-NEW Statistic
	Equation (1)	Equation (3)	
Δlog.(TOTAL)	0.0049	0.0053	-0.6093
Δlog.(DURABLE)	0.0288	0.0288	0.2239
Δlog.(SEMI)	0.0147	0.0159	-0.7922
Δlog.(NOND)	0.0117	0.0115	0.6046
Δlog.(SERVICES)	0.0070	0.0073	0.3015
Δlog.(VEHICLES)	0.0586	0.0578	0.4408

In connection with the ENC-NEW test, the critical values, corresponding to $k_2 = 3$ and $\pi = 0.2$, consist of: 2.144 (99 percentile); 1.525 (95 percentile), which have been obtained from Table 3 of Clark and McCracken (2000).
k_2 refers to the number of additional regressors in the unrestricted equation.
π denotes the ratio of the number of forecasts to the number of observations which are initially used in estimation.

Upon inspecting the contents of Table 4, it is apparent that, for two of the consumption variables, equation (3) is associated with a smaller root mean square error. However, when contrasting each of the computed values of the ENC-NEW statistic with the relevant critical values, in no situation is it possible to reject the null hypothesis. Hence, for all six of the consumption variables, the inference is drawn that the forecasts which emanate from equation (3) are encompassed by those which are derived from equation (1).

4. Conclusions

This paper has sought to compare the usefulness of alternative confidence measures for predicting household expenditure in the UK. The study is distinguished by a consideration of different forms of consumption and by conducting a post-sample, as well as a within-sample, analysis. In general, CCI has been seen to be more successful than RTI in explaining the within-sample variation that is exhibited by the consumption variables. The notion that RTI does not contain information, in addition to CCI, that is beneficial for predicting consumption expenditure was reinforced, having applied forecast encompassing tests.

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