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The contribution of consumer confidence indexes in forecasting the effects of oil prices on private consumption

Peter PRAET and Jef VUCHELEN
Free University of Brussels, 50 ave Franklin Roosevelt, 1050 Brussels, Belgium

Abstract: In this article the contribution of consumer confidence indexes in forecasting consumption expenditures is analysed. In the first part equations explaining the consumer confidence index (CCI) in four major European countries (Germany, Italy, United Kingdom and France) are estimated by a few exogenous variables (oil prices, interest rates, exchange rates and the U.S. stock market index) are estimated. In the next section these equations are used to forecast the CCI for 1986. We then present equations explaining private consumption by using the CCI. In the final section a comparison is made between forecasts of consumption expenditures for 1986 obtained by using the observed and the predicted CCI. The forecasts obtained by using the predicted CCI tend to overestimate the positive impact of the recent drop in oil prices on consumption expenditures. The conclusions support the view that consumer surveys do contain original information since their use reduces, in general, the forecasting errors.

Keywords: Consumer expenditures, Consumer surveys, Forecasting, Linear models.

1. Introduction

Several studies have attempted to assess the usefulness in econometric work of the information contained in consumer confidence surveys. Studies by Hymans (1970), Fair (1971), Shapiro (1972) and McNeil (1974) for the US and by Vanden Abeele (1983) for the main European Community countries conclude that indexes of consumer sentiment do not contain much useful information because they can be explained by a small number of economic variables. For example, Shapiro's model (1972) relates consumers' opinions to measures of aggregate economic activity, stock prices, and the rate of inflation. In Vanden Abeele's article (1983), the consumer confidence index is regressed against a national stock market index, an unemployment index, real disposable income, and a consumer price index. Only to a minor extent have these studies examined the impact of policy and internationally determined variables on consumer confidence. None has considered the extent to which consumers' opinions respond in a systematic way to exogenous shocks. These could originate in the international sphere (exchange rates, oil price or U.S. stock market) or be economic policy shocks (interest rates). The retained variables need to have some predictive value about the economic situation.

In the next section econometric results are presented which explain the consumer confidence index (CCI). Regression results for four European countries and samples ending in 1985, tend to support the view that consumer confidence indexes contain no information that cannot be approximated reasonably well by observed, measurable economic variables. A forecaster in need of forecasts for the CCI, could thus, at the end of 1985, predict consumers' mood in the periods ahead, by using expected changes of the explanatory exogenous variables. Out-of-sample forecasting errors for 1986 (section 3) indicate, however, that consumers did not react to observed changes in oil prices in a mechanistic way, perhaps due to different perceptions whether the changes that occured will be permanent. Because the observed

CCI can be used to forecast actual private consumption, it is interesting to compare such forecasts with the ones obtained with a predicted CCI (section 4). This gives an indication of the comparative advantage of incorporating the CCI in a forecasting exercise of private consumption. The conclusion stresses the usefulness of consumer surveys.

2. Explaining consumer confidence

The European Community's survey of consumer opinions began in the early 1970s on a thrice-yearly basis (January–May–October). Monthly data became available by October 1980 for the UK, June 1981 for Germany, and January 1982 for Italy. The questions relate only to directions of changes and not to numbers. The response frequencies on each question are summarized by the European Commission to obtain weighted average answers that are termed 'balances of opinions' (see Praet and Vuchelen (1984) for a more complete description). A consumer confidence index is then computed as the arithmetic average of the answers to five questions. These cover the present and expected financial situations of households, the general economic situation, present and expected; and the advisability of making major purchases. The selection of the survey questions retained in the confidence index as well as their respective weights were based on principal components analysis.

Although several attempts have been made to model consumers' opinions, no straightforward theoretical approach has been developed. The procedure followed consists in testing the significance of as many economic variables as possible. In selecting explanatory variables of consumers' opinions, one can choose between a structural approach, where use is made of variables which themselves intervene in traditional econometric consumption functions (e.g. disposable income), and a reduced form approach where only exogenous variables appear. This latter approach was followed in this article by including international variables, such as the oil price and the U.S. stock market index, and variables that can be considered instruments or indicators of economic policy and of the future economic condition (interest rates and exchanged rates). The drawback of this reduced form approach is, however, that the signs and magnitudes of the coefficients cannot always be established from an a priori point of view.

The most satisfactory regression results are presented in Table 1. In order to avoid fortuitous results as far as possible, quarterly changes and not levels were used for the variables as has often been the case in similar work. The results show that increases in the price of oil depress the CCI; the same occurs when the currency depreciates and interest rate rise. This could reflect fears of rising inflationary expectations. The effect of a rise in the stock market is positive in the equation for Germany but negative in the equation for the United Kingdom. This illustrates the ambiguous significance of increases in the stock market index.

Table 1
Regression results for the change in the consumer confidence index (a).

Country	Constant	Change in U.S. dollar quotation	Change in oil price	Change in money market rate	Change in bond rate	Change in US stock market index (1980 = 100)	Lagged level of CCI	R^2	h	D.W.
Germany	0.304	−6.875	−1.936	−1.110		0.191		0.50		1.85
	(0.52)	(−1.78)	(−4.94)	(2.53)		(2.10)				
United	−0.450		−1.452		−3.182	−0.253	−0.141	0.35	0.15	
Kingdom	(−0.35)		(−2.05)		(−2.90)	(−1.71)	(−1.71)			
Italy	−1.803		−1.220		−1.183		−0.117	0.37	0.07	
	(−1.11)		(−3.38)		(−2.75)		(−1.68)			
France	−0.652	−2.882	−2.950				−0.070	0.23	−0.39	
	(−1.32)	(−2.36)	(−1.67)				(−1.63)			

Notes (a) = all sample end in 1985-IV and start 1973-II except for the United Kingdom, 1974-III. R^2 = coefficient of determination. D.W. = Durbin–Watson autocorrelation statistic. h = Durbin's h autocorrelation statistic. Figures in brackets are t-values.

On the one hand this could indicate an expected upturn in the economic activity; on the other hand possible restrictive policy moves and/or a rising inflation rate. The negative coefficients of the level of the CCI could reflect a 'regression to the mean' effect. According to traditional statistical tests, the results appear to be satisfactory, except for France where variables are less significant and the coefficient of determination is relatively low.

These regressions allow, contrary to other research, for foreign influences (exchange rates, the oil price and the U.S. stock market index) and offer, therefore, an interesting link with what occurs on the international political and economic scene.

3. Consumer confidence and foreign shocks

The previous regression functions have been estimated for the period up to the end of 1985. Their forecasting performances are now tested for 1986. This period is extraordinary not only because of the magnitude of the drop in oil prices, more than $13 a barrel in the first quarter of 1986, but also because no large oil price decline was observed over the estimation period. Furthermore, exchange rates were also subject to important shocks. Table 2 summarizes the forecasting results.

The forecasting period was necessarily subdivided into two parts. For the first half of 1986, a period in which the oil price drop occured, the estimated models strongly overpredicted the actual changes in the consumer confidence index, except for Italy and the second quarter prediction for the U.K. A comparison of the forecasting errors with the size of the coefficient of the change in the oil price reveals a strong connection between both. The largest coefficient is observed in the equation for France, the lowest coefficient in the equation for Italy.

The predictions for the second half of 1986 are much more in line with what could have been expected on the basis of the regression results. Note, however, that the forecast errors are systematically positive for this period.

These results tend to show that consumers' confidence does not appear to respond in a mechanistic way to important changes in exogenous variables. It may make sense to collect information on consumers' opinions since such information cannot be deducted from other readily available data.

4. Consumer confidence indexes and the forecast of changes in private consumption

In this section we estimate, by using the CCI, simple models that explain quarterly changes of real private consumption. The models basically assume that consumers modify their consumption–income ratio in relation to their expectations

Table 2
Forecasts for the change in the consumer confidence index for 1986.

	Period	Observed change	Predicted change	Forecast error	Observed level confidence index
Germany	1986-1	4.3	20.0	−15.7	−0.3
	2	3.0	15.4	−12.4	2.7
	3	2.3	1.8	0.5	5.0
	4	0.3	−1.8	2.1	5.3
United	1986-1	−3.7	8.7	−12.4	−10.7
Kingdom	2	3.4	7.3	−3.9	−7.3
	3	2.6	−0.8	3.4	−4.7
	4	−0.7	−4.8	4.1	−4.0
France	1986-1	5.0	24.8	−19.8	−12.0
	2	−0.3	16.7	−17.0	−12.3
	3	2.6	2.1	0.5	−9.7
	4	6.3	−3.5	2.8	−16.0
Italy	1986-1	6.3	9.3	−3.0	−8.0
	2	4.7	8.5	−3.8	−3.3
	3	1.6	−0.4	2.0	−1.7
	4	−1.0	−2.7	1.7	−2.7

of the general or personal economic and financial situation as measured by the CCI. The regression results for sample periods ending 1985-IV are reported in table 3

In spite of the measurement problems inherent in consumer surveys, the models perform surprisingly well, given their simplicity. As a test for the specific contribution of the CCI, we compare now forecasts of changes in real private consumption for the first half of 1986, obtained with the observed CCI, to the forecasts obtained by using the predicted CCI (as in section 2). The latter results give an indication of what would have been actual consumption if consumers had behaved in a way consistent with previous experience. The six-month rates of growth listed in table 4 refer to the preceding period but are on an annual basis.

The main observation is that the rates of growth of private consumption that were forecasted for the first half of 1986 by using the actual CCI are much lower (except for the U.K.) than the growth rates one would have expected on the basis of past behavior. In Germany and France, private consumption growth was actually higher than expected on the basis of consumers' opinions but lower than if consumers had reacted in a mechanistic way to the drop in oil prices. Forcasts for the second half of 1986, obtained by using the actual CCI, are much more accurate than those obtained with the predicted CCI.

This indicates that the consumer confidence index is helpful in explaining the behavior of consumers. However its usefulness is impaired by the large forecasting errors observed for the first half of 1986. It must be recalled that some of the questions of the consumers' survey concern the *expected* economic conditions in the next twelve months, along with the question on the current economic condition. Empirical evidence has shown a strong correlation between the responses to both kinds of questions. In the first half of 1986 this was not observed, i.e., consumers seem to have been overly cautious in their declared opinions on the future. In their actual spending behavior, however, consumers may have decided to cash in on some of the terms of trade gains.

Table 3
Private consumption equations.

Germany (1973-II to 1985-IV)
$D_4C_t = 0.152\ \mathrm{CCI}_t - 20.322\ (C/YD)_{t-4}$
(10.43) (−16.62)
$R^2 = 0.85$ DW = 1.97

United Kingdom (1974-III to 1985-IV)
$D_4C_t = 0.204\ \mathrm{CCI}_{t-2} - 29.503\ (C/YD)_{t-4}$
(7.50) (−10.16)
$R^2 = 0.73$ DW = 2.01 $RHO = 0.096$

France (1973-II to 1985-IV)
$D_4C_t = 0.114\ \mathrm{CCI}_t - 22.300\ (C/YD)_{t-4}$
(3.95) (−10.51)
$R^2 = 0.94$ DW = 2.11 $RHO = 0.636$

Italy (1973-II to 1985-IV)
$D_4C_t = 4.409 + 0.104\ \mathrm{CCI}_{t-1}$
(3.49) (2.15)
$R^2 = 0.68$ DW = 1.69 $RHO = 0.800$

DC = the four period or annual difference of real private consumption (in logarithm), YD = disposable income (in logarithm), RHO = coefficient of correction for first order autocorrelation.

Table 4
Six-month rates of growth of real private consumption (%; annual rates).

	Observed	Predicted with	
		actual CCI	simulated CCI [a]
Germany			
1st half 1986	4.3	1.5	8.2
2nd half 1986	3.6	5.4	6.7
United Kingdom			
1st half 1986	4.3	−1.2	−1.0
2nd half 1986	5.1	4.6	10.6
France			
1st half 1986	3.7	−1.8	5.7
2nd half 1986	2.8	3.0	5.1
Italy			
1st half 1986	3.7	2.7	3.0
2nd half 1986	2.7	5.5	5.7

[a] Using the predicted changes as reported in table 2.

5. Conclusions

The usefulness of consumer surveys has often been denied in the past because they have contained no information that cannot be approached by directly observable variables. In this paper we showed that consumer confidence indexes do contain orginal information even if, for a given period of time, they can successfully be explained by a few exogenous variables. Our main conclusion is

that consumers' perceptions could have been usefully considered in assuming the effects of the drop in oil prices on private consumption, together with other information, including past responses to exogenous shocks.

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Biography: Peter PRAET is professor of economics at the Université Libre de Bruxelles and Associate Directior of the Institute of European Studies of the same university. He is a former staff member of the I.M.F. and editor of the review *Cahiers Economiques de Bruxelles*.

Jef VUCHELEN is professor of economics at the Vrije Universiteit Brussel and is Director of the Center for Econometrics and Management Science. He is the European editor of the monthly review *Economic Forecasts, a World Wide Survey*.