



## **The Causality Relationships between Economic Confidence and Fundamental Macroeconomic Indicators: Empirical Evidence from Selected European Union Countries\***

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### **ABSTRACT**

Economic confidence is an important tool in predicting macroeconomic changes. In this study, causality relationships between the confidence level and the fundamental macroeconomic indicators are analyzed using panel data analysis for 13 European Union countries for the period 2000: 1-2014: 12. According to the obtained results, a bidirectional causality relationship between the level of confidence and consumption expenditures, industrial production and inflation; a unidirectional relationship from the level of confidence to the unemployment rate (UNE); and a unidirectional relationship from interest rates to the level of confidence were detected. These results are compatible with the view that economic confidence is a leading indicator in explaining the changes in macroeconomic indicators.

**Keywords:** Economic Confidence, Panel Causality Analysis, European Union, Macroeconomic Variables

**JEL Classifications:** C33, E20, O52

### **1. INTRODUCTION**

Economics is the science of choices. These choices are made by people. According to neo-classical economic theory, people make choices based on rational factors. This neo-classical model of individual is called as homo economicus. Homo economicus represents a rational, reasonable and symbolic man who attempts to maximize utility and takes into account a social fact only if it maximizes utility (Gintis, 2000. p. 312). Along with homo economicus assumption, human behaviours are put in a predictable frame. In terms of economic theory, clearer assumptions about human behaviours, which in reality cannot be predicted precisely, could be made due to this assumption. However, the extent to which homo economicus assumption reflects the real human behaviours has been a matter of debate. That is to say, individuals show deviations from rationality assumption while making their economic decisions under the influence of psychological factors.

With reference the fact that John Maynard Keynes focused on consumer and investor sentiments, also known as animal spirits, has raised the importance of psychological inputs. In the following period, in his book “Psychological Analysis of Economic Behavior”, published in 1951, George Katona called on economists to use psychological factors in their analyses (Katona, 1951). Akerlof and Shiller (2010), on the other hand, reworked Keynes animal spirits and drew attention to the government’s role on manipulating those spirits. However, using psychological inputs for economic analysis is basically defined as psychological economics.

Accordingly, so as to have a better understanding of human beings and to put forward more realistic predictions, it is crucial to include psychological factors in economic analyses. As a matter of fact, various disciplines as convergence of economics and psychology such as behavioural economics, experimental economics and neuroeconomics have emerged especially since the second half

of the 20<sup>th</sup> century. All these different disciplines handle the relationship between economics and psychology from different perspectives and with different methods. Also as Bogliacino et al. (2016, p. 323-324) said these studies improve new and successful policy implications with the interaction of these subfields.

From this point of view, discretionary consumer spending is accepted as a function of actual purchases and willingness-to-buy. Purchasing power primarily depends on consumer's income and wealth at the time of discretionary spending. Willingness-to-buy, however, as a subjective factor, is dependent on customer's personal perceptions and expectations about the economic conditions (Katona, 1968, p. 22). So that consumer confidence indices are used in the attempt of measuring perceptions and expectations in an economy. Therefore, within the context of using psychological factors it could be said that the phenomenon of confidence is one of the most important psychological inputs in economics.

For instance, standard theories of consumer behaviour attribute fluctuations in consumer spending to current and future fluctuations in wealth and interest rates, neglecting independent fluctuations in consumer confidence. Therefore, it is getting difficult to determine the influence of confidence on consumer preferences (Fuhrer, 1993, p. 33). However, when it is considered that the consumption preferences and other economic preferences are formed by people, confidence (as a psychological data) is expected to have an impact on these economic preferences, and thus, on economic variables.

The aim of this study is to establish the causal relationship between economic confidence and major macroeconomic variables. In accordance with this purpose, causal relationships between consumer confidence and consumption expenditures, industrial production, inflation, real exchange rate, interest rate and UNE were investigated using panel causality analysis for 13 European Union (EU) countries for the period of 2000: 1 - 2014:12. Thus, the novelty of this study is using panel causality analysis and enlarging the variables that interrelated with economic confidence.

The remainder of this paper is organised as follows: Section two elaborates indices measuring confidence and then discusses theoretical relationships between confidence and macroeconomic variables. Section three examines the literature regarding the relationship between confidence and macroeconomic variables. Following the section four which introduces the data set, section five includes some descriptive statistics for the data used in the study. Section six discusses the estimation methodology while section seven concludes the paper.

## 2. RELATIONSHIPS BETWEEN CONFIDENCE AND MACROECONOMIC VARIABLES

The phenomenon of confidence, as a psychological data, is important for conducting economic activities effectively. Within this context, the degree of relationship between economic confidence and economic activities are often discussed in the

literature. However, a consistent measurement of confidence is required in order to express this relationship completely. Thus, especially in recent years, confidence indices have gained importance for measuring how economic decision makers respond to economic developments.

Consumer confidence was firstly measured in the late 1940s by the index of consumer sentiment (ICS) devised by the University of Michigan under the leadership of George Katona. Following ICS, consumer confidence index (CCI) produced by the conference board was initiated in 1967 (Curtin, 1982, p. 340-342; Ludvigson, 2004, p. 30). On the other hand, world values survey association periodically conducts an extensive survey on confidence and other social phenomena. On this survey, people are asked about their feeling of confidence towards their families, neighbours as well as towards majority and towards the people from other religions and nationalities. National Opinion Research Center at the University of Chicago also performs similar work.

The term "confidence" is defined by Webster's Dictionary as "the act of confiding, trusting, or putting faith in; trust; reliance; belief." The definition of confidence involves trust. Thus, confidence and trust are often used interchangeably (Adams, 2005, p. 3). However meanings of these concepts are interrelated, they do not mean the exact same thing. Trust can be defined as the belief that other people can be relied on, but confidence is the conviction that everything is under control, and uncertainty is low (Siergist et al., 2006, p. 145). On the other hand, because of the term confidence involves trust; factors that affect trust can be expected to affect confidence in process related to economics.

The concept of confidence in economics is related to predictability. Predicting high confidence leads to becoming optimistic about the future while predicting low confidence leads to pessimism (Akerlof and Shiller, 2010, p. 32). Decreases in the level of confidence makes people slow down their spending and shift from risky financial assets to money. In that case, firms stop hiring and postpone their capital investments. Production falls and unemployment rises accordingly. According to Keynes, as a matter of fact, consumer and producer confidence plays a key role in explaining economic fluctuations (Van Aarle and Kappler, 2012, p. 44-45).

On the other hand, with a higher level of confidence, people spend less to protect themselves from being exploited in their economic relations, and not to divert their resources to tax payments, bribes or security spending. Providing an environment of political confidence in a high-confidence society also triggers greater investments and other economic activities. As a consequence, in such societies which provide a high confidence environment, people can make healthier investment decisions with long-term perspectives (Knack and Keefer, 1997, p. 1252-1254). As a matter of fact, nearly all economic interactions embody some confidence. In this regard, economic activities performed by economic agents relying on the future actions of others are accomplished at lower cost in higher-confidence environments (Knack and Keefer, 1997, p. 1252). Moreover, according to Arrow (1972, p. 357), much of the economic distress in the world is caused by the

lack of confidence. Briefly speaking, economic confidence has a significant effect on economic choices made by decision makers in economic life. This effect reveals itself on macroeconomic variables as well. And this perspective indicates the importance of confidence for the economic theory.

### 3. REVIEW OF THE LITERATURE

In literature, investigating the relationship between level of confidence and economic variables has been stimulated by the measurement of confidence level. Along with the steady measurement of confidence, a number of studies have investigated the relationship between confidence and several economic variables, particularly production and consumption level. Even though there seems to be no consensus, it is possible to say that the findings from the literature review indicate a relationship between confidence and macroeconomic variables. In simple terms, they tend to indicate that level of confidence has a predictive power for macroeconomic variables. In this context, Garner (1991) investigated the relationship between confidence index and durable goods spending by BVAR method. The study established that the confidence level is not a reliable independent variable for durable goods. However, it is also concluded that in normal conditions the confidence level has little explanatory power when used with other macroeconomic variables, but could be helpful during exceptional periods (such as wars).

Matusaka and Sbordone (1995) examine Granger causality between consumer confidence and gross natural product (GNP) in USA, using quarterly ICS data over the period 1953-1988 provided by the University of Michigan. According to the results, changes in confidence level have a significant effect on predicting GNP. In another study using Granger causality, Santero and Westerlund (1996) examined the causal relationships between consumer and business confidence indicators and economic variables such as real gross domestic product (GDP), growth rate, industrial production, real business investments, real private consumption, household saving rate for 11 OECD countries over the period of 1979-1995, and they conclude that especially business confidence has a predictive power in predicting economic variables.

Knack and Keefer (1997) analysed the relationship between confidence and growth in their study covering 19 countries over the period of 1980-1992. According to the results of the study, an increase in the confidence level leads to an increase in growth. Likewise, Zak and Knack (2001) investigated the relationship between trust, investment and growth, using world values survey data over the period of 1970-1992. The study ultimately establishes a positive impact of confidence on investment and growth.

In their study which included monthly data covering the period of 1978-1992, Eppright et al. (1998) analysed the link between consumer expectations and consumption expenditures in a vector autoregressive (VAR) model, and asserted that consumer expectations can predict consumption expenditures better than other economic data. In another study using VAR analysis, Utaka (2003) examined the effect of consumer confidence on the real economy in Japan. Based on confidence and GDP data over the

period of 1982-2000, a positive and significant relationship was found between consumer confidence and GDP. However, it was established that confidence may have some predictive ability only on very short-term economic fluctuations. Vuchelen (2004), on the other hand, in his regression analysis using quarterly Belgian data over the period of 1985-2000, suggested that a decrease in consumer confidence indicates a decrease in the growth rate.

Afshar (2007) investigated the Granger causal relationship among the confidence measures of consumers, investors and businesses, GNP fluctuations using quarterly data from the United States in the period of 1980-2005. In the study, along with the evidence of causality running from confidence to GNP, it was also concluded that consumer, business and investor confidence levels play an important role in economic fluctuations. For almost the same time period in Afshar's work, Gelper et al. (2007) examined the causal relationship between confidence and the consumption of services, durable and nondurable goods in the United States using monthly ICS data provided by the University of Michigan over the period 1978-2004, and concluded that confidence predicts future consumption with a time lag of 4-5 months. In another study using surveys on consumer confidence and expectations conducted by the University of Michigan, Qiao et al. (2009) tried to establish the predictive power of confidence on consumer expenditure. As a result of the study which applies Granger causality, it is concluded that confidence surveys are effective indicators for predicting consumer expenditure.

Çelik and Özerkek (2009) examined the relationship between consumer confidence, stock exchange index, real exchange rates and interest rates for 9 EU countries using panel data analysis over the period of 1997-2006. A long run relationship is detected between confidence and stock market index, real exchange rates and personal consumption expenditures. Mermod et al. (2010) examined the relationship between consumer confidence, economic growth and retail sales for 12 developed and developing EU countries over the period of 1980-2010. Causality from consumer confidence to consumption expenditure was detected by frequency domain analysis for developed countries. However, for developing countries, causality from economic growth to confidence was detected while there was no causality detected from confidence to growth. Van Aarle and Kappler (2012) analysed the effect of changes in Economic Sentiment Indicator (ESI) on industrial production, retail sales and unemployment in the Euro Area for the period of 1990-2011. With the help of impulse-response analysis, they conclude that confidence shocks had an impact on industrial production, retail sales and unemployment. Additionally, it was also asserted that economic conditions had a determining impact on confidence. In another study on Euro Zone, the relationship between confidence and consumption expenditure was examined also for the United States. Dées and Brinca (2013) constructed a VAR model using quarterly data over the period of 1985-2010 to analyse the relationship between consumer confidence and consumption expenditures in Euro Zone and in the United States. It was concluded that CCI has a predictive power on consumption expenditures in certain circumstances.

## 4. DATA

In this study, the causal effects of economic confidence on macroeconomic variables were investigated for 13 EU countries whose long term monthly data can be provided<sup>1</sup>. Panel data analysis was used over the base period of 2000: 1 - 2014: 12. Data used in the analysis and explanations relating to those data are demonstrated in Table 1.

Economic sentiment indicator (ESI) published by the European Commission Directorate General for Economic and Financial Affairs was used in the study as a measure of confidence. ESI is a confidence indicator constructed from the data which are collected through national and union-wide surveys of industry, services, construction and retail sectors, and of consumers. In ESI, the industrial confidence indicator has a weight of 40%, the services confidence indicator a weight of 30%, the consumer confidence indicator a weight of 20% and construction and retail confidence indicators a weight of 5% each.

<sup>1</sup> Study is restricted to include 15 countries which had become EU members before 2004. However, as industrial production index data for Greece, and industrial production and confidence index data for Ireland could not be provided, both countries are excluded from the sample. The countries included in the study in this regard are Germany, Austria, Belgium, Denmark, Finland, Netherlands, United Kingdom, Spain, France, Sweden, Italy, Luxembourg, and Portugal.

**Table 1: Description of variables used in the study**

Variables	Description
ESI	Economic sentiment indicator
RET	Retail trade index (2010=100)
INP	Industrial production index (2010=100)
CPI	Consumer price index (2005=100)
RER	Real effective exchange rate index (2005=100)
IRT	Long term government bond yields
UNE	Unemployment rate

**Table 2: Descriptive statistics for study variables**

Variables	Mean	Minimum	Period	Country	Maximum	Period	Country
ESI	100.26	64.60	2009:3	United Kingdom	121.00	2000:5	Italy
RET	97.20	69.70	2000:1	Finland	182.71	2014:12	Luxembourg
			2000:2				
			2000:3				
INP	102.52	71.54	2000:1	Belgium	146.00	2006:12	Spain
CPI	104.83	83.59	2000:2	Portugal	128.50	2014:10	United Kingdom
RER	98.38	76.32	2009:1	United Kingdom	108.62	2000:4	United Kingdom
IRT	3.91	0.59	2014:12	Germany	13.85	2012:1	Portugal
UNE	7.65	1.80	2001:2	Luxembourg	26.30	2013:2	Spain
			2001:5			2013:3	
						2013:4	

**Table 3: Correlation matrix for study variables**

	ESI	RET	INP	CPI	RER	IRT	UNE
ESI	1.0000						
RET	-0.0984 (0.0000)	1.0000					
INP	0.2728 (0.3134)	0.2120 (0.0000)	1.0000				
CPI	-0.3169 (0.0000)	0.4043 (0.0000)	-0.1693 (0.0000)	1.0000			
RER	-0.1026 (0.0000)	0.1344 (0.0000)	0.0277 (0.1794)	0.1107 (0.0000)	1.0000		
IRT	0.0422 (0.0408)	-0.3953 (0.0000)	-0.0128 (0.5329)	-0.5295 (0.0000)	-0.0119 (0.5622)	1.0000	
UNE	-0.1932 (0.0000)	-0.7095 (0.0001)	-0.1254 (0.0000)	0.2935 (0.0000)	0.0832 (0.0001)	0.1515 (0.0000)	1.0000

Another data used in the study is RET which reflects the index of retail sales. As monthly consumption data could not be provided, retail sales index was used as a proxy for consumption expenditures. INP is the industrial production index, including mining, quarrying, construction, electricity, gas and ventilation industries. CPI represents consumer price index. IRT indicates long term bond yields. RER is the real effective exchange rate. Finally, UNE indicates unemployment rate. All data were collected from Eurostat which is the EU statistical database.

## 5. DESCRIPTIVE STATISTICS

Descriptive statistics for all variables are presented in Table 2 where average, maximum and minimum values of the data set are available along with the period and country for those values. For the period 2000. p. 1; 2014. p. 12, the average ESI value was 100.26, and the minimum and maximum values were 64.60 and 121.00 respectively. The minimum ESI value of 64.60 belonged to the United Kingdom on 2009. p. 3. ESI reached its maximum in Italy on 2000. p. 5.

Correlation relationships between variables are shown in Table 3 along with their significance levels. Even if the correlation analysis does not indicate a causal relationship, it is still important as it reveals the antecedent of the relationship between variables. According to the results of correlation analysis, there exist significant relationships between macroeconomic variables and economic confidence as well as among macroeconomic variables. The highest correlation was found as 0.71 between retail trade and UNE.

## 6. METHOD AND EMPIRICAL RESULTS

This study investigates the impact of economic confidence on macroeconomic variables for 13 EU countries. For this



purpose, firstly cross sectional dependence across variables were investigated. Then, panel unit root test taking account of cross sectional dependence was employed to determine if the variables have unit root, that is, if they are stationary. And finally, considering the results for cross sectional dependence and unit root, causal relationship between economic confidence and major macroeconomic variables were analysed.

### 6.1. Analysis of Cross Sectional Dependence

Tests for unit root are classified as either first generation or second generation tests, according to whether they take into account cross sectional dependence or not. In this regard, interaction across cross-sections (cross sectional dependence) was primarily tested, using cross-sectional dependency test (CD-test) suggested by Pesaran (2004). Hypotheses for Pesaran’s (2004) cross sectional dependence test are as follows: H0: No cross sectional dependence; H1: Cross sectional dependence.

The results for Pesaran’s (2004) CD-test are presented in Table 4. According to the findings, H0 hypothesis of no cross sectional dependence is rejected at 1% significance level. That is to say, there exists cross sectional dependence across all variables. This result indicates that confidence and macroeconomic variables for 13 EU countries examined in the study are in interaction with each other.

### 6.2. Panel Unit Root Test

As cross sectional dependence was detected in panel data of 13 EU countries, CIPS (cross-sectionally augmented IPS) panel unit root test suggested by Pesaran (2007) was used for testing unit root under cross sectional dependence. Hypotheses for Pesaran’s (2007) panel unit root test are as follows: Ho: Series is non-stationary; there is unit root; H1: Series is stationary; there is no unit root.

The calculated CIPS statistics were compared with the table critical values in Pesaran (2007) to determine whether there was unit root in the series. If the calculated CIPS statistics are higher than the table critical values, Ho is rejected and it is decided there is no unit root and the series is stationary. In the study, in order to determine whether the series are stationary or not, the model with intercept-and-trend is used for the levels and the model with intercept-only for the first differences. The test results obtained from the models are shown in Table 5.

According to the results of Pesaran’s (2007) panel root analysis, as CIPS statistics for ESI, RET and INP in levels are higher than table critical values in Pesaran (2007), null hypothesis of panel has a unit root is rejected. That is, ESI, RET and INP series are statistically stationary at 1% significance level. On the other hand, CPI, RER, IRT and UNP series are not stationary as CIPS statistics for those variables including intercept-and-trend are not higher than table critical values in Pesaran (2007). In other words, CPI, RER, IRT and UNP series have unit root in levels.

Series that are non-stationary in levels become stationary when first differenced. Since trend is eliminated after first differencing CPI, RER, IRT and UNP series, CIPS statistics for intercept-only model

**Table 4: The results of cross sectional dependence tests**

Variables	Level	
	CD-test	P
ESI	88.70	0.000
RET	28.16	0.000
INP	35.51	0.000
CPI	116.76	0.000
RER	60.19	0.000
IRT	74.20	0.000
UNE	41.00	0.000

**Table 5: The results of CIPS unit root tests**

Variables	At level with trend and intercept	At first difference with intercept
	CIPS-test	CIPS-test
ESI	-3.441*	
RET	-2.968*	
INP	-3.159*	
CPI	-1.775	-2.867*
RER	-2.010	-2.884*
IRT	-2.274	-5.206*
UNE	-1.070	-4.655*

CIPS null hypothesis is that panel has a unit root. CIPS critical values are tabulated by Pesaran (2007). \*show statistical significances at the 1% level

are calculated. As those statistics are higher than the table critical values in Pesaran (2007), Ho hypothesis of non-stationarity is rejected. This result means that CPI, RER, IRT and UNP variables are stationary in first difference.

### 6.3. Panel Causality Analysis

Considering the cross sectional dependence across variables and the results of panel unit root test, short term causality relationships between macroeconomic variables and economic confidence are analysed using a causality test suggested by Dumitrescue and Hurlin (2012). The equations used for this analysis -where country is denoted by *i*, time by *t* and lag length by *k*- are as follows:

$$esi_{i,t} = \alpha_i + \sum_{k=1}^k \gamma_i^{(k)} esi_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} ret_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} inp_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta cpi_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta rer_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta irt_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta une_{i,t-k} + e_{i,t} \quad (1)$$

$$ret_{i,t} = \alpha_i + \sum_{k=1}^k \gamma_i^{(k)} ret_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} esi_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} inp_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta cpi_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta rer_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta irt_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta une_{i,t-k} + e_{i,t} \quad (2)$$

$$inp_{i,t} = \alpha_i + \sum_{k=1}^k \gamma_i^{(k)} inp_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} ret_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} esi_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta cpi_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta rer_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta irt_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta une_{i,t-k} + e_{i,t} \quad (3)$$

$$\Delta cpi_{i,t} = \alpha_i + \sum_{k=1}^k \gamma_i^{(k)} \Delta cpi_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} ret_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} inp_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} esi_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta rer_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta irt_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta une_{i,t-k} + e_{i,t} \quad (4)$$

$$\Delta rer_{i,t} = \alpha_i + \sum_{k=1}^k \gamma_i^{(k)} \Delta rer_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} ret_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} inp_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} esi_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta cpi_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta irt_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta une_{i,t-k} + e_{i,t} \quad (5)$$

$$\Delta irt_{i,t} = \alpha_i + \sum_{k=1}^k \gamma_i^{(k)} \Delta irt_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} ret_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} inp_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} esi_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta cpi_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta rer_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta une_{i,t-k} + e_{i,t} \quad (6)$$

$$\Delta une_{i,t} = \alpha_i + \sum_{k=1}^k \gamma_i^{(k)} \Delta une_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} ret_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} inp_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} esi_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta cpi_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta rer_{i,t-k} + \sum_{k=1}^k \beta_i^{(k)} \Delta irt_{i,t-k} + e_{i,t} \quad (7)$$

The results of Dumitrescu and Hurlin (2012) causality test using the above equations are presented in Tables 6 and 7.

The findings in Table 7 show that there exists bidirectional causal relationship between inflation rate and retail trade which is used as a proxy for consumption expenditures. Similarly, bidirectional relationships are detected between retail trade and industrial production, between retail trade and inflation, between retail trade and unemployment, and between inflation rate and interest rate.

A unidirectional causal relationship runs from real exchange rate and interest rate to economic confidence and from economic confidence to unemployment. Moreover unidirectional causality runs from industrial production and inflation to real exchange rate and from unemployment to inflation.

These results reveal that confidence affects production level, consumption level, inflation rate and unemployment in the country, and is affected by the changes in production, consumption, inflation rate, real exchange rate and interest rate. Besides, other macroeconomic variables affect each other either in one-way or in two-way relationships as well.

## 7. CONCLUSION

People are influenced by psychological as well as rational factors while making their choices. If we approach this reality from the angle of economics, confidence is considered as one of the most important psychological factors. Hence, in view of the economic importance of confidence, this study uses panel causality analysis to investigate the causal relationships among confidence, consumption expenditures, industrial production, inflation, real exchange rate, interest rate and unemployment data collected from 13 EU countries which had become an EU member before 2004. The importance of these variables used in the study has ability to show general view of economies. For sure, other variables could be included to analysis such as, current account balance, fiscal deficit, savings etc. Therefore, variable selection could be enlarged with the variables mentioned above for future studies. Data used in this study covers the period of 2001: 1 - 2010: 12. In the analysis, firstly cross-sectional dependence is investigated. Then, panel unit root test taking account of cross sectional dependence -which is suggested by Pesaran (2007) is employed. Finally, considering

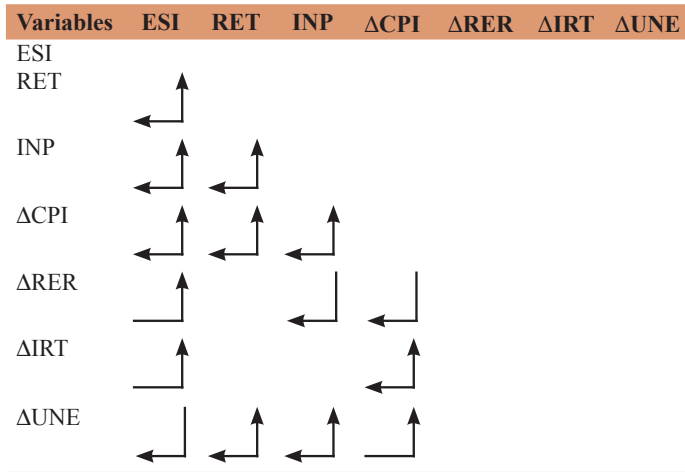
**Table 6: Results of the panel causality analysis**

The direction of causality	W-Stat.	Zbar-Stat.	Significance
ESI→RET	18.770	4.565	0.000
ESI→INP	31.274	13.214	0.000
ESI→ΔCPI	17.342	3.575	0.000
ESI→ΔRER	13.941	1.224	0.221
ESI→ΔIRT	13.326	0.798	0.425
ESI→ΔUNE	23.104	7.558	0.000
RET→ESI	18.462	4.352	0.000
RET→INP	19.557	5.109	0.000
RET→ΔCPI	14.961	1.929	0.054
RET→ΔRER	13.496	0.916	0.360
RET→ΔIRT	12.225	0.037	0.971
RET→ΔUNE	17.038	3.365	0.001
INP→ESI	17.690	3.818	0.000
INP→RET	18.110	4.109	0.000
INP→ΔCPI	15.870	2.557	0.011
INP→ΔRER	14.774	1.800	0.072
INP→ΔIRT	11.401	-0.533	0.594
INP→ΔUNE	21.126	6.191	0.000
ΔCPI→ESI	18.163	4.143	0.000
ΔCPI→RET	16.000	2.647	0.008
ΔCPI→INP	15.667	2.417	0.016
ΔCPI→ΔRER	32.057	13.749	0.000
ΔCPI→ΔIRT	21.164	6.217	0.000
ΔCPI→ΔUNE	12.221	0.034	0.973
ΔRER→ESI	15.462	2.275	0.023
ΔRER→RET	13.306	0.785	0.433
ΔRER→INP	12.359	0.130	0.897
ΔRER→ΔCPI	13.672	1.037	0.300
ΔRER→ΔIRT	12.630	0.317	0.751
ΔRER→ΔUNE	13.233	0.734	0.463
ΔIRT→ESI	15.845	2.540	0.011
ΔIRT→RET	13.065	0.618	0.537
ΔIRT→INP	13.375	0.832	0.406
ΔIRT→ΔCPI	14.575	1.662	0.097
ΔIRT→ΔRER	9.842	-1.611	0.107
ΔIRT→ΔUNE	14.260	1.444	0.149
ΔUNE→ESI	13.336	0.805	0.421
ΔUNE→RET	16.252	2.821	0.005
ΔUNE→INP	14.689	1.741	0.082
ΔUNE→ΔCPI	14.760	1.789	0.074
ΔUNE→ΔRER	11.032	-0.788	0.431
ΔUNE→ΔIRT	11.959	-0.147	0.883

panel unit root test results, causality test suggested by Dumitrescu and Hurlin (2012) is used.

There are causal relationships detected running from four of the five major macroeconomic variables used in the study - except unemployment - to economic confidence. In other words, changes in consumption expenditures, industrial production, inflation, real exchange rate and interest rate are the determinants of economic confidence. On the other hand, there also causal relationships running from economic confidence to consumption expenditures, industrial production and inflation rate. In brief, economic confidence is influenced by five of the six variables used in this study, and influence three of these five variables. So it is seen that, when its relation with the major macroeconomic variables is taken into account, economic confidence works within a feedback

**Table 7: Causal relationships between the macroeconomic variables**



mechanism. Macroeconomic variables have a determining effect on economic confidence while economic confidence influences some of these variables. Working of this mechanism through variables (e.g., production, consumption, inflation) is not only in accord with the overall tendency in literature, but also reveals the importance of the confidence factor for economies, and thus, for economic theory.

When the influence of confidence on economy is taken into account, policy makers should take necessary precautions to establish and maintain a high confidence environment in society. Consumers and companies feel safer in such a society where democratic rights and freedoms are protected, property rights are guaranteed, the rule of law principle is allowed to prevail, political stability is established and low corruption level is achieved. Seriously decreasing transaction costs in an economy with a high level of confidence plays an encouraging role on new investments and technological developments. To put it briefly, an effective organisational structure that provides a high confidence environment for individuals and companies can have an impact upon economic performance, reducing the uncertainty and making economic activities easier to handle.

## REFERENCES

Adams, B.D. (2005), Trust vs. Confidence. Available from: <http://www.oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA630696>. [Last accessed on 2016 Nov 25].

Afshar, T. (2007), Stock return, consumer confidence, purchasing manager's index and economic fluctuations. *Journal of Business and Economics Research*, 5(8), 97-106.

Akerlof, G.A., Shiller, R.J. (2010), *Hayvansal Güdüler (Animal Spirits)*. In: Domaniç, N., Konyar, L., editors. 1<sup>st</sup> ed. İstanbul: Scala Publishing.

Arrow, K.J. (1972), Gifts and exchanges. *Philosophy and Public Affairs*, 1(4), 343-362.

Bogliacino, F., Codagnone, C., Giuseppe, A.V. (2016), An introduction to the special issue on the behavioral turn in public policy: New evidence from experiments. *Economia Politica*, 33, 323-332.

Çelik, S., Özerkek, Y. (2009), Panel cointegration analysis of consumer confidence and personal consumption in the European Union. *Journal*

of Business Economics and Management, 10(2), 161-168.

Curtin, R.T. (1982), Indicators of consumer behavior, *The university of Michigan surveys of consumers. The Public Opinion Quarterly*, 46(3), 340-352.

Dées, S., Brinca, P.S. (2013), Consumer confidence as a predictor of consumption spending: Evidence for the united states and the Euro Area. *International Economics*, 134, 1-14.

Dumitrescuc, E.I., Hurlin, C. (2012), Testing for granger non-causality in heterogeneous panels. *Economic Modelling*, 29(4), 1450-1460.

Eppright, D.R., Arguea, N.M., Huth, W.L. (1998), Aggregate consumer expectation indexes and indicators of future consumer expenditures. *Journal of Economic Psychology*, 19(2), 215-235.

Fuhrer, J.C. (1993), What Role does Consumer Sentiment Play in the US Macroeconomy? *New England Economic Review*, January/February, 32-44.

Garner, C.A. (1991), Forecasting consumer spending: Should economists pay attention to consumer confidence surveys? *Economic Review*, 76(3), 57-71.

Gelper, S., Lemmens, A., Croux, C. (2007), Consumer sentiment and consumer spending: Decomposing the granger causal relationship in the time domain. *Applied Economics*, 39(1), 1-11.

Gintis, H. (2000), Beyond homo economicus: Evidence from experimental economics. *Ecological Economics*, 35(3), 311-322.

Katona, G. (1951), *Psychological Analysis of Economic Behavior*. New York: McGraw-Hill Book Company, Inc.

Katona, G. (1968), Consumer behavior: Theory and findings on expectations and aspirations. *The American Economic Review*, 58(2), 19-30.

Knack, S., Keefer, P. (1997), Does social capital have an economic payoff? A cross country investigation. *The Quarterly Journal of Economics*, 112(4), 1251-1288.

Ludvigson, S.C. (2004), Consumer confidence and consumer spending. *The Journal of Economic Perspectives*, 18(2), 29-50.

Matsusaka, J.G., Sbordone, A.M. (1995), Consumer confidence and economic fluctuations. *Economic Inquiry*, 33(2), 296-318.

Mermod, A.Y., Çelik, S., Güneş, H. (2010), Frequency domain analysis of consumer confidence, industrial production and retail sales for selected European countries. 6<sup>th</sup> colloquium on modern tools for business cycle analysis. The Lessons from the Global Economic Crisis. Luxembourg: Jointly Organized by Eurostat and the European University Institute (Florence, Italy). p26-29.

Pesaran, H.M. (2004), General Diagnostic Tests for Cross Section Dependence Panels. CE Sifo Working Paper Series No. 1229, IZA Discussion Paper No. 1240. Available from: [http://www.papers.ssrn.com/sol3/papers.cfm?abstract\\_id=572504](http://www.papers.ssrn.com/sol3/papers.cfm?abstract_id=572504). [Last accessed on 2015 Mar 15].

Pesaran, H.M. (2007), A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics*, 22(2), 265-312.

Qiao, Z., McAleer, M., Wong, W.K. (2009), Linear and nonlinear causality between changes in consumption and consumer attitudes. *Economics Letters*, 102(3), 161-164.

Santero, T., Wasterlund, N. (1996), Confidence Indicators and Their Relationship to Changes in Economic Activity. OECD Economics Department Working Papers. 170. OECD Publishing. Available from: [http://www.oecd-ilibrary.org/economics/confidence-indicators-and-their-relationship-to-changes-in-economic-activity\\_537052766455](http://www.oecd-ilibrary.org/economics/confidence-indicators-and-their-relationship-to-changes-in-economic-activity_537052766455). [Last accessed on 2015 Apr 15].

Siergist, M., Gustcher, H., Earle, T.C. (2006), Perception of risk: The influence of general trust, and general confidence. *Journal of Risk Research*, 8(2), 145-156.

Utaka, A. (2003), Confidence and the real economy-the Japanese case.

- Applied Economics, 35(3), 337-342.
- Van Aarle, B., Kappler, M. (2012), Economic sentiment shocks and fluctuations in economic activity in the Euro Area and the USA. *Intereconomics*, 47(1), 44-51.
- Vuchelen, J. (2004), Consumer sentiment and macroeconomic forecasts. *Journal of Economic Psychology*, 25, 493-506.
- Webster's Revised Unabridged Dictionary. (2016), Available from: <http://www.dict.org/bin/Dict?Form=Dict3&Database=web1913>. [Last accessed on 2016 Nov 30].
- Zak, P.J., Knack, S. (2001), Trust and growth. *The Economic Journal*, 111(470), 295-321. Available from: <http://www.ec.europa.eu/eurostat>. [Last accessed on 2015 Apr 15].