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EU Business and Consumer Survey Indicators and Croatian Economy

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Abstract: The aim of this paper is to investigate the relationship between EU business and consumer survey composite indicators and Croatia's economy which is approximated by Croatian industrial production. In order to find out if European confidence indicators have any impact on Croatia's economy, various econometric models were defined using the monthly series from January 1998 to May 2009. Furthermore, the paper tries to provide an answer whether, and the extent to which, the recession in Europe (through its impact on EU indicators) affects the economy in Croatia.

Keywords: business and consumer Survey, composite indicators, Croatia, time series analysis

JEL classification: C32, C51

Introduction

Business and consumer survey (BCS) is a method of gathering information about the businessmen's and consumers´ perception of their environment. The European Commission (Directorate General for Economic and Financial Affairs, DGECFIN) has been conducting Business Surveys in accordance with the Joint Harmonised EU Programme of BCS for different sectors of national economies (27 countries) from 1962. The included sectors in Business survey are: manufacturing industry, building, retail trade, services and financial sector. Consumer surveys are conducted among consumers.

Businessmen's perceptions of their economic environment are translated into quantitative expressed indicators, namely Industrial Confidence Indicator (ICI),

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Construction Confidence Indicator (BCI), Retail Trade Confidence Indicator (RTCI), Consumer Confidence Indicator (CCI) and Services Confidence Indicator (SCI). The Economic Sentiment Indicator (ESI) is a composite indicator, deriving from Business and Consumer Surveys and it includes all variable components of composite indicators which are mentioned above.

Survey results are intended for short-term economic analysis and allow comparison among different countries' business cycles. They are appropriate for monitoring the evolution of the EU and the euro area economies, as well as monitoring developments in the applicant countries like Croatia. The results obtained from Business and consumer surveys are important because business survey results of economic variables are available before the same or the similar data from the official statistics are published (Bahovec and Cizmesija, 2003).

Business and consumer survey results are (in essence) subjective opinion of managers and consumers. Managers' and consumers' subjectivity which is included in BCS is one of the reasons that BCS indicators are primly used to forecast the direction of changes in referent economic series, not to forecast the value of changes.

Their perception of economic situation as a whole is an important signal in tracking and forecasting changes in national (regional and global) economic activity. There have been many research results, studies and papers on this topic, especially after 2000 (Erkel-Rousse and Minodier, 2008; Claveria, Pons and Ramos, 2004; Etter and Graff, 2002). The importance of BCS extensively rises in a time of global recession which started in 2008. The confidence indicators efficiently predict changes in referent macroeconomic series (on the national or regional level) with up to six months ahead (Gayer, 2005).

Since Croatian economy depends on European and global economy, the aim of this paper is to find out if European managers' and consumer s' opinions are the signal of changes in Croatia's economy in forthcoming period. Research results conducted in Croatia (Bahovec, Cizmesija and Kurnoga – Zivadinovic, 2007 and 2008; Nikic, Sosic and Cizmesija, 2002 ; Sosic and Cizmesija, 2003; Bahovec and Cizmesija, 2003) show that Croatia's business survey results correctly predict changes in Croatia's industrial production, building and retail trade with one or two quarters ahead in around 60% of cases. Therefore, the objective of this study is to investigate the relationship between European's business survey results and Croatia's economy. Since general economic activity is highly sensitive to the developments and changes in the manufacturing industry (Etter and Graff, 2002), the Croatia's economy is presented by industrial production.

Each variable in business and consumer survey, such as expectation and composite indicators, can be a short-term forecasting indicator for the corresponding variable. Consequently, it is of interest here to track the direction of changes in a variable and in the referent series, namely industrial production, private

consumption, GDP etc. However, it should be pointed out that not all of EU BCS indicators are appropriate in forecasting macroeconomic variables on EU or Euro-zone level (Gayer, 2005).

Confidence Indicators

Manager's and consumer's assessments and expectations, as a result of (in essence) qualitative surveys, are translated into quantitative expressed indicators. Balance as the difference between weighted percentages of positive and negative answers to corresponding variables, is than calculated for all the questions (variables) in the survey. In order to aggregate the results further, confidence indicators are calculated.

There are a large number of composite indicators derived from business and consumer surveys. The selection of variables which are components of confidence indicators and mathematical function to be used in calculation are not strictly determined and unique. The EU harmonised methodology is a benchmark of worldwide used business survey methodology. Therefore, the confidence indicators calculated and published by the European Commission in the framework of the Joint Harmonized European Union Programme of Business and Consumer Surveys are used in the study. Five indicators are selected: one from the consumer survey and four from the business survey.

The Consumer Confidence Indicator (CCI) is a simple average of seasonally adjusted balances of: the financial position of households, the general economic situation, unemployment expectations (with inverted sign) and saving over the next 12 months.

The Industrial confidence indicator (ICI) is a composite indicator of the business climate in a manufacturing industry. It is calculated as a simple average of seasonally adjusted balances[1] of three variables: order book, production expectation and stock of the finished products (negative sign).

The Construction Confidence Indicator (BCI) is a composite indicator which expresses managers' expectations and assessments in construction sector. It is calculated as a simple average of seasonally adjusted balances of two variables: order book and production expectations.

The Retail Trade Confidence Indicator (RTCI) is calculated as a simple average of seasonally adjusted balances of: present business position, assessment of stock of finished products and business expectations. It is calculated for the retail trade sector.

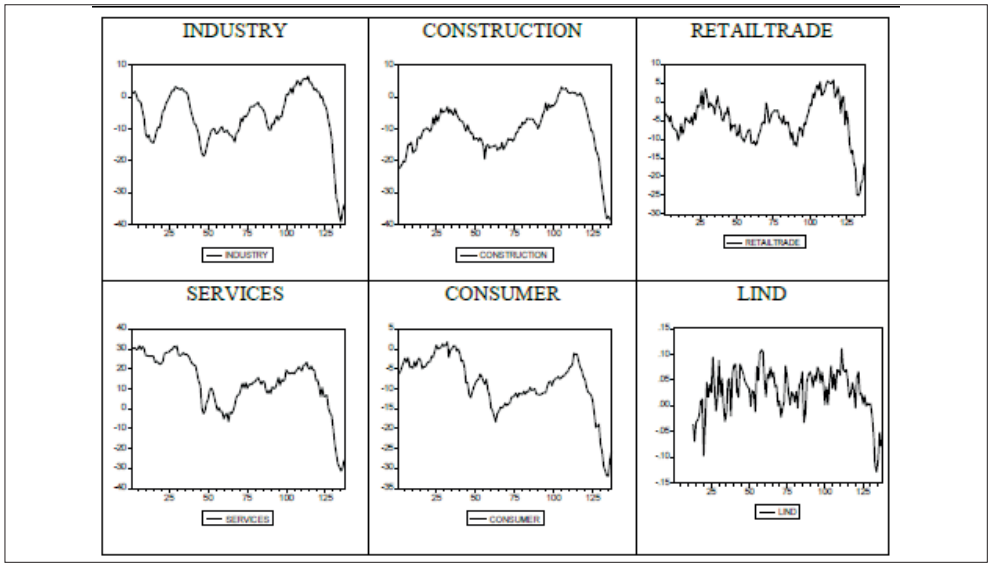
The Services Confidence Indicator (SCI) is a simple average of seasonally adjusted balances of past business situation, turnover over the past three months and expected demand.

Empirical Results

The empirical analysis consists of two parts. The first part tries to provide an answer whether and to which extent EU business and consumer survey indicators influence the Croatian economy. The objective of the second part is to find out if the sudden drop in the indicator (caused by the recession in EU) has any effect on the Croatian industry growth. The empirical analysis was performed using the monthly data covering the period from 1998/1 to 2009/5. Seasonally adjusted indices (2000=100) of Croatian industrial production were taken from Croatian National Bank. Data on EU composite indicators were from European Commission - Directorate General for Economic and Financial Affairs.

The variable LIND stands for Croatia's growth rate of industrial production[2]. Other abbreviations used in the study are: INDUSTRY for Industrial Confidence Indicator (ICI), CONSTRUCTION for Construction Confidence Indicator (BCI), RETAILTRADE for Retail Trade Confidence Indicator (RTCI), CONSUMER for Consumer Confidence Indicator (CCI) and SERVICES for Services Confidence Indicator (SCI). The data series are presented in Figure 1. The sudden drop by the end of period caused by recession in Europe is obvious for all variables.

Figure 1: EU survey indicators and Croatia's growth rate of industrial production, 1998/1 - 2009/5



In order to analyse the relationship between EU business and consumer survey composite indicators and Croatia's economy, various econometric models were

considered. The most adequate showed to be the regression model with AR(1) errors[3]:

$$LIND_t = \beta_0 + \beta_1 INDUSTRY_t + \beta_2 CONSTRUCTION_t + \beta_3 CONSUMER_t + \\ + \beta_4 RETAILTRADE_t + \beta_5 SERVICES_t + u_t \quad (1)$$

where errors ut follow the AR(1) process

$$u_t = \rho u_{t-1} + \varepsilon_t \quad (2)$$

For given data, the results from estimating the model (1) are given in Table 1 with diagnostic statistics in Table 2.

Table 1: Estimates of the regression model with AR(1) errors for LIND

Variable	Parameter	Estimate	Std. Error	t-Statistic	p-value
Constant	β_0	0.130599	0.030643	4.261982	0.0000
$INDUSTRY_t$	β_1	0.000814	0.001405	0.579503	0.5634
$CONSTRUCTION_t$	β_2	0.003000	0.001410	2.128348	0.0354
$CONSUMER_t$	β_3	0.003629	0.001791	2.025662	0.0451
$RETAILTRADE_t$	β_4	0.000410	0.001396	0.293995	0.7693
$SERVICES_t$	β_5	-0.002859	0.001091	-2.620806	0.0099
AR(1)	ρ	0.423565	0.086305	4.907760	0.0000

The results presented in Table 1 show that instantaneous effects of EU indicators INDUSTRY and RETAILTRADE on the Croatian growth rate of industrial production are not statistically significant. The other indicators (CONSTRUCTION, CONSUMER and SERVICES) prove to be statistically significant at 5% significance level. The obtained results can be interpreted as follows: European managers' assessment and expectation in industrial and retail trade sector have no significant instantaneous impact on Croatia's industrial production growth rate as opposed to their assessment and expectation in construction, consumption and services.

The second part of the analysis investigates the influence of the recession period in Europe (through its impact on EU indicators) on Croatia's economy. The aim is to find out if a sudden drop in the EU indicator has any significant effect on Croatia's industrial production growth rate. To perform the task, a step dummy variable is defined for each EU indicator. The dummy variable takes value one in the period

when the value of the indicator falls in 2008, i.e. starting with the first month when the indicator began to decrease continuously. Additionally, this part of the analysis tries to provide an answer which lags of a particular indicator (if any) significantly affects Croatia's economy. The investigation was based on several regression models which initially included up to six[4] lags of the indicator and a step dummy variable. Eventually, the insignificant lags of a particular indicator and/or dummy variable were excluded from the final models.

Table 2: Diagnostic statistics - regression model with AR(1) errors for LIND

R-squared	0.503732	Mean dependent var	0.027612
Adjusted R-squared	0.478282	S.D. dependent var	0.045168
S.E. of regression	0.032625	Akaike info criterion	-3.952675
Sum squared resid	0.124534	Schwarz criterion	-3.793465
Log likelihood	252.0658	F-statistic	19.79328
Durbin-Watson stat	2.003553	Prob(F-statistic)	0.000000

Results from the analysis of the relationship between the growth rate of Croatian industrial production (variable LIND) and the previous values of confidence indicator INDUSTRY are presented in Table 3 with diagnostic statistics in Table 4.

Table 3: INDUSTRY (Industrial Confidence Indicator, ICI)[5]

Variable	Parameter Estimate	Std. Error	t-Statistic	p-value
Constant	0.042913	0.007093	6.049790	0.0000
$INDUSTRY_{t-3}$	0.001771	0.000744	2.380104	0.0189
D1	-0.053350	0.021177	-2.519174	0.0131
AR(1)	0.498707	0.079033	6.310125	0.0000

From table 3 it can be seen that the three month lag of Industrial Confidence Indicator is statistically significant (at 5% significance level). It indicates that changes in European ICI indicator have significant impact on changes in Croatia's industrial production with the lag of three months. Current direction of change in growth rate of Croatia's industrial production is the same as the direction of change of EU Industrial Confidence indicator three months before.

The results are in accordance with the primarily task of BCS indicators which is to forecast only the direction of changes, not the values of changes. The sign of the

regression coefficient is positive which means that European managers' assessment and expectation in industrial sector can predict direction of changes in Croatia's growth rate of industrial production with three months lead. Furthermore, the dummy variable is significant and has an expected negative value.

Table 4: Diagnostic statistics - model with INDUSTRY indicator

R-squared	0.498711	Mean dependent var	0.027612
Adjusted R-squared	0.486179	S.D. dependent var	0.045168
S.E. of regression	0.032377	Akaike info criterion	-3.990996
Sum squared resid	0.125794	Schwarz criterion	-3.900019
Log likelihood	251.4417	Hannan-Quinn criter.	-3.954039
F-statistic	39.79434	Durbin-Watson stat	2.014645
Prob(F-statistic)	0.000000		

The estimation results for the regression model with CONSUMER EU indicator is presented in Table 5 with diagnostic statistics in Table 6. The results show that the indicator significantly influences growth rate of Croatian industrial production with the five months lag. Therefore, it can be concluded that EU consumers' assessments and expectations can predict changes in Croatian economy earlier than EU managers in manufacturing industry.

Table 5: CONSUMER, Consumer Confidence Indicator (CCI)[6]

Variable	Parameter Estimate	Std. Error	t-Statistic	p-value
Constant	0.053549	0.011243	4.762864	0.0000
$CONSUMER_{t-5}$	0.002335	0.001113	2.098290	0.0380
D3	-0.042928	0.018664	-2.300105	0.0232
AR(1)	0.577598	0.073701	7.837011	0.0000

During the EU recession period, which is represented by the significance of a dummy variable and its negative parameter value, the Croatian growth rate of industrial production falls. In accordance with obtained results, it follows that consumers' estimates of current situation are (in essence) pessimistic.

Table 6: Diagnostic statistics - model with CONSUMER indicator

R-squared	0.488924	Mean dependent var	0.027612
Adjusted R-squared	0.476147	S.D. dependent var	0.045168
S.E. of regression	0.032692	Akaike info criterion	-3.971659
Sum squared resid	0.128250	Schwarz criterion	-3.880682
Log likelihood	250.2428	F-statistic	38.26618
Durbin-Watson stat	2.056577	Prob(F-statistic)	0.000000

Table 7 presents the results of the estimated model for the indicator CONSTRUCTION with diagnostic statistics given in Table 8. All lags of the indicator (up to six months)[7] proved not to be significant (at the usual level of significance) indicating that the effect of the indicator on industry growth in Croatia is only instantaneous.

Table 7: CONSTRUCTION (Construction Confidence Indicator, BCI)[8]

Variable	Parameter Estimate	Std. Error	t-Statistic	p-value
Constant	0.049622	0.008944	5.548370	0.0000
$CONSTRUCTION_t$	0.001861	0.000827	2.249074	0.0263
D5	-0.033157	0.021862	-1.516668	0.1320
AR(1)	0.498900	0.078163	6.382834	0.0000

The dummy variable, although with an expected negative value, is not statistically significant which means that decrease of European managers' assessment and expectation in construction sector (in the period 2008/1 – 2009/5) do not affect Croatian economy.

When performing the same analysis for the indicator RETAILTRADE with the appropriate dummy variable[9], it shows that all lags of the indicator, as well as dummy variable, were insignificant[10]. The findings and the results from Table 1 lead to the conclusion that the EU RETAILTRADE indicator does not have any effect (either instantaneous or lagged) on Croatian industry growth.

For the indicator SERVISES all lags of indicator are not significant, although the appropriate dummy variable is. This result is in accordance with the Gayer's research results (Gayer, 2005) which state that the European Commission's services confidence indicator derived from the Harmonised Services survey on the EU level has no significant impact on the short-term forecast of European economic activity.

Table 8: Diagnostic statistics - model with CONSTRUCTION indicator

R-squared	0.490557	Mean dependent var	0.027612
Adjusted R-squared	0.477821	S.D. dependent var	0.045168
S.E. of regression	0.032640	Akaike info criterion	-3.974860
Sum squared resid	0.127841	Schwarz criterion	-3.883883
Log likelihood	250.4413	F-statistic	38.51711
Durbin-Watson stat	2.041292	Prob(F-statistic)	0.000000

Conclusion

The EU business survey results are used for economic research in order to explain and forecast changes in EU economic activity. Croatia's economy depends on European and global economy. Therefore, it is expected that European managers' opinions will be the signal of changes in Croatia's economy in forthcoming period which can be an important source of information for Croatia in recession period.

The performed study proved that EU composite indicators derived from European business and Consumer surveys are in relationship with Croatia's industrial production and therefore with Croatian economy as a whole. EU consumers and EU managers and their assessments and expectations expressed as composite indicators in EU industry, service and consumer sectors have a significant impact on Croatian economy with three to five months lags. On the other hand, EU indicator in the construction sector instantaneously affects Croatian industrial production, while EU indicator in the retail trade sector does not have any statistically significant effect (either instantaneous or lagged) on Croatian industry growth.

Furthermore, in order to investigate if the recession period in Europe (through its impact on EU indicators) influences Croatia's economy, dummy variables were included in the regression models. All coefficients of the dummy variables have expected negative signs. D1 dummy variable (indicating the continuous decrease of the EU Industrial Confidence Indicator in 2008) has the highest parameter value. It indicates that European managers' assessment and expectation in manufacturing industry have the strongest impact on changes in Croatia's industrial production in recession period.

NOTES

[1] The European Commission and Croatia use the DAINTIES seasonal adjustment method.

[2] In accordance with the Joint Harmonised EU Methodology of Business and Consumer Survey variable LIND is expressed as a growth rate compared to the same period of the previous year, i.e. the variable is defined as a log of relative changes of industrial production compared to the same period of the previous year.

[3] Dummy variable used to allow for a recession period in Europe and trend did not prove to be statistically significant in model (1).

[4] The period of 6 month lags is in accordance with the empirical results, i.e. that the confidence indicator correctly predicts changes in referent series with the lags up to six months (Gayer, 2005; Bahovec , Cizmesija and Kurnoga, 2008).

[5] D1 = 1 if t≥August, 2008 and 0 otherwise.

[6] D3 = 1 if t≥January, 2008 and 0 otherwise.

[7] See reference 4.

[8] D5 = 1 if t≥April, 2008 and 0 otherwise.

[9] For EU indicator SERVICES dummy variable was defined as D2 = 1 if t≥July, 2008 and 0 otherwise. For EU indicator RETAILTRADE dummy variable was D4 = 1 if t≥July, 2008 and 0 otherwise.

[10] In order to save the space, the results are not reported but can be obtained upon request.

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