

# **CONSUMER CONFIDENCE INDICES AND SHORT-TERM FORECASTING OF CONSUMPTION<sup>1</sup>**

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**Abstract:** Recently there has been growing interest in examining the potential short-term link between survey-based confidence indicators and real economic activity, notably for macroeconomic policy making. This paper builds on previous studies to establish whether there is a short-term predictive relationship between measures of consumer confidence and actual consumption, that could be used for forecasting, in a range of major industrial countries. It then extends such previous analyses by assessing whether this relation has changed over time, and whether we can attribute any time-varying relation to structural developments in the economy, such as financial deepening and the increasing role of house prices in determination of consumption.

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## I. Introduction

Econometric work has traditionally shown that measures of consumer confidence are highly correlated with real consumption (see Carroll et al., 1994), and more tentatively may have some short-term forecasting ability. Recently, there has been a renewed interest in examining the potential link between survey-based confidence indicators and real economic activity (see Ludvigson, 2004, for example). This interest stems from the frequent reference to such measures in leading economic commentary – and increasingly in policymaking circles<sup>3</sup> – as “contributing” to current macroeconomic conditions and hence implicitly of relevance to forecasting.

This paper builds on previous studies – which are mainly of the US - to first assess using a long period of data for 5 countries whether there is on average a short-term predictive relationship between measures of consumer confidence and actual consumption, in the presence of key addition determinants of consumption over the same time horizon. We then extend previous analyses to assess whether this relation has changed over time, and whether we can attribute any time-varying relation to structural developments in the economy, notably financial deepening<sup>4</sup> and a heightened role of the housing market, both of which may relate to changing liquidity constraints and scope for consumption smoothing.

In this context, we contend that the exercise of determining whether a relation between confidence and consumption exists, and if it has indeed changed over time due to structural features, provides useful information for forward-looking policymakers. Our main result is that the role and information content of confidence indicators has generally declined, and that

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<sup>3</sup> For example, in April 2006 Lucas D. Papademos, Vice-President of the European Central Bank, hinted at future interest rate moves in the following statement: “We see from indicators, hard data as well as survey data, that the expected recovery of economic activity will take place”.

<sup>4</sup> Financial deepening is not the only possible structural influence, as both ongoing structural reforms in labour and product markets and rising concerns related to the implications of aging could impact on consumption and its link to surveys through their effects on the confidence consumers have in their income prospects.

policy makers should be wary of reading too much into them when evaluating short-term prospects for the future.

The paper is structured as follows; after a brief overview of existing work, we begin our statistical analysis by drawing upon standard statistical techniques to establish a relation between measures of consumer confidence and consumption. The analysis benefits from a rich quarterly dataset spanning 33 years (1973-2005) for Germany, Italy, France, the UK and the US. The methodology is first to derive simple correlations, before testing for pairwise Granger causality, both in the light of unit root tests (since confidence is a stationary variable, it is not appropriate to include cointegrating relationships in our testing). Also in the light of this finding, we establish whether there is a causal relation between confidence and log first differences of major determinants of consumption: real personal disposable income (RPDI) and real net financial wealth (RNW), which includes equity-based wealth and bonds whose values change with interest rates and expected future profits. These variables are chosen due to their presence in typical consumption functions in working macroeconomic models (see for example Barrell and Davis 2006), accordingly we do not include other candidates such as unemployment that have generally not been included in determination of consumption in such models. Furthermore, as shown in the definitions in Appendix 3, there is already an effect of unemployment on confidence within the index for all the countries surveyed.

We go on to assess whether the Granger causality relation for confidence and consumption changes when these other key variables are included – conditional Granger causality – by conducting redundancy tests on confidence in the context of multivariate ARMA (autoregressive moving average) specifications. We conduct rolling regressions and variable redundancy tests with a 15 year window to assess whether the importance of confidence changes over time with conditional Granger causality regressions, plotting P-values of F-tests

over time. Using a measure of financial liberalization utilized in Barrell and Davis (2007) and housing prices, we seek to assess whether these variables have a role in the changing relationship of confidence to consumption, and whether any residual conditional causality can still be detected in the most recent period.

## **II Background**

Eppright et al (1998) discuss behavioral reasons why confidence as measured by surveys could affect consumption per se, notably in the presence of uncertainty. They find that negative shocks can worsen confidence disproportionately, thus inducing a self fulfilling downward shift in confidence and consumption. Indeed, studies such as Haugh (2005) find a particular predictive power of confidence at times of recession, while Garner (2002) shows that some adverse political events such as the 1991 Gulf War affected confidence, while others such as 9/11 did not. (Following the previous point, this may link to the fact that the Iraq war broke out during a recession while 9/11 was not in a recession period.)

Heuristically speaking, confidence cannot determine consumption in the long run since people cannot go on being excessively (lacking in) confident forever, as by construction confidence is a relative measure, and we might expect it to be stationary. Nevertheless, a number of empirical studies, such as Fuhrer (1993), Carroll et al (1994), Bram and Ludvigson (1998) have found that confidence measures improve short-term forecasting of consumption. All of these studies have focused on the US and studies of other countries are sparser. One exception is Nahuis and Jansen (2003) who find a complementary role for retail trade confidence in a number of EU countries.

Recent work has focused closely on conditional causality of consumer confidence, i.e. in the context of other relevant variables for prediction of consumption. Looking at Australian data, Roberts and Simon (2001) find that when currently available economic information is filtered from the confidence indicators, the latter fail basic Granger causality tests for predictive power. Ludvigson (2004) for the US also finds that much of the information from surveys is present in other key economic and financial indicators, such as labour income growth, real share prices and three month treasury bill rates. He suggests that the remaining predictive power of confidence indicators reflects their ability to forecast future labour income and non stock market wealth, although there remains a residual part of confidence's forecasting ability that cannot be attributed to this. Including confidence in an error-correction model of consumption, income and financial wealth, Pain and Weale (2001) found only contemporaneous confidence significant in the UK, but like Ludvigson did find a lagged effect in the US.

A priori reasoning suggests that the importance of confidence measures in explaining consumption growth may change over time, notably as scope for consumption smoothing changes. This might for example eliminate the lagged relationship between confidence and consumption. Background to a possible impact of declining liquidity constraints on the relation of confidence to consumption can be gleaned from studies such as Al-Eyd and Barrell (2005) and Barrell and Davis (2007) which show that consumption's relationship to its traditional determinants of income and financial wealth has not been invariant to structural change in the financial system.

Work on this aspect is sparse, although Berry (2004) does show that the contemporaneous relation between UK confidence and consumption is not stable. He looks at rolling contemporaneous correlations at 5 and 10 year intervals showing that these correlations

change over time, weakening in recent years. It would be a paradox if increasing reference to measures of confidence in leading economic commentary coincides with a decline in usefulness of confidence for forecasting due to easing of liquidity constraints over time. Such a result – the veracity of which we now go on to assess - would be of considerable relevance for policymakers.

### **III Preliminary statistical analysis**

Details of the variables used and the consumer confidence definitions are given in Appendices 2 and 3. It can be seen that both in the US and the four EU countries surveyed, the indices include questions regarding real economy, financial and employment conditions. It would then be perhaps unwise to include separate indicators for these influences when looking at the determinants of the evolution of consumption. The construction methodology is identical across the four EU countries, and comparable between them and the US.

In order to assess forecasting ability of confidence, information on the stationarity properties of the data is required. Details of ADF tests and orders of integration are given in Table 1. We should note, that as expected, confidence is a ‘bounded series’ meaning that it cannot trend over time, although it may within a finite subsample. The results show that logs<sup>5</sup> of real net wealth (RNW)<sup>6</sup>, real personal disposable income (RPDI) and real consumption (C) are all I(1) variables and therefore require differencing for stationarity. Meanwhile, confidence (CONF) is an I(0) variable for all countries as it is stationary at least at the 5% level of significance for Germany, France, Italy and the UK, and at the 10% level for the US.

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<sup>5</sup> As suggested by Campbell and Deaton (1989), real income (as well as consumption and wealth) in levels is unlikely to be difference stationary. In particular, the first difference of the level of income does not display constant variance; earlier increases in the level of income, in any reasonable sample of data, are likely to be substantially less than increases later in the sample.

<sup>6</sup> Net financial wealth includes deposits with minus loans from financial intermediaries, personally held equities and bonds and assets in pension funds. See data appendix.

Accordingly, causality and predictive testing is appropriately between the level of confidence and the differences of consumption, income and wealth. This also implies that a VAR or VECM approach is inappropriate for assessing confidence since we do not have a set of I(1) variables that may cointegrate. Instead, we may adopt a simple autoregressive moving average (ARMA) approach as detailed below.

**Table 1: Unit root tests (Augmented Dickey-Fuller)**

	Germany	France	Italy	UK	US
LRNW	-1.4	0.08	-0.1	-0.3	0.1
DLRNW	-10.8***	-8.8***	-12.2***	-9.9***	-11.1***
LC	-1.7	-1.2	-2.1	1.4	1.3
DLC	-3.2**	-5.0***	-4.8***	-4.6***	-8.9***
LRPDI	-1.3	-0.25	-4.1**	0.7	0.1
DLRPDI	-12.5***	-12.6***	-4.4***	-15.7***	-13.8***
CONF	-7.5***	-3.2**	-2.9**	-3.6***	-2.6*

\*\*\* 99% significance, \*\* 95% significance; \* 90% significance

In the light of these results, and as a further descriptive statistic, Appendix 1 shows contemporaneous correlations between levels of confidence, and the first difference of the log of consumption, income and wealth. There is a positive contemporaneous correlation of confidence and consumption averaging 0.275 (only that of income and consumption is higher on average at 0.348). However, a contemporaneous correlation is irrelevant for forecasting, for which significant lags are needed, and we can utilize an equation of the form

$$\Delta \ln c_t = \alpha + \sum_{j=1,4} \beta_{1j} \Delta \ln c_{t-j} + \sum_{j=1,4} \delta_{1j} conf_{t-j} + \nu_t \quad (1)$$

This equation allows us to undertake bivariate Granger causality analysis, testing for the significance of such lags of an “indicator” in an autoregression on the “target” gives a first indication of forecasting ability. Following tests of lag length we chose a maximum of 4 for the target and the forecasting variable. This is, however, unconditional and excludes the possible influence of other variables on the “target”. Using F tests for deleting all the lagged terms for confidence in Table 2 shows that confidence has a significant Granger causality on consumption over 1973-2005 in all countries except Italy, albeit only at 10% in France, which

is on the face of it supportive of a short-term forecasting potential for confidence. There are also some reverse causality, with confidence Granger caused by consumption in the US and at 10% in Italy.

**Table 2 Bivariate F tests of the relationship between consumption and confidence**  
F test for deleting CONF (-1 to -4) in row 1 or DLC (-1 to -4) in row 2 from equation 1

	Germany	France	Italy	UK	US
<b>CONF&gt;DLC</b>	0.0002***	0.052*	0.455	0.017**	0.024**
<b>DLC&gt;CONF</b>	0.875	0.43	0.07*	0.284	0.022**

Key: See Table 1. DLC: change in the log of real consumption, CONF: confidence indicator  
. Confidence level \*\*\* 99% \*\* 95% \*90%

If we undertake more comprehensive bivariate tests including real personal disposable income and real net financial wealth, we see (in the appendix) that confidence also Granger causes income in Germany, the UK and US, and wealth in the US. There is reverse causality from wealth to confidence in the US. These indicate a more complex relation than simple Granger causality can cater for, so we proceed to more complex, conditional analyses.

#### IV Methodology and results

In order to examine the time series properties of the determinants of consumption we specify an ARMA equation with consumption, confidence, income and wealth and undertake variable exclusion tests on confidence. This enables us to find whether there is a residual forecasting ability of confidence when income and wealth are included, i.e. it is a conditional test. The full equation is as follows, where again j=4.

$$\begin{aligned} \Delta \ln c_t = & \alpha + \sum_{j=1,4} \beta_{1j} \Delta \ln c_{t-j} + \sum_{j=1,4} \beta_{2j} \Delta \ln rrdi_{t-j} + \sum_{j=1,4} \beta_{3j} \Delta \ln rnw_{t-j} \\ & + \sum_{j=1,4} \delta_{1j} conf_{t-j} + v_t \end{aligned} \quad (2)$$

Such conditional Granger causality tests seek to show whether we can exclude confidence from the ARMA when other variables are included. Accordingly, the figures quoted in Table

3 below are variable exclusion F tests for CONF(-1) to CONF (-4). Bearing in mind the result quoted above, that in a simple bivariate case Granger causality is present in all countries except Italy, we find some notable differences. Inclusion of the change in the log of income (DLRPDI) alone excludes confidence in France and the UK, while inclusion of the change in the log of real net financial wealth (DLRNW) alone eliminates confidence in the US. Consistent with these results, the inclusion of both income and wealth excludes confidence in all countries except Germany. The results imply that confidence is proxying wealth in the more financially liberalised US, and income in France and the UK.

**Table 3: Conditional Granger causality for Confidence given Income and Wealth**  
(F test for exclusion of CONF (-1 to -4))

	Germany	France	Italy	UK	US
<b>With DLRDPI (-1 to -4)</b>	5.39 (0.0005)***	1.09 (0.362)	0.64 (0.638)	2.4 (0.054)	2.75 (0.031)**
<b>With DLRNW (-1 to -4)</b>	5.67 (0.0003)***	2.54 (0.043)**	0.85 (0.494)	2.9 (0.025)**	1.48 (0.210)
<b>With both</b>	5.02 (0.0009)***	1.50 (0.205)	0.54 (0.709)	2.18 (0.075)	1.40 (0.238)

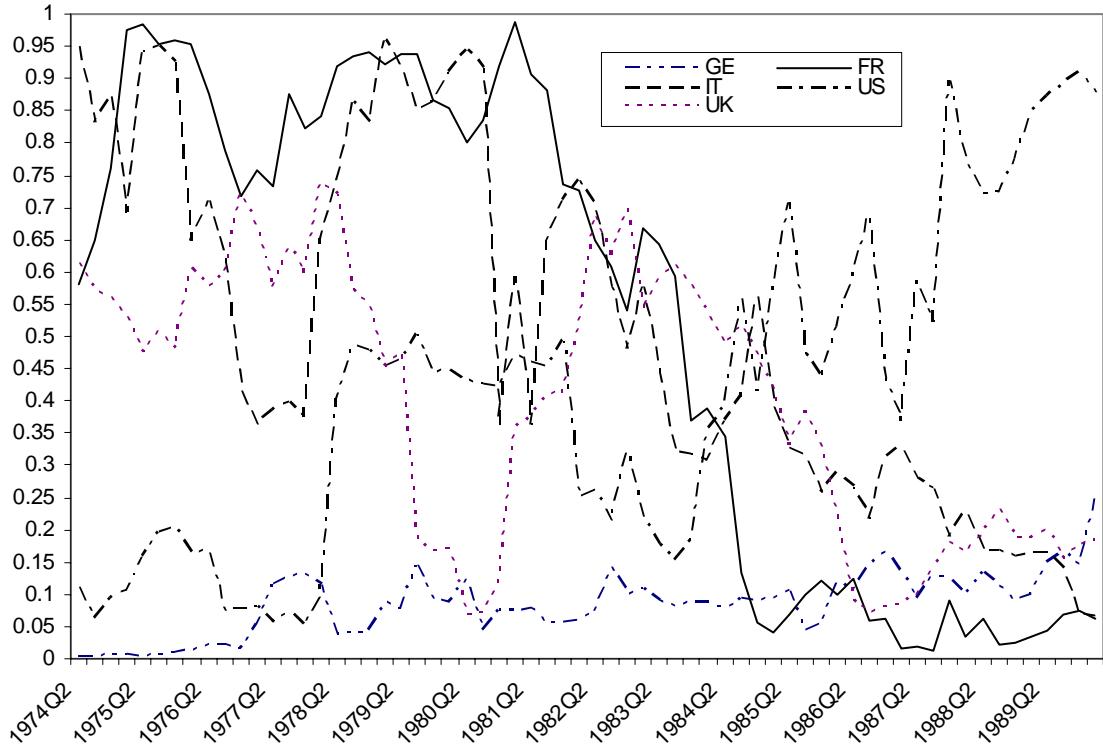
Notes: See Table 1. Based on 4 lags of each variable, the null hypothesis is of no causality. \*\*\* 99% \*\* 95%

Given the length of our sample, it is likely that the role of confidence may have changed over time. As noted, with the development of domestic financial systems the ability of households to smooth their consumption has increased, perhaps weakening the advance ‘link’ between confidence and actual spending, as it also has between real income and consumption (see Barrell and Davis 2007). We approach this issue by first conducting a series of rolling regressions and related variable redundancy tests on confidence in order to see if its importance has changed over time. We employ the full specification from the conditional Granger causality VAR tests in Table 3 (i.e. including consumption, wealth and income), and we choose a window length of 15 years allowing us approximately 64 separate regressions and observations. Figure 1 plots over time the associated P-Values from rolling redundancy tests using an F test.<sup>7</sup>

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<sup>7</sup> It should be noted that the likelihood ratio test provides very similar results to these.

**Figure 1: P-Values for F-Statistics from redundancy tests on CONF (-1 to -4) for each country taken from 15 year Rolling Regressions including DLC, DLRNW and DLRPDI (dates on X axis show start date of regression)**



We see that for France and Italy confidence has increased in significance in the consumption regression over this period. In contrast, in the US and Germany confidence has decreased in significance, markedly so in the US from the early 1980s. Meanwhile we see that in the UK, confidence has had periods where it has increased and periods where it has decreased as a driver of consumption. The general trend, however, is for UK confidence to have increased as a driver of consumption, albeit rarely reaching conventional significance levels over this 15-year window.

We complemented the rolling regressions with variable-exclusion tests for the CONF lags in the two halves of the sample and found similar results. We note that for the UK, neither half of the sample shows the variables jointly significant, although the full sample does, albeit at 90% only. For France and Italy the second half of the sample is perhaps significant as the test is passed at the 90% level. For Germany confidence is significant at the 99% level in the first

half of the sample, whilst not being significant in the second half. For the US the test of the significance of confidence is passed the first half, albeit at only the 90% level of confidence. These results confirm the graphical summary of the previous results presented in Figure 1.

**Table 4: Sub-period Conditional Granger causality test for Confidence**  
(F test for exclusion of CONF (-1 to -4) from equation including DLC, DLRPDI and DLRNW)

	Germany	France	Italy	UK	US
Full sample	5.02 (0.0009)***	1.50 (0.205)	0.54 (0.709)	2.18 (0.075)*	1.40 (0.238)
1973-1989	4.82 (0.002)***	0.7 (0.59)	0.25 (0.91)	0.8 (0.53)	2.32 (0.07)*
1990-2005	1.44 (0.24)	2.23 (0.08)*	2.5 (0.056)*	1.25 (0.3)	0.36 (0.84)

Notes: Based on 4 lags of each variable, the null hypothesis is of no causality . \*\*\* 99% \*\* 95% \* 90%

These results confirm that there might be a weak role for confidence in short run forecasting of consumption in some time periods, and we therefore seek to assess economic factors underlying the potential shifts in the role of confidence. As noted, the role of confidence could have changed over time in these countries due to financial deepening which increases the scope for consumption smoothing. We investigate using financial liberalization dummy variables. We also explore a role for house prices since in a liberalised housing market, the relation between confidence and consumption may be disturbed if borrowing is facilitated. Both these variables are included in variants of working consumption functions, as in Barrell and Davis (2007), and are commonly seen as driving consumption. Other variables that might seem useful in a causality test, such as unemployment, are not normally considered as relevant in such studies, and are already encompassed in the questions, as we discuss in the annex on consumer confidence definitions.

First, the ARMA from (1) is estimated with a term capturing the process of financial deepening ( $Finlib_{it} * conf_t$ ), where  $i$  denotes each country in our sample

$$\begin{aligned}\Delta \ln c_t = & \alpha + \sum_{j=1,4} \beta_{1j} \Delta \ln c_{t-j} + \sum_{j=1,4} \beta_{2j} \Delta \ln rpd_i{}_{t-j} \\ & + \sum_{j=1,4} \beta_{3j} \Delta \ln rnw_{t-j} + \sum_{j=1,4} \delta_{1j} conf_{t-j} \\ & + \sum_{j=1,4} \delta_{2j} finlib_{it} * conf_{t-j} + v_t\end{aligned}\quad (3)$$

The term capturing the process of financial deepening,  $\text{finlib}_{it}$  is drawn from Barrell and Davis (2007) who calculate this process based on announced reform packages. The dummies are based on the dates of liberalisation provided in OECD (2000), as shown in Appendix Table 3, using judgement as to which is the key date, at times selecting from a number of successive measures. The dummies are distributed from 0.0 prior to liberalisation to 1.0 five years after, with the transition being in the form of an ogive imposed to conserve degrees of freedom. Five years is consistent with typical analyses of the time required for liberalisation to have a full effect, notably in terms of completion of the “stock adjustment” rise in the household debt/income ratio. Note that this does not allow for a reversal of liberalisation , and also imposes the same length of the transition process on all countries, which will not be precise.

**Table 5: Conditional Granger causality on Confidence with liberalisation**

(F test for exclusion of CONF\*FINLIB (-1) to (-4) from equation including  
DLC, CONF, DLRPDI and DLRNW)

Germany	France	Italy	UK	US
1.37 (0.25)	1.51 (0.2)	0.26 (0.9)	0.77 (0.55)	2.83 (0.028)**

Notes: Based on 4 lags of each variable, the null hypothesis is of no causality

\*\*\* 99% \*\* 95% \* 90%

Table 5 indicates that financial liberalisation has not changed the relationship between consumption and confidence in four of the countries but in the US the financial liberalisation period marks a change in the coefficients on confidence. After liberalisation the significant coefficients on lagged confidence are opposite in sign to (and approximately the same in absolute value than) the coefficients on confidence, negating the effect it might have had before liberalisation took place. This result is consistent with that above showing that confidence is insignificant in the 1990-2005 period.

As regards house prices, we specify these I(1) variable in differences of logs (denoted as DLPH in Table 6), giving it the same dimensionality as consumption, wealth and income. As

shown in Table 6, their inclusion changes the results as compared with Table 4. Positive effects from confidence that had appeared previously to be present, albeit at the 10% level for the whole sample for the UK and for the recent period in France are now absent, implying that confidence is closely linked to house prices in those countries. In the first half of our sample confidence remains significant in the US regression even when we include house price effects. In the most recent period it is only in Italy that there is strong evidence of current forecasting ability of consumer confidence, and this is the country where collateralisation of housing remains very difficult, and it is also the country where financial markets are least liberalised.

**Table 6: Conditional Granger causality test on consumption with house prices**  
(F test for exclusion of CONF (-1) to (-4) from equation including C, DLRPDI, DLRNW and DLPH)

	Germany	France	Italy	UK	US
Full sample	4.8 (0.0013)***	1.0 (0.4)	0.71 (0.59)	1.66 (0.16)	0.66 (0.63)
1973-1989	5.4 (0.0014)***	0.48 (0.75)	0.27 (0.89)	0.38 (0.82)	2.24 (0.08)*
1990-2005	1.8 (0.15)	1.82 (0.14)	2.77 (0.04)**	1.46 (0.23)	0.52 (0.72)

Notes: Based on 4 lags of each variable, the null hypothesis is of no causality \*\*\* 99% \*\* 95% \* 90%

The result for Germany of a decline in forecasting power of confidence remains unexplained by the Granger Causality test equations augmented by financial liberalisation and house pricing, which is unsurprising since the regulation of the financial system has been little changed over the 1973-2005 period (interest rate and balance sheet regulation of banks was liberalised in the 1960s) while limits on mortgage loan-to-value ratios and high transactions costs limit use of housing for consumption smoothing. Our suggestion is rather that the reunification of Germany at the point of the sample split led to a structural break in the link of confidence to consumption, which is supported by the jump towards insignificance of confidence in Chart 1 above.

It was noted in the literature survey that some significant links have been found in the US between confidence and consumption during periods of economic downturn. Accordingly, in Table 7 to check robustness we show a test whether low confidence (i.e. below the sample mean) retains a predictive power in the 1990-2005 equation with house prices. We accordingly test for exclusion of a variable which is equal to confidence when it is below the mean and zero otherwise, similar to the financial liberalisation variable above. Note that a significant result could either augment or offset an existing confidence effect, or generate a significant result where the level of confidence is insignificant. As shown, there is no evidence in the most recent period 1990-2005 of asymmetrically-significant confidence, even in Italy, so the key result of Table 6 continues to hold that only in Italy is confidence still significant for forecasting in the presence of income, wealth and house prices. There is also no evidence of asymmetry in 1973-89 for any country, although there is some evidence of a differential asymmetric effect for Italy and the UK over the whole sample.

**Table 7: Conditional Granger causality of asymmetric confidence effects**  
 (test for exclusion of CONF\*LOW (-1) to (-4) from equation including  
 DLC, CONF, DLRPDI, DLRNW and DLPH)

	Germany	France	Italy	UK	US
Full sample	0.32 (0.87)	0.82 (0.52)	2.02 (0.1)*	2.82 (0.03)**	2.0 (0.11)
1973-1989	0.42 (0.79)	1.15 (0.34)	1.52 (0.22)	2.05 (0.11)	2.02 (0.12)
1990-2005	1.23 (0.31)	0.77 (0.55)	2.02 (0.11)	0.5 (0.73)	0.44 (0.78)

Notes: Based on 4 lags of each variable, the null hypothesis is of no causality \*\*\* 99% \*\* 95% \* 90%

Given the results suggesting there is little or no forecasting power in the recent period for confidence, we finally assess whether confidence has become a more useful contemporaneous indicator of consumption, which could be used for “flash” estimates of consumption within the quarter rather than short term forecasting. We look again at simple correlations, now

including the sub periods. As shown in Table 8, apart from Germany there is an increase in contemporaneous correlation between the subperiods, but except for France it is quite small, and it is only in this case that the difference between the sub period correlation coefficients is statistically significant<sup>8</sup> Nevertheless, together with earlier conditional-causality results, this result could be consistent with a shift from a lagged towards a contemporaneous relationship of confidence to consumption.

**Table 8: Correlation between CONF and DLC**

	Germany	France	Italy	UK	US
Full sample	0.294	0.273	0.128	0.393	0.296
1973-1989	0.306	0.146	0.287	0.405	0.316
1990-2005	0.256	0.407	0.346	0.425	0.333

## Conclusions

We have found that naïve correlations and Granger causality results sometimes taken to imply a useful predictive role for confidence obscure weaker confidence effects on consumption when other key determinants of consumption are taken into account. In conditional ARMA based Granger causality equations with income and wealth confidence effects are restricted to the 1973-1989 period in Germany and weakly so the US, and weakly to the 1990-2005 period in France and Italy, while for the UK it is weakly present over 1973-2005. Meanwhile there is evidence that the decline in the link from confidence to consumption is related to financial liberalisation in the US, while house prices may account for much of the forecasting ability of consumer confidence in France and the UK. Results are the same even if only below-average confidence is taken into account. In the most recent period it is only in Italy that there is strong evidence of current forecasting ability of consumer confidence given house prices – the country which is least financially liberalised and where collateralisation of housing remains very difficult.

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<sup>8</sup> The correlation coefficient ‘p’ is distributed approximately as  $\log_e((1+p)/(1-p))$  with variance  $(1/(n-3))$  where n is the number of observations.

## Appendix

**Table A.1: Simple Correlations**

	Germany	France	Italy	UK	US	Average
CONF – DLC	0.289	0.273	0.125	0.393	0.296	0.2752
CONF - DLRNW	0.023	-0.189	0.064	-0.031	-0.063	-0.0392
CONF - DLRPDI	0.318	0.251	-0.799	0.287	0.215	0.0544
DLRNW - DLC	0.018	0.052	0.172	0.079	0.127	0.0896
DLRPDI - DLC	0.749	0.125	0.264	0.274	0.327	0.3478
DLRPDI - DLRNW	0.127	-0.075	0.084	0.05	0.07	0.0512

**Table A.2: Granger causality relations (P-values)**

	Germany	France	Italy	UK	US
Confidence variable	CONF	CONF	CONF	CONF	CONF
CONF>DLC	0.0002***	0.052*	0.455	0.017**	0.024**
DLC>CONF	0.875	0.43	0.07*	0.284	0.022**
CONF>DLRNW	0.114	0.177	0.571	0.661	0.008***
DLRNW>CONF	0.261	0.992	0.871	0.128	2.10E-05***
CONF>DLRPDI	0.001**	0.317	0.069	6.20E-05***	0.004***
DLRPDI>CONF	0.835	0.133	0.401	0.034	0.472
DLRNW>DLC	0.108	0.217	0.718	0.137	0.004***
DLC>DLRNW	0.049**	0.373	0.141	0.872	0.936
DLRPDI>DLC	0.194	0.011**	0.607	0.078*	0.637
DLC>DLRPDI	0.034**	0.161	0.747	0.013**	0.0004***
DLRPDI>DLRNW	0.025**	0.574	0.214	0.097*	0.542
DLRNW>DLRPDI	0.162	0.319	0.267	0.647	0.034***

Notes: Based on 4 lags of each variable, the null hypothesis is of no causality \*\*\* 99% \*\* 95% \* 90%

**Table A.3: Dating of Financial Liberalisation**

Country	Date	Event
US	1980	Start of interest rate deregulation and elimination of portfolio restrictions for thrifts
UK	1980	Elimination of the “corset” restrictions on bank lending.
Germany	1992	EU Second Banking Directive.
France	1987	Elimination of credit controls.
Italy	1994	Separation of short term and long term credit institutions abolished.

Source: OECD (2000), Barrell and Davis (2006). Note that interest rates were deregulated in Germany in 1967

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## Data Sources and Definitions

### Confidence Indicators

Data source: Primark Datastream access to Consumer Surveys; Consumer Opinion Survey: confidence indicator, seasonally adjusted. Underlying sources (see definitions in following section):

United States: Conference Board consumer confidence indicator

UK, France, Germany, Italy: European Commission Consumer confidence indicator.

**Net financial wealth:** gross financial wealth of the household or personal sector at market value (including short term assets, bonds, equities, life insurance and pension claims) less liabilities (consumer credit, mortgages and other loans).

Data sources:

United States: Board of Governors of the Federal Reserve System, Flow of funds accounts for the United States.

United Kingdom: Office of National Statistics, Financial Statistics, Financial Balance Sheets

Germany: Deutsche Bundesbank, Capital Accounts for Germany

France: Banque de France. The national financial accounts

Italy: Banca d'Italia. Supplements to the statistical bulletin; financial accounts.

**Consumption:** total household or personal consumption at constant prices

Data source: Primark Datastream access to National Accounts Statistics

**Real personal disposable income (RPDI):** disposable income of the household or personal sector at constant prices

Data source: Primark Datastream access to National Accounts Statistics

**Real House Prices** Nationally published house price index, BIS database and NIESR database deflated by the consumer expenditure deflator, source Primark Datastream access to National Accounts Statistics

## **Consumer Confidence Definitions**

### **United States<sup>9</sup>**

The UK company Taylor Nelson Sofres PLC (TNS) conducts a monthly survey of 5,000 U.S. households in conjunction with The Conference Board, which is a nonprofit organization for business membership and research. Data are available bi-monthly from 1967 through mid-1977. Beginning June 1977, data are available monthly. The questions asked to compute the indexes have remained constant throughout the history of the series.

The Index is based on responses to 5 questions included in the survey:

- (1) Respondents' appraisal of current business conditions.
- (2) Respondents' expectations regarding business conditions six months hence.
- (3) Respondents' appraisal of the current employment conditions.
- (4) Respondents' expectations regarding employment conditions six months hence.
- (5) Respondents' expectations regarding their total family income six months hence.

For each of the 5 questions, there are three response options: positive, negative and neutral. The response proportions to each question are seasonally adjusted. For each of the five questions, the positive figure is divided by the sum of the positive and negative to yield a proportion, which we call the "relative" value. For each question, the average relative for the calendar year 1985 is then used as a benchmark to yield the index value for that question. The 5 indexes are then averaged together for the Consumer Confidence Index.

### **Germany, France, Italy, UK (EU Harmonised index)**

The EU harmonised consumer confidence indicator (European Commission 2007) is based on answers to the following four questions with five answer alternatives to each question (a lot better, a little better, the same, a little worse, a lot worse). Surveys are conducted monthly with 2,000 households in Germany, Italy and the UK and 3,300 in France.

- (1) Expected change in financial situation of household over the next 12 months;
- (2) Expected change in general economic situation over next 12 months;
- (3) Expected change in unemployment over the next 12 months;
- (4) Expected change in savings of household over next 12 months.

The confidence indicator is expressed as the balance of positive over negative results for each question, then the balances are averaged arithmetically with equal weights for each question. The confidence indicator published by the EC is constructed with double weights on the extremes. Responses "a lot better" and "a lot worse" get the weight 1 and "a little better" and "a little worse" get the weight 1/2, and "the same" has zero weight. Whereas the data begin in January 1985 and the Commission added earlier data on a national basis, there is no evidence of break points that would suggest that the behaviour and predictive power of the indicators differed markedly at an earlier date.

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<sup>9</sup> Source: Datastream page produced by the Conference Board - <http://product.datastream.com/Navigator/NotesSearchResults.aspx?entity=6845899&name=CONSUMER+CONFIDENCE+INDEX&category=Economics&navigatoruserid=XNIE101>