Consumer confidence indicators

and private consumption expenditure

in 13 OECD countries

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Abstract

Consumer confidence indicators are frequently used by forecasters of the business cycle. This paper examines the predictive power of such indicators in predicting aggregate private consumption expenditure in 13 OECD countries. There is clearly a high degree of correlation between these indicators and private consumption expenditure in the data. However, an evaluation of the forecasting performance of the indicators should be done with reference to reasonable benchmark models. In this paper indicators are added to five different consumption models and the predictive power of the indicators are examined. If the indicators help predict consumption expenditure, independently of the information set used, it is considered useful. A distinction is done between indicators available simultaneously with other data and indicators known in advance. The evaluation is done by comparing predictive performance both within and out-of-sample. The results show that the confidence indicators help predict consumption for some countries, especially when the indicator is known in advance. However, it is also shown that when there is an improvement of the within-sample standard error of the regression or the out-of-sample RMSE it is quite small and economically insignificant.

1. Introduction

The life cycle-permanent income hypothesis (LCH) is the almost completely dominant economic theory for explaining aggregate private consumption expenditure as described by the national accounts. The LCH describes the behaviour of a consumer that maximises the expected discounted utility of future consumption with respect to an intertemporal budget constraint. The solution of this problem gives a structural consumption function in which consumption depends on wealth (human as well as non-human) of which a fraction is consumed each period. This fraction sometimes defines permanent income and can be interpreted as that annuity value of wealth that the consumer can spend each time period for the rest of expected life time.

Alternatively, a consumption function may be derived in which the maximisation problem is not solved but is directly derived from the first-order condition regarding a variation between two time periods. The consumption functions derived in this way are often called Euler equations, starting with the seminal paper by Hall (1978). In this paper we shall use the Euler equation approach to test whether the information collected in consumer surveys, consumer confidence indicators, improve models derived from the LCH.

In this paper we test this proposition by adding consumer confidence indicators to simple Euler equations derived from the LCH with the rational expectations hypothesis. This is Benchmark Model 1 and analyses if and to what extent this can help predict future consumption levels in 14 OECD countries.

Besides Euler equations derived from the LCH consumption functions based on the error correction form are very common. This approach started with the paper by Davidson, Srba, Hendry, and Young (1978) and is very common in applied work. We use a simple version of the error correction model including real disposable income and real financial net wealth as explanatory variables alongside the confidence indicators. This is Benchmark Model 2.

Finally, we make use of a more specialised model in which we introduce additional variables like the rate of inflation and/or the rate of unemployment. Here, we also add dummy variables to capture extraordinary events not captured by the included explanatory variables. This is Benchmark Model 3. The first two benchmark models are very simple and if there is much information content in the confidence indicators, they surely should add something to these models. Benchmark Model 3 is more elaborated and adapted to each country so it is not so evident that the confidence indictors add much to this model. However, we adapt the criterion suggested e.g. by Hsiao (1975) that for the confidence indicators to be causative with respect to private consumption they should be so *irrespective* of the particular information set used.

The paper is organised as follows. The next section describes the benchmark models desribed above. Section 3 describes the confidence indicators. The fourth section describes the tests of the predictive power of confidence indicators. The final section summarises and concludes.

2. The Benchmark Models

(i) Benchmark Model 1: Simple Euler Equation

The first seminal paper on the Euler equation (first-order condition) approach is the 1978 *JPE* paper by Robert Hall. We use that model as the first benchmark model. Hall from the first-order condition assuming rational expectations and a quadratic utility function $u_t = -\frac{1}{2}(c_t - \bar{c})^2$, where $\bar{c}$ is the bliss consumption level, derives the regression equation $c_{t+1} = a_0 + a_1 c_t + \varepsilon_{t+1}$. c_{t+1} is aggregate consumption expenditure at time t+1, $a_1 = \frac{1+\beta}{1+r}$ where β is the constant subjective discount rate and r the constant real rate of interest and $a_0 = (1-a_1)\bar{c}$. He also tested the life cycle hypothesis by adding lagged real disposable income and lagged equity prices. He found that lagged equity prices were significant, hence rejecting the hypothesis, but lagged income insignificant, thereby not supporting the notion of liquidity-constraints (Flavin, 1981). Finally, if durables are included in consumption expenditure, then an MA term should be added to the equation, as shown by Mankiw (1982).

Denote the confidence indicator at time t by I_t. Then the first test of the predictive power of the indicator is done in the equation

$$c_{t+1} = a_0 + a_1 c_t + a_2 y_t + a_3 w_t + a_4 I_t + \varepsilon_t + \varepsilon_{t+1} \qquad (1a)$$

where w_t is real financial net wealth at time t. Confidence indicators are published frequently and are often known before other variables that rely on national accounts statistics. Therefore the second test checks whether prior information improves prediction in the equation

$$c_{t+1} = a_0 + a_1 c_t + a_2 y_t + a_3 w_t + a_5 I_{t+1} + \varepsilon_t + \varepsilon_{t+1} \qquad (1b)$$

The very weak test is in (1a). If $a_4 \neq 0$ then the life cycle hypothesis in this version is rejected. The test in (1b) does not reject the hypothesis but rather tests if prior information on the confidence indicator helps predict aggregate consumption expenditure.

(ii) Benchmark Model 2: Simple Error Correction Model

Error correction models have been used extensively as consumption functions, notably by Davidson, *et al* (1978). We use the following simple model as benchmark and perform similar tests as above.

$$\Delta c_{t+1} = \beta_0 + \beta_1 \Delta c_t + \beta_2 \Delta y_t + \beta_3 \Delta w_t + \beta_4 c_t + \beta_5 y_t + \beta_6 w_t + \beta_7 I_t + \varepsilon_{t+1} \quad (2a)^1$$

and

$$\Delta c_{t+1} = \beta_0 + \beta_1 \Delta c_t + \beta_2 \Delta y_t + \beta_3 \Delta w_t + \beta_4 c_t + \beta_5 y_t + \beta_6 w_t + \beta_7 I_{t+1} + \varepsilon_{t+1} \quad (2b)$$

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[1] Note that this can be written in error correction form as $\Delta c_{t+1} = \lambda_0 + \beta_1 \Delta c_t + \beta_2 \Delta y_t + \beta_3 \Delta w_t + \delta(c_t - \gamma_0 - \gamma_1 y_t - \gamma_1 w_t) + \beta_7 I_t + \varepsilon_{t+1}$. In the model above then $\beta_0 = \lambda_0 - \delta\gamma_0$, $\beta_4 = \delta$, $\beta_5 = -\delta\gamma_1$ and $\beta_6 = -\delta\gamma_2$.

(iii) Benchmark Model 3: Elaborated Error Correction Model

Finally, I try to improve the error correction models in (ii) by using additional relevant information for consumer behaviour. It has been suggested (??) that the rate of inflation, π, may capture intertemporal substitution behaviour and the rate of unemployment, u, as a proxy variable for income uncertainty (??). Also, extreme events like the switch from fixed to flexible exchange rate, might call for the use of dummies. Denote these additional variables by X. We then get the test equations

(2a) + X (3a)

(2b) + X (3b)

In the evaluation it is asserted that for a consumer confidence indicator to be acceptable as a predictor of private consumption expenditure it should help predict consumption *irrespective* of the particular information set used. This approach was defined by Hsiao (1982) in the case of VAR models and adopted by Assarsson (1984). In this paper this means that the consumer confidence indicator should help predict consumption in either of the three benchmark models used.

1. Empirical results

Table 1. Summary of results from regressions with consumer confidence indicators. The figures show the percentage improvement in the standard error of the regression equation induced by the confidence indicator. A * indicates if the indicator is statistically significant at least at the five percent significance level.

Country	Estimation period	Simple model				Error correction model			
		t-1 information		t information		t-1 information		t information	
		CCI	Own	CCI	Own	CCI	Own	CCI	Own
Belgium	1985-1999	1.8	0	4.1 *	0	1.2	0	3.6 *	0
Denmark	1980-2000	4.5*	-6.8 ♣	5.2*	-6.2 ♣	4.6 *	0 ♣	4.1 *	0 ♣
Finland	1987-2000	14.6♦	8.1 *	15.8♦	13.4 *	10.6♦	7.9	10.1♦	15.2 *
France	1973-2000	22.5	39.4*♣	21.4 *	41.8*♣	1.0	20.4♣	1.0*	23.2*♣
Germany	1973-2000	0	0 ♣	0	0 ♣	0	0 ♣	0	0 ♣
Ireland	1977-2000	0	27.7 ♣	1.8 *	29.7 ♣	0	14.1 ♣	0	14.3 ♣
Italy	1973-2000	6.7 *	18.5*♣	11.0*	24.0*♣	0	6.7 ♣	2.8*	9.6 ♣
Japan	1971-1999	NA	0	NA	0	NA	0.8	NA	0
Netherlands	1985-1998	21.8	20.3	20.7	22.5	28.1	25.3	25.7	26.9
Portugal	1986-1997	0	0	0	0	0	0	0	0
Spain	1986-1999	17.2*	18.4*	22.5*	23.9*	10.5*	12.5*	14.9*	17.0*
Sweden	1974-2000	55.5 ♦	11.9*	56.0 ♦	14.0*	41.1 ♦	4.7*	42.5 ♦	5.2*
UK	1987-2001	8.7*	7.3*	12.0*	5.0*	3.1*	4.2*	7.9*	4.4*
USA	1978-2001	10.1	12.6*	14.7*	10.7	5.6	7.6*	10.0*	6.2

♣) 1985-2000 ♦) 1995-2000

Table 2. Information and general consumer confidence indicators.						
Country	t-1 and t		t, not t-1		t-1, not t	
	Simple model	ECM model	Simple model	ECM model	Simple model	ECM model
Belgium			*	*		
Denmark	*	*				
Finland						
France			*	*		
Germany						
Ireland						
Italy	*			*		
Netherlands						
Portugal						
Spain	*	*				
Sweden						
UK	*	*				
USA			*	*		

Table 3. Information and consumer confidence indicator of own economy.						
Country	t-1 and t		t, not t-1		t-1, not t	
	Simple model	ECM model	Simple model	ECM model	Simple model	ECM model
Belgium (-)						
Denmark (-)						
Finland	*			*		
France	*			*		
Germany (-)						
Ireland (-)						
Italy	*					
Netherlands (-)						
Portugal (-)						
Spain		*	*			
Sweden	*					
UK	*	*				
USA					*	*

Table 4. Information in elaborated model and consumer confidence indicators. Per mill improvements in the standard error of the regression equation are given.												
Country	t-1 and t				t, not t-1				t-1, not t			
	General		Own economy		General		Own economy		General		Own economy	
	Sign	Impr	Sign	Impr	Sign	Impr	Sign	Impr	Sign	Impr	Sign	Impr
Belgium (-)												
Denmark	*	0.60	*	0.64								
Finland							*	0.53				
France (-)												
Germany	*	0.32										
Ireland (-)												
Italy	*	0.07										
Netherlands (-)												
Portugal (-)												
Spain	*	0.68	*	0,69								
Sweden			*	0.85								
UK			*	0.49								
USA					*	0.12						

Table 5. Results from one-year-ahead out-of-sample dynamic forecasts. Figures show RMSE for one-year-ahead forecasts with and without consumer confidence indicator.								
Country	t-1				t			
	General		Own economy		General		Own economy	
	Without	With	Without	With	Without	With	Without	With
Belgium (-)								
Denmark								
Finland								
France (-)								
Germany								
Ireland (-)								
Italy								
Netherlands (-)								
Portugal (-)								
Spain								
Sweden								
UK								
USA								