Can Consumer Confidence Data Predict Real Variables? Evidence from Croatia

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Abstract

This paper uses monthly data to examine the links between consumer confidence and real economic variables in Croatia, and it tests whether movements in the former contain predictive power for the latter. The results suggest that changes in consumer confidence help to explain retail turnover and imports and that expectations about forthcoming major purchases have predictive power for retail turnover. We also find that the inclusion of confidence on the right-hand side improves the fit of simple models of retail turnover, a variable that is highly correlated with quarterly GDP. The results therefore highlight the usefulness of these survey data in helping explain and forecast the real economy.

Keywords: consumer confidence, Croatia

JEL classification: E2, P3

1 Introduction[1]

Many countries in Central and South Eastern Europe suffered a crisis of confidence during and after the major economic downturn in 2009-2010 period. Croatia was one of the most badly affected economies in this region. Its real GDP fell by 6 percent in 2009 and by 1.2 percent in 2010. No growth occurred in 2011, and 2012 seems to have been another year of negative growth. In parallel, surveys of consumer and business confidence showed a big drop in 2009 and little sign of recovery since then. But are these real economic trends and psychological expectations linked, and can movements in the latter help us predict trends in the former?

This paper attempts to answer these questions for the case of Croatia. We test whether consumer survey data can explain subsequent movements in economic variables such as retail sales or industrial production, or whether expectations about the course of economic variables actually follow such outcomes. We also test whether the inclusion of confidence data improves the fit of a simple model of monthly retail sales. In both cases, we find support for these hypotheses. These are potentially important findings, not just for Croatian policy-makers, but perhaps also for those in the neighbouring countries where the same forces may be at work but where data comparable to those in Croatia are not yet available.

Many economists have explored, both theoretically and empirically, the ways in which consumer sentiment may influence economic performance. The importance of expectations and "animal spirits" was frequently emphasised by Keynes in his writings, notably in *The General Theory*, and more recently by Akerlof and Shiller (2009). It is not hard to see why business people who are pessimistic about the economic outlook might delay or cancel planned investments. With regard to consumers, low expectations for the future may affect different types of spending in different ways. One would expect, for example, spending on more expensive,

1 We are grateful to Cagatay Bircan, Josip Funda, Jonathan Lehne, Franto Ricka, Erwin Tiongson and two anonymous referees for comments and suggestions on an earlier draft.

Views expressed in this article are of the authors only and do not reflect the views of the EBRD.

durable items to be more sensitive to consumer sentiment, whereas outlays on essential day-to-day goods would fluctuate less in response to expectations.

Our paper adds to a large body of literature, much of it based on US data, which explores the link between confidence data and real variables.[2] Economists became increasingly interested in the issue once detailed data began to be collected. Okun (1960) is an early example that examines the usefulness of what he and others termed "anticipations" data. Ludvigson (2004) is a more recent survey of the main issues surrounding the measurement and reporting of consumer confidence, as well as its relationship with the real economy. He concludes that the most popular surveys do help to predict future consumer expenditure, but the extra predictive power beyond that of other economic and financial indicators is modest.

There is a small literature that focuses on transition economies, with several papers concerned specifically with Croatia.[3] Čižmešija and Sorić (2010) find, on the basis of two Vector Autoregression (VAR) models, that a quarterly economic sentiment indicator does contain some predictive power for quarterly GDP. Sorić and Marković (2010) identify a negative relationship between consumer confidence and retail activity, a surprising result that the authors suggest may be due to the structural shifts in consumer behaviour in Croatia over the sample period and the slowdown in retail trade growth in the latter part of the sample, despite the unchanged levels of confidence.[4] However, the analysis of these papers is inevitably constrained by the short time series. Our approach concentrates on monthly data instead and uses a related but somewhat different methodology.

2 A recent example from the US literature, using similar methodology to the one we employ in this paper, is Afshar, Arabian and Zomorrodian (2007).

3 Recent papers for transition countries include Bodnár (2010) for Hungary and Kuziakiv (2010) for Ukraine.

4 Earlier papers on this topic in Croatia, written in the Croatian language, are Bukovšak (2006) and Čižmešija (2008). We are grateful to an anonymous referee for drawing our attention to the Croatian literature.

2 Data Description

In Croatia, a consumer survey has been carried out regularly by the Croatian National Bank (CNB) since April 1999. Originally carried out quarterly, since May 2005, the survey has been conducted monthly by the CNB in cooperation with the statistical arm of the European Commission, Eurostat. The survey is conducted in accordance with the methodology established by the Commission – the Joint Harmonised European Union (EU) Programme for business and consumer surveys. The survey is conducted each month via face-to-face interviews with 1,000 individuals from all over the country. The individuals are selected via a double random stratifying procedure.[5]

The main goal of the consumer survey is to measure consumer expectations about the financial situation of their households, the general economic situation, unemployment expectations and savings in the next 12 months (see Appendix for the full list of questions). In most cases, answers can be on a five-point scale – two positive, two negative and one in-between. For example, in response to the question: "How do you expect the financial situation of your household to change over the next 12 months?", the answers can be: "get a lot better", "get a little better", "stay the same", "get a little worse" and "get a lot worse".[6] Strongly positive/negative responses (for example, "get a lot better") are coded with the value 2/-2 while weakly positive/negative answers (for example, "get a little better") are coded 1/-1. The answers "stay the same" are coded as zero. The indicator is then expressed as the weighted sum of responses. The result is calculated for each population stratum, and then the answers are weighted by the share of the population stratum in the whole population. Lastly, a confidence indicator is calculated as a simple average of the (seasonally adjusted) responses to four questions: those on the financial situation of the household, general economic situation, the path of unemployment and the likelihood of saving

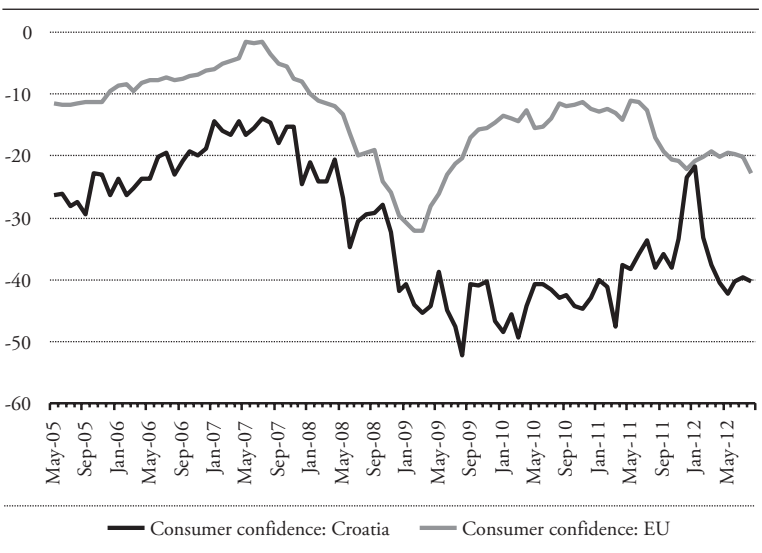
5 See http://epp.eurostat.ec.europa.eu/portal/page/portal/euroindicators/business_consumer_surveys/methodology for a description of the sampling methodology. A business confidence survey has also been carried out monthly since May 2008, but for now the short sample size rules out any meaningful econometric testing.

6 Another possible response is "don't know" – these answers are discarded in the analysis.

money – all in relation to the next 12 months.[7] All consumer variables in this paper are expressed in this fashion. In addition, all data are seasonally adjusted using the TRAMO/SEATS method.[8]

Figure 1 shows the time trend of this indicator since the beginning of the monthly sampling, with the EU average also charted for comparison. Although the time series is relatively short, it covers the distinct periods of robust growth, crisis and subsequent stagnation. Several interesting points emerge. First, consumer confidence in Croatia has been below the EU average throughout the entire time period, even prior to 2009 when growth in the Croatian economy was faster on average than in the European Union. This may reflect the significant gap between the European Union and Croatia in this period, not only in the standard of living but also in terms of social safety nets and employment opportunities.

Figure 1: *Consumer Confidence Time Trend in Croatia and the European Union*



Source: European Commission - DG Economic and Financial Affairs, 2012.

7 That is, questions 2, 4, 7 and 11 – see the Appendix.

8 "TRAMO/SEATS", stands for "Time series Regression with ARIMA noise, Missing observations, and Outliers/ Signal Extraction in ARIMA Time Series", and is a seasonal adjustment programme first developed by Agustin Maravall and Victor Gomez at the Bank of Spain.

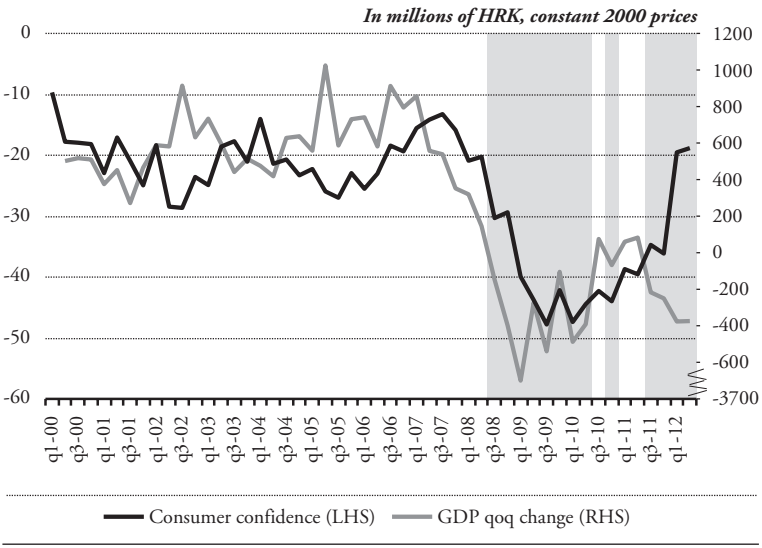
Second, the drop in confidence from peak to trough was even bigger in Croatia than in the EU (nearly 40 points in Croatia compared with 30 points in the EU), but the lowest point in Croatia came around six months after the trough in the EU (August versus February 2009). Third, the recovery in confidence has taken place much later in Croatia, compared with the fairly rapid recovery in the EU in the second half of 2009 and first half of 2010. Lastly, the most recent data suggest significant volatility in Croatia. There was a sharp rise in late 2011/ early 2012 at a time of elections, a change of government and the signing of the European Union treaty (and its subsequent ratification by the Parliament and the people). However, confidence has fallen again since then, and as of August 2012 the gap between Croatia and the EU average was once again close to 20 points.

How well do the confidence data shadow real economic variables? As a first pass at this question, Figure 2 graphs the confidence index against quarterly changes in the real level of (seasonally adjusted) GDP. The shaded areas refer to the quarters when GDP growth was negative. Although the two series move fairly closely together, the chart suggests that movements in confidence precede those in GDP. This is the first bit of evidence in favour of the hypothesis that the confidence index may help to predict future movements in real variables.

Although GDP data in Croatia are available on a quarterly basis only, other variables are published monthly. Charts 3(a)-(d) compare confidence with four series: industrial production and retail turnover (both measured as an index), and imports and exports in dollar values.[9] All series are seasonally adjusted. The correlation with the first two is quite strong; as with GDP, the drop in confidence during the crisis appears to have foreshadowed the fall in industrial output and retail turnover. The link with imports and exports is less clear, as these variables have fluctuated dramatically during the crisis.

9 Taking quarterly averages, the simple correlation coefficient between each of these variables and GDP is quite strong – at least 0.7 – in all cases except between GDP and exports, where the correlation coefficient is only 0.06.

Figure 2: *Consumer Confidence and Quarterly GDP in Croatia*



Notes: The quarterly value of the confidence indicator was calculated as the arithmetic average of the monthly indicator values for the three months in each quarter. The shaded areas represent quarters in which seasonally adjusted GDP fell compared with the previous quarter.
Source: Eurostat, 2012.

3 Econometric Tests

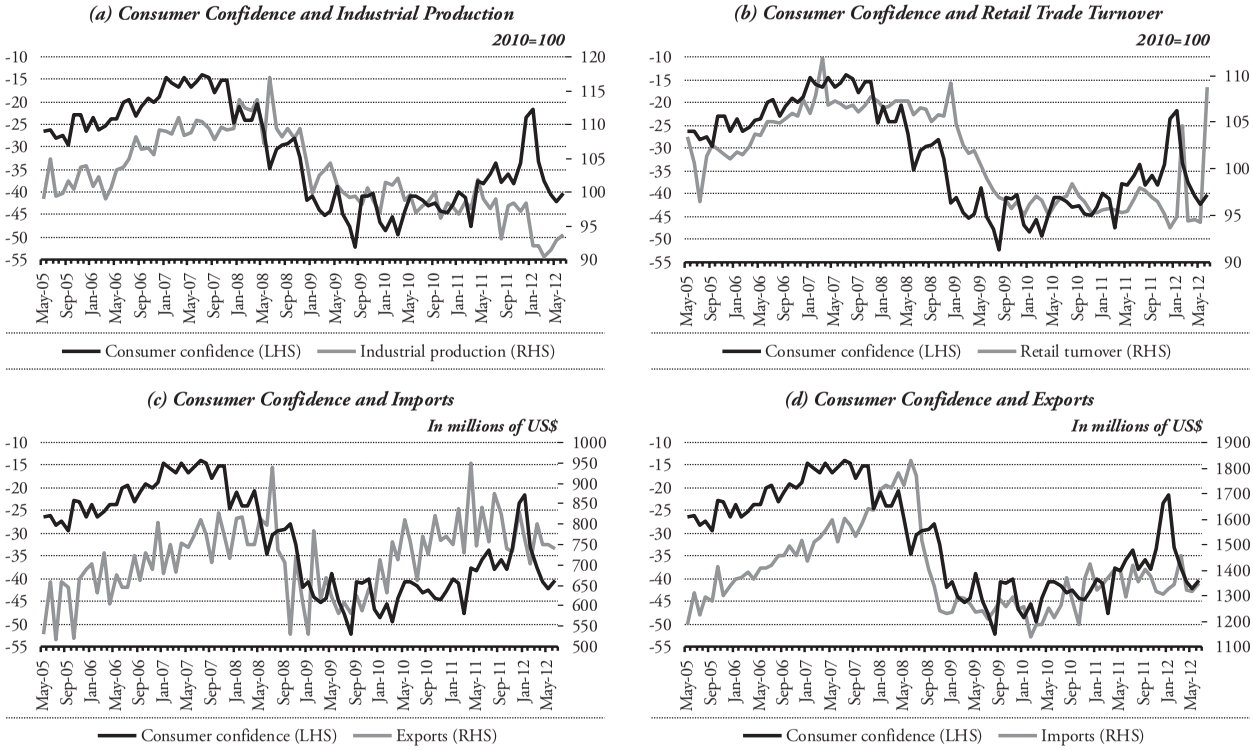
3.1 Stationarity, Cointegration and Causality

While the charts above are suggestive, it is not possible to say anything definitive about the predictive power of the confidence index without an econometric analysis of the series. Therefore, we examined the direction of causality between confidence and the four high-frequency time series depicted above.[10] We followed the standard methodology for testing causality in time series, according to the steps below.[11]

10 We experimented with taking logs, instead of levels, of exports and imports but the results are broadly unchanged.

11 Enders (1995) is a useful textbook guide to these methods.

Figure 3: *Consumer Confidence and Other High-Frequency Series*



Sources: Eurostat, International Monetary Fund, European Commission - DG Economic and Financial Affairs, 2012.

First, we tested each series for stationarity using the Augmented Dickey-Fuller (ADF) test. We applied the ADF test for each of the following three specifications: models with an intercept and trend; models with an intercept but no trend; and models with no intercept and no trend (see Table 1). The number of lags used in the ADF regressions was determined using the Akaike Information Criterion (AIC). We found that under all three specifications, the level series are non-stationary (that is, they failed to reject the null hypothesis of a unit root). We also found that the first-differenced series for our four variables are stationary under all three specifications. Table 1 also reports ADF tests for the three other series: unemployment; expected unemployment (question 7 in the survey – see Appendix); and expected purchases (question 9 in the survey) – the rationale for including these variables is discussed below.

Table 1: *Stationarity Test Results*

	Trend, constant		***Constant, no trend***		***No trend, no constant***	
	Level	**First difference**	**Level**	**First difference**	**Level**	**First difference**
Consumer confidence	-2.168 (1) -3.461	-9.666 (0) -3.461	-1.171 (1) -2.899	-9.692 (0) -2.899	0.257 (1) -1.950	-9.702 (0) -1.950
Industrial production	-2.003 (2) -4.069	-5.358 (4) -3.466	-0.426 (2) -2.900	-4.952 (4) -2.903	-0.716 (2) -1.950	-4.896 (4) -1.950
Retail trade turnover	-2.391 (5) -3.468	-3.505 (4) -3.468	0.466 (5) -2.904	-3.255 (4) -2.904	-0.768 (5) -1.950	-3.219 (4) -1.950
Imports	-2.009(1) -3.466	-6.910 (1) -4.467	-1.755 (1) -2.903	-6.898 (1) -2.904	-0.087 (1) -1.950	-6.937 (1) -1.950
Exports	-2.223 (3) -3.468	-7.759 (2) -3.468	-2.268 (3) -2.904	-7.771 (2) -2.904	-0.320 (3) -1.950	-7.788 (2) -1.950
Unemployment	-1.345 (1) -3.465	-9.312(0) -3.465	-0.031 (1) -2.902	-8.532 (0) -2.902	0.618(1) -1.950	-8.539(0) -1.950
Expected purchases	-2.516 (2) -3.462	-5.946 (3) -3.464	-0.950 (2) -2.900	-5.983 (3) -2.901	-0.832 (2) -1.950	-5.822 (3) -1.950
Expected unemployment	-1.893(1) -3.462	-10.091 (0) -3.461	-1.072 (1) -2.899	-10.128 (0) -2.899	-0.010 (1) -1.950	-10.149(0) -1.950

Notes: For each series, the first statistic is the Augmented Dickey-Fuller (ADF) statistic. The number of lags used in the ADF regressions is indicated in the parentheses. The second statistic is the 5 percent critical value associated with the test. If the test statistic is more negative than the critical value, the null hypothesis of a unit root is rejected at the 5 percent significance level.
Source for original data: Eurostat, 2012.

We then proceeded to test if the confidence indicator is cointegrated with each of the macroeconomic series (see Table 2). Cointegration means that a linear combination of two (or more) non-stationary series is stationary, implying a long-run equilibrium relationship among these variables. We used the Engle-Granger method to test for cointegration between the variables. That is, we regressed the confidence index on each of the macro variables, using least squares. We then tested for stationarity of the residuals using the Dickey-Fuller test. In each case but two (expected purchases under all specifications and retail turnover under the no trend specification), the residuals were non-stationary, suggesting that no cointegrating relationship exists between confidence and the other macro series. We repeated the results using Johansen's test for cointegration and found no cointegration relationship in all cases, including that of expected purchases and retail turnover.[12] We conclude therefore that we cannot identify a long-term causal relationship in the data.[13]

Table 2: *Cointegration Test Results*

	No trend			*Trend*		
	Lag 0	**Lag 1**	**Lag 2**	**Lag 0**	**Lag 1**	**Lag 2**
Industrial production and consumer confidence	-2.943 (-2.895)	-2.095 (-2.895)	-1.933 (-2.895)	-2.553 (-3.461)	-2.216 (-3.461)	-2.012 (-3.461)
Retail trade turnover and consumer confidence	-3.368 (-2.896)	-3.006 (-2.896)	-2.307 (-2.896)	-2.791 (-3.462)	-2.523 (-3.462)	-2.001 (-3.462)
Imports and consumer confidence	-2.881 (-2.896)	-2.688 (-2.896)	-2.498 (-2.896)	-3.235 (-3.463)	-3.366 (-3.463)	-2.996 (-3.463)
Exports and consumer confidence	-1.517 (-2. 896)	-1.408 (-2. 896)	-1.294 (-2. 896)	-3.976 (-3.463)	-2.826 (-3.463)	-2.940 (-3.463)
Expected purchases and retail turnover	-4.274 (-2.896)	-3.800 (-2.869)	-2.962 (-2.869)	-4.689 (-3.462)	-3.720 (-3.462)	-2.892 (-3.462)
Expected unemployment and unemployment	-1.551 (-2.896)	-1.458 (-2.869)	-1.476 (-2.869)	-1.905 (-3.463)	-1.813 (-3.463)	-1.860 (-3.463)

Notes: The first statistic is the Engle-Granger test statistic. The 5 percent significance critical value for each test is included in parentheses. If the test statistic is more negative than the critical value, we reject the null hypothesis of no cointegration.
Source for original data: Eurostat, 2012.

12 The Johansen results are available on request.

13 Note that, if we had found evidence of a cointegrating relationship, we would still have had to test for causality.

Notwithstanding the last result, we can still test for short-term causality, using the standard Granger causality test. That is, confidence Granger causes a macro variable if and only if the macro variable is better predicted using past changes in the confidence variable in addition to past changes in the macro variable itself. We tested for Granger causality using the VAR model, as applied to the stationary (first-differenced) series. Table 3 reports the results with the optimum number of lags as determined by the Akaike Information Criterion.

Table 3: *Granger Causality Test Results*

Model	Null hypothesis	Lags	p-value
VAR (CCI, Industrial production)	CCI does not cause industrial production	1	0.312
	Industrial production does not cause CCI	1	0.036
VAR (CCI, Retail trade turnover)	CCI does not cause retail trade	6	0.000
	Retail trade does not cause CCI	6	0.516
VAR (CCI, Imports)	CCI does not cause imports	1	0.103
	Imports do not cause CCI	1	0.951
VAR (CCI, Exports)	CCI does not cause exports	4	0.040
	Exports do not cause CCI	4	0.194
VAR (CCI Q9 - Expected purchases, Retail trade turnover)	Expected purchases do not cause retail trade	5	0.000
	Retail trade does not cause expected purchases	5	0.518
VAR (CCI Q7 - Expected unemployment, Unemployment)	Expected unemployment does not cause unemployment	3	0.355
	Unemployment does not cause expected unemployment	3	0.166

Notes: The test statistic reported in this table is the p-value associated with each test. If the p-value is less than 0.05, the associated null hypothesis is rejected at the 5 percent significance level. CCI denotes consumer confidence index. Source for original data: Eurostat, 2012.

There are two main results in Table 3. First, consumer confidence Granger causes both retail turnover and imports, but not vice versa although the result for imports is significant only at the 10 percent level. The link with imports is unsurprising as Croatia imports most of its durable goods, and, as argued in the introduction, this category of spending may be particularly vulnerable to changes in confidence. Second, the component of the consumer confidence index that reflects consumer expectations of major purchases in the coming 12 months (question 9 in the survey – see Appendix) also has predictive power with

respect to retail turnover. This is an important finding because it highlights the potential value of analysing different parts of the confidence index rather than simply taking the aggregate value.

The other main findings are as follows. There is evidence that consumer confidence causes exports, although it is unclear what drives this chain of causality. There is also evidence of a feedback effect from industrial production to confidence. We also tested whether there might be a relationship between the component of the indicator that reflects expectations of future unemployment (question 7 in the survey) and actual unemployment figures. However, the results suggest no such link in either direction.

3.2 Goodness of Fit

In addition to these results, we carried out a couple of further experiments with the data. We wanted to test whether consumer confidence adds any predictive power to a model of household consumption for Croatia. In line with some of the existing literature, we estimated several simple models of household consumption and we measured whether adding consumer confidence to each model enhances its predictive power.[14]

The models can be represented by the following equation, where C_t represents consumption at time t and Z^k represents the different explanatory variables in each model.[15]

$$\Delta C_t = \alpha + \sum_{i=1}^{3} \gamma_i \Delta Z_{t-i}^k + \varepsilon_i \quad (1)$$

$$\Delta C_t = \alpha + \sum_{i=1}^{3} \beta_i \Delta conf_{t-i} + \sum_{i=1}^{3} \gamma_i \Delta Z_{t-i}^k + \varepsilon_i \quad (2)$$

14 See, for example, Dees and Soares Brinca (2011) for a cross-country analysis of the US and the euro area.

15 The models are run in first differences because ADF tests (not reported here) revealed all variables to be non-stationary in levels but stationary in first differences.

In the first model (without a confidence measure), we initially included only past changes in real disposable income as explanatory variables, which we proxy by net real wages. We then added changes in household wealth (proxied by the value of the Zagreb Stock Exchange Index), and subsequently we also added changes in short-term interest rates and changes in unemployment.

We experimented with quarterly data but the results were rather inconclusive, unsurprising given the small number of observations. Therefore, we decided to stick to monthly data, where retail trade turnover is used as a proxy for household consumption. The monthly series are also relatively short – they are available since May 2005 for all the required variables. However, because of the higher frequency, they provide more data points.

Table 4 shows the goodness of fit of each model, as measured by the adjusted R^2. In each case the model fit improves, by an average of about three percentage points (0.03) when lagged changes of consumer confidence were added as explanatory variables.[16] Real wages appear to have significant explanatory power with respect to consumption. The best model includes real wages, unemployment and consumer confidence. Overall, the results suggest that any model of consumer behaviour, however sophisticated, may benefit from the inclusion of confidence indicators on the right-hand side.

Table 4: *Consumption Model Regression Results*

Explanatory variables consumption model	**Adjusted R^2 without consumer confidence**	**Adjusted R^2 with consumer confidence**
Real wage	0.5012	0.5340
Real wage, stock market index	0.4951	0.5237
Real wage, unemployment	0.4842	0.5364
Real wage, interest rates	0.2926	0.3255

Source for original data: Eurostat, 2012.

16 In each regression, the level of lag length was chosen to maximise explanatory power.

4 Conclusion

This paper provides support for the view that data from consumer surveys in Croatia are useful and important. We conclude that the Croatian consumer confidence index has predictive power for retail turnover, which in turn is closely linked to GDP movements, and for imports. We also showed that one element of this index – the one relating to expected purchases – is closely related to subsequent retail developments. Lastly, we found that including confidence in a model of retail turnover can help improve the statistical fit. These are important results for policy-makers and business owners, who have to plan ahead and anticipate market trends. Unfortunately, the present depressed state of confidence in Croatia suggests that no economic recovery is in sight, at least in the short term.

There are various ways in which our preliminary analysis could be extended. First, it is unclear how robust the results are to further tests and inclusion of other variables. These can be the topics of future investigation as extra months and years of data become available. It will also be interesting to see how well the business confidence indicator – available on a monthly basis since May 2008 only – performs in similar tests, once there are sufficient data to make such tests statistically meaningful. An even more interesting avenue to pursue will be to carry out a multi-country analysis for those countries in the transition region, in particular among those that joined the European Union in the past decade, where comparable data are available. It is hoped that neighbouring countries, including those of the former Yugoslavia, where good-quality confidence data are not available, will accelerate efforts to gather such data. Lastly, we hope that the paper will contribute to shaping a broader debate about how confidence can be boosted, because without an upturn in consumer sentiment, it is hard to see how sustainable growth in Croatia can be restored.

Appendix

The Consumer Confidence Questionnaire

The consumer confidence survey includes the following questions:

1) How has the financial situation of your household changed over the last 12 months? It has…

   ++ got a lot better

   + got a little better

   = stayed the same

   - got a little worse

   -- got a lot worse

   N don't know

2) How do you expect the financial situation of your household to change over the next 12 months? It will…

   ++ get a lot better

   + get a little better

   = stay the same

   - get a little worse

   -- get a lot worse

   N don't know

3) How do you think the general economic situation in the country has changed over the last 12 months? It has….

   ++ got a lot better

   + got a little better

   = stayed the same

   - got a little worse

   -- got a lot worse

   N don't know

4) How do you expect the general economic situation to develop over the next 12 months? It will…

++ get a lot better

+ get a little better

= stay the same

- get a little worse

-- get a lot worse

N don't know

5) How do you think consumer prices have developed over the last 12 months? They have…

++ risen a lot

+ risen moderately

= risen slightly

- stayed about the same

-- fallen

N don't know

6) In comparison with the past 12 months, how do you expect that consumer prices will develop in the next 12 months? They will…

++ increase more rapidly

+ increase at the same rate

= increase at a slower rate

- stay about the same

-- fall

N don't know

7) How do you expect the number of people unemployed in this country to change over the next 12 months? The number will….

++ increase sharply

+ increase slightly

= remain the same

- fall slightly

-- fall sharply

N don't know

8) In view of the general economic situation, do you think that now is the right moment for people to make major purchases such as furniture, electrical/ electronic devices, etc?

++ yes, it is the right moment now

= it is neither the right moment nor the wrong moment

-- no, it is not the right moment now

N don't know

9) Compared with the past 12 months, do you expect to spend more or less money on major purchases (furniture, electrical/electronic devices, etc) in the next 12 months?

++ much more

+ a little more

= about the same

- a little less

-- a lot less

N don't know

10) In view of the general economic situation, do you think that now is…?

++ a very good moment to save

+ a fairly good moment to save

- not a good moment to save

-- a very bad moment to save

N don't know

11) Over the next 12 months, how likely is it that you will save any money?

++ very likely

+ fairly likely

- not likely

-- not at all likely

N don't know

12) Which of these statements best describes the current financial situation of your household?

++ we are saving a lot

+ we are saving a little

= we are just managing to make ends meet on our income

- we are having to draw on our savings

-- we are running into debt

N don't know

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