

## HOW DEEP AND HOW LONG COULD BE THE RECESSION IN ROMANIA ?

Lucian-Liviu Albu<sup>1\*</sup> and Vasile Dinu<sup>2</sup>

<sup>1)</sup> *Institute for Economic Forecasting, Romanian Academy, Bucharest, Romania*

<sup>2)</sup> *Academy of Economic Studies, Bucharest, Romania*

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### Abstract

Using adequate composite indicators, indeed together with other specific models, to analyse high frequency time series and to obtain short-term forecasts can improve information for business environment, in modern era characterised by an accelerate process of changing. In our study we tried to build a composite indicator based on some monthly time series and to use it in order to obtain short-term forecasts for economic activity at national level. This indicator could be useful taking into account that actually there is no synthetic indicator to describe short-run dynamics of economic activity. To verify hypotheses of the estimating model for composite index, we used in case of Romanian economy the quarterly time series for the elements of it and quarterly published GDP as a benchmark indicator.

**Keywords:** composite index, economic recession, business cycle indicators, high frequency time series

**JEL Classification:** C22, C63, C82, E32

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### Introduction

The global crisis following other EU countries already affected Romanian economy in a severe manner. Today, all forecasts are changing rapidly. There are very different opinions regarding how deep and how long the actual recession could be. Synthetically, the pessimistic authors are viewing the future economic dynamics as one of so-called L type or U type, but the optimistic authors consider only a so-called V type dynamics. In any case, the medium- or long-term forecasts will be more affected by uncertainty.

Coming from the methodology of the composite index IEF-RO (Albu, 2008), we analyse the last time evolution of the Romanian economy under the effect of the actual global crisis. Moreover, based on absolute levels of GDP expressed in real (comparable) terms, we try to estimate few short-term scenarios of the GDP growth rate.

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\* Corresponding author, **Lucian-Liviu Albu** - [albul@ipe.ro](mailto:albul@ipe.ro)

### **1. Applying the composite index methodology for high frequency time series**

In order to compute a synthetic index to characterise the general economic dynamics in OECD countries, its Division of Economic Statistics for Short-Run started in 80's to build a system for evaluating a composite leading indicator in case of each member country. After a number of revisions and methodological reformulating, last years main efforts were concentrated on replacing quarterly series by monthly series. In cases where official publications do not satisfy this necessity it is recommended for conversion to use certain interpolating techniques. Last period, it is an intensification of efforts made by national organisms or research institutes from numerous countries in order to compute a composite indicator of business cycle and implicitly to elaborate better short-run forecasts. As example, we mention the using of principal component method, adapted conforming to the methodology of Global Insight under the coordination of Lawrence Klein for Russian and Romanian economies (within a project made under the Regional Think Tank Partnership Programme in 2002-2004 by CMASF-Moscow, IEF-Bucharest, and Global Insight-Eddystone, former DRI-WEFA, USA), and some attempts of research teams (including from IEF) to estimate the so-called monthly virtual GDP.

The components of business cycle indicators and even computing methodology are different from country to country. Moreover, in case of a country there are periodic revisions, the total number of individual indicators or components included in the composite indicator of business cycle is periodically changed. Generally, the methodology supposes a number of steps, implying time consuming processes for computing and testing statistic significance in case of a large number of macroeconomic variables or indicators in order to select the components to be included in the final version of composite index. Usually, there are three types of indicators: leading, coincident, and lagging indicators.

Burns and Mitchel (1946) defined the business cycle in terms of fluctuations in economic activity. GDP is mostly used as a measure of economic activity, but since GDP is only available at a quarterly frequency, extra variables are necessary to establish a monthly chronology. Therefore, we must look at other monthly macroeconomic variables. Usually, economic activity is defined explicitly in terms of monthly variables, namely employment, personal income, industrial production and manufacturing and trade sales, together making up the composite coincident index. Potentially relevant macroeconomic variables are evaluated based on how closely they track the cyclical behaviour of the reference series. The composite indexes of leading, coincident, and lagging indicators are summary statistics for an economy. They are constructed by averaging their individual components in order to smooth out a good part of the volatility of the individual series. Historically, the cyclical turning points in the leading index have occurred before those in aggregate economic activity, cyclical turning points in the coincident index have occurred at about the same time as those in aggregate economic activity, and cyclical turning points in the lagging index generally have occurred after those in aggregate economic activity.

In order to assess the properties of a given composite indicator, it is necessary to compare it with a reference series considered to be representative for economic activity. We have chosen GDP, since it is the most comprehensive variable among the official statistics, and also because it is regularly used in analysing the economic evolution. Since GDP is quarterly published, the assessment of the indicators was made on a quarterly basis (notwithstanding the fact that these are monthly indicators). Thus, the composite indicator was compared with the quarter-on-quarter growth rate and/or the year-on-year growth rate

of GDP. In case of our experiment for Romanian economy, as sample period we used 2001 Q1 – 2009 Q2. The procedure for computing the composite leading indicator supposes a number of six distinct steps, as follows:

- Building of a monthly (and quarterly) database for a reasonable large period, comprising the selected economic variables,  $V$ , supposed to be significantly correlated with aggregated economic activity;
- Testing statistically of the correlation and analysing the relation between each variable included in database and GDP as benchmark variable (by cointegration test and Granger causality test);
- Choosing of the variables (indicators) have to be included in composite index;
- Computing of month-to-month (or quarter-to-quarter) changes for each component. If the component  $X$  is in percent change form or an interest rate, simple arithmetic differences are calculated

$$v_t = V_t - X_{t-1} \quad (1)$$

When the component is not in percent change form, a symmetric alternative to the conventional percent change formula is used

$$v_t = 200 * (V_t - V_{t-1}) / (V_t + V_{t-1}) \quad (2)$$

- Adjusting of month-to-month (or quarter-to-quarter) changes to equalise the volatility for each component. First, standard deviations  $s_v$  of the changes in each component are computed. Then, these statistical measures of volatility are inverted

$$r_v = (1/s_v) * [1/\Sigma(1/s_v)] \quad (3)$$

where  $\Sigma(1/s_v)$  is the sum of inverse values of components  $v$  included in composite index (it is facile to demonstrate that, by construction, the sum of all components in composite index is equal to 1,  $\Sigma r_v = 1$ ). The adjusted change in each component is the month-to-month (or quarter-to-quarter) change multiplied by the corresponding component standardization factor

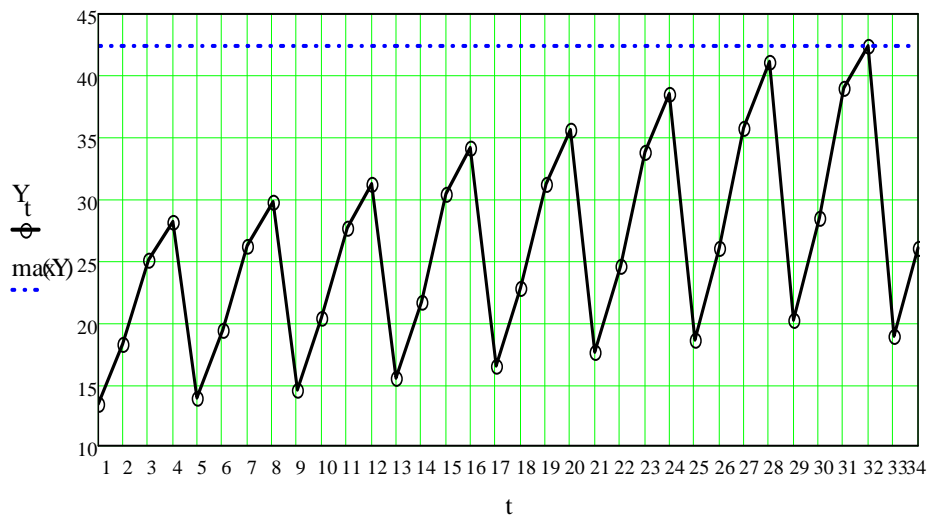
$$m_t = r_v * v_t \quad (4)$$

- The level of the index is computed using the same symmetric percent change formula and, in case of our application on Romanian economy, the index is re-based to average 100 in 2000 (as base year in case of quarterly data) and respectively in 2001 (as base year in case of monthly data).

Among the components to be included in the composite index we selected: Industrial production, Number of employees, Number of registered unemployment (with negative impact), Exports (FOB), and Imports (CIF). In case of considering quarterly data, the composite index for Romania, namely IEF-RO (Institute for Economic Forecasting – RO), reflects satisfactory the economic cycle for the period 2001-2009 (correlation coefficient = + 0.944530384 in case of trend and correlation coefficient = + 0.7518704122 in case of seasonal component).

**2. Identifying the moment when recession started**

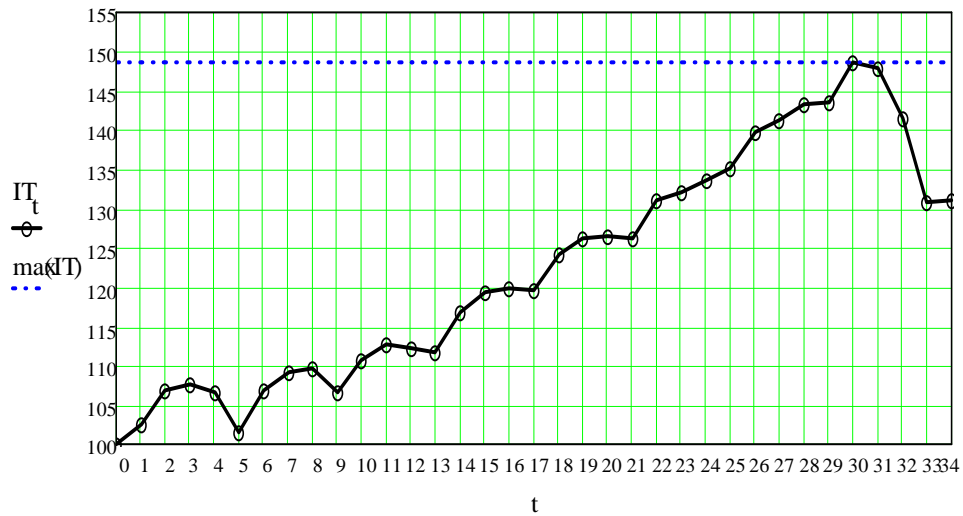
In order to find the point when the GDP started to decrease, we analysed a number of time series. One of them is the time series of the absolute level of GDP in constant prices. In Figure no. 1 is presented the evolution of quarterly GDP in constant prices (prices of the year 2000). On horizontal axe is the time (quarter) from 1 (2001 Q1) to 34 (2009 Q2) and on vertical axe the quarterly level of GDP in billion RON (constant prices). We can see a high seasonality in the GDP quarterly time series that makes difficult to identify a trust moment when the recession begun to affect the GDP trend (from Figure 1, the recession seems to begin only after Q4 in 2009, noted as 32 on the abscise axe). In Romania, contrary to the situation existing in other members of EU, mainly due to the relative high share of agriculture in GDP, there is an accentuated asymmetry in the structure of aggregated annual GDP by quarters. For instance, during the period 2000-2008, the shares of quarters in the annual GDP level where as follows: Q1 between 16.0-18.1%; Q2 between 21.6-22.8%; Q3 between 26.9-29.3%; and Q4 between 31.6-33.4%.



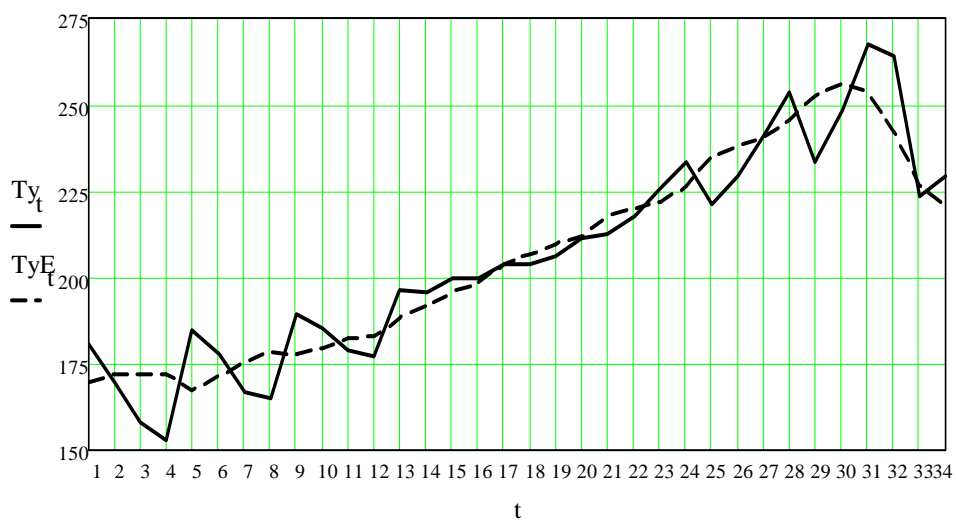
**Figure no. 1: The evolution of quarterly GDP in constant prices**

Other method we used to investigate the fluctuations is based on the time series of the computed quarterly composite index (noted as IT). In Figure no. 2 is presented the evolution of the estimated composite index during the period 2001 Q1 – 2009 Q2 (on the vertical axe, 100 means the average level of the year 2000, corresponding to 0 on the horizontal axe). We can see a more smoothed evolution comparing to Figure 1 (one reason could be that the composite index does not include directly the impact of agriculture). In this case, the signs of the recession seem to occur already after the end of the second quarter of last year, 2008 Q2 (noted as 30 on the horizontal axe in Figure no. 2). Moreover, in Figure no. 3 are presented the trend of the quarterly GDP index (Ty) and respectively the trend extracted from the quarterly time series of the computed composite index (TyE). This

time, the turnover point of trend seems to be placed in 2008 Q3-Q4 (noted as 30-31 on the horizontal axe in Figure no. 3).



**Figure no. 2: The evolution of the estimated composite index during the period 2001 Q1 – 2009 Q2**



**Figure no. 3: The trend of the quarterly GDP**

Taking into account last published data for the components of composite index, we computed the monthly composite index, IEF-RO, for the period December 2001 – July

2009. In Figure no. 4, where  $IL$  is the monthly composite index, is presented the resulted dynamics but only for the period December 2005 – July 2009. In this figure, the time (month) is noted on the abscise axe from 0 (December 2005) to 43 (July 2009) and on the vertical axe 100 means the monthly average level of 2001). We can see that the first signs of recession occurred after the turnover point represented by the maximum level of July 2008 (noted as 31 on the horizontal axe in Figure no. 4).

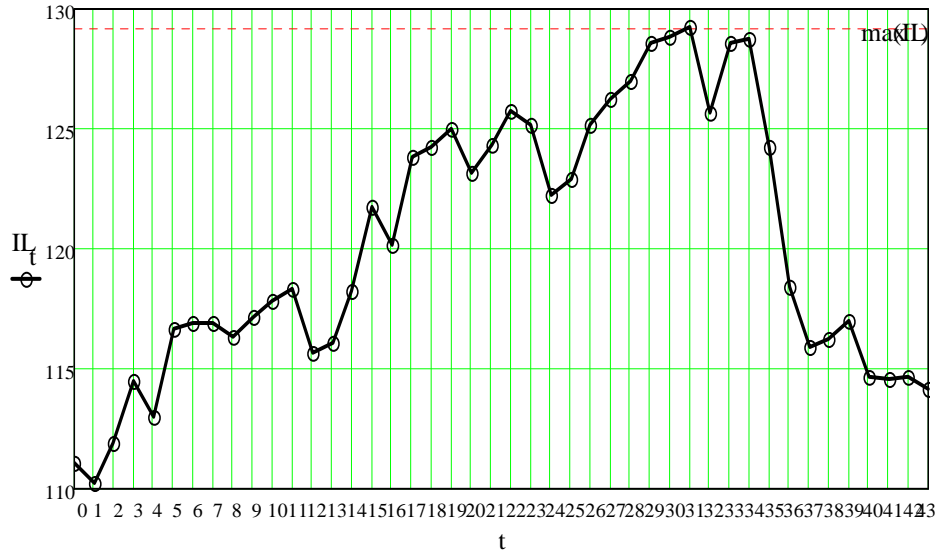


Figure no. 4: The resulted dynamics of monthly composite index for the period December 2005 – July 2009

### 3. Scenarios regarding the period of economic recession

Global economic crisis will affect, according to the Global Insight’s (GI, July 2009), the world economy in 2009 (-2.6%, after +2.2% in 2008), but in 2010 it is expect a positive growth rate (+2.0%) as well as in the period 2011-2014 (+3.8%). Also, the Blue Chip Consensus forecast (the Blue Chip Economic Indicators, August 2009) shows that the most affected zones in 2009 will be the majority of developed countries: Japan (-6.2%, after -0.7% in 2008); Eurozone (-4.4%, after +0.7% in 2008); US (-2.6%, after +1.1% in 2008); Canada (-2.2%, after +0.5% in 2008). Alone China will continue high growth (+7.7%, after +9.1% in 2008). For 2010 (the Blue Chip Consensus forecast - August 2009) and for the period 2011-2014, as average growth rate of real GDP (GI, July 2009), respectively, in case of all these zones is expected a recovering process of economic growth, as follows: +1.3% and +2.8% in Japan, +0.8% and +1.7% in Eurozone, +2.3% and +3.1% in US, +1.8 and +3.2% in Canada, and +8.6% and +9.2% in China. One conclusion of GI study is: countries that aggressively fought to stabilize financial markets will recover sooner and stronger. The other one is that economic recovery will be uneven across the globe as some countries remain in recession while others have already begun to grow. Countries especially hit hard by credit bubbles will face protracted adjustments. In any case, the global economy will continue to remain below potential growth through at least 2010. Positive aspects are

referring to the facts that investors remain optimistic about future demand growth relative to current market conditions and that several major economies (Japan, Germany, China) have responded positively to the significant monetary and fiscal stimuli, while the future growth may remain weak given lackadaisical external demand.

Indeed, in case of Romania the future trend will be decisively influenced by the global economy and especially by external demand coming from its EU partners. Generally, it is expected a delay in recovering process in Romania, its more fragile economy being more affected by global crisis comparing to the case of developed countries. However, for the Romanian economy a deep recession is expected also in 2009. Beginning with 2010, some forecasts (IMF, EU) show a slow but firm recovering process. Romanian economy will continue to remain below the potential growth at least a couple of years after 2009.

Coming from the existing data, in order to prepare scenarios for next period we are analysing some significant facts. Thus, the GDP decreased in the first two quarters of 2009 against the corresponding periods in 2008 by -6.2% and by -7.6% respectively, resulting for the first semester of 2009 a GDP growth rate of -7.6%. However, comparing to the corresponding period of 2007, in 2009 the absolute level of GDP, in constant prices, registered a positive growth rate of about +0.8% (around +1.7% in Q1 and around +0.1% in Q2).

If during the following two quarters in 2009 the absolute levels of GDP in constant prices will be equal to those registered in the corresponding quarters of 2007 (thus results weaker than in the first semester of 2009), then the quarterly GDP growth rate against 2008 will be by -8.7% in Q3 and by -3.1% in Q4 respectively. In this case, at the level of the whole year 2009 the resulted GDP growth rate against previous year is -6.4%. This scenario could be considered as a basic one.

Other scenario could consider for the second semester of 2009 the same growth rate of GDP relatively to the year 2007 like in case of the first semester, namely +0.8%. According to this scenario (named optimistic), the resulted annual GDP growth in 2009 will be by -6.0% against the year 2008.

In case that the economic conditions will be more depreciated in last two quarters of 2009, the absolute level of GDP in constant prices registering values even smaller than in the corresponding quarters of 2007, the recession will be more sever at the level of the entire year 2009. For instance, a decrease in GDP by -9.0% in the second semester against the corresponding semester of previous year will result in a deeper negative annual growth rate, namely -8.5%. This scenario could be considered as a pessimistic one.

## **Conclusions**

Composite indicators, using high frequency time series, could be useful tools to analyse past evolution of national economy, to evaluate certain factors of business cycles and to forecast economic activity at macroeconomic level in short-run. A composite index can be an adequate tool to replace at the monthly level the GDP (usually reported quarterly), as a "virtual monthly GDP". Based on quarterly time series of the composite index, the starting point of recession in Romania seems to be placed in 2008 Q3-Q4 and using monthly time

series of it the first signs of recession occurred after the turnover point represented by the maximum level of July 2008.

Conforming to the so-called basic scenario, at the level of the whole year 2009 the GDP growth rate against previous year could be -6.4%. Beginning with 2010, a slow but firm recovering process could register in Romania. Perhaps, the economy will continue to remain below the potential growth at least a couple of years after 2009.

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