RISK AND ECONOMIC GROWTH

Radu STROE

Finance Department
Academy of Economic Studies, Bucharest

In the expectation of the EU integration, the improvement of the economic growth on medium term constitutes a national strategic objective. The achievement of a compatible economy regarding to the mechanism, structure and legislative with the EU countries economies allows for a multitude of actions and measures that must be realized, inclusive the evolution until certain levels of some synthetic economic indicators that characterizes economic growth. This paper presents the evolution of the economic growth indicators in period 1990 – 2004 as well as the evolution of the factors that contributes to economic growth.

Keywords*: economic growth, risk, macroeconomic indicators, multi-criteria analysis*

The economic growth improvement on medium term in the expectation of the EU integration constitutes a national strategic objective. Through that have been pursued the setting up of compatible economy regarding to the mechanism, structure and legislative with the EU countries economies. The achievement of this goal allows for a multitude of actions and measures that must be achieved, inclusive the evolution until certain levels of some synthetic economic indicators that characterizes economic growth. Is expected an improvement of the production force return, the growth of saving rate, the increase of the entrance of the foreign capital. The development Romanian strategy on medium term foresees the levels of some macroeconomic indicators thus:

- ✓Annual growth rate of GDP 4,75%;
- ✓Budgetary deficit rate in GDP 3%;
- ✓Inflation rate under 10%.

The characterization in dynamic of the economic growth has distinguished the measure of tending to the selected target. In this scope we are studying the Romanian economic growth in the 1990 – 2004 periods expressing the following premises:

1)Multi-criteria characterization;
2)Measurement of the tendency toward ideal situation.

Multi-criteria analysis is realized taking into account five indicators for economic growth. For each of them we have accepted a variation interval min-max. The maximum variation margin evaluates less favourable value of the indicator, while minimum variation margin evaluates the best favourable value that is ideal situation. (table 1).

Table 1

Indicator	Maximum margin	Minimum margin
1. growth rate of real GDP	-25%	10%
2. unemployment rate	20%	0%
3. inflation rate	500%	1%
4. share in GDP of the consolidate public budget balance	-12%	4%
5. share in GDP of the current account balance	-10%	4%

The interval margins are chosen taking into account the values registered in the last 15 years by approximate 80 countries, in accordance with the published dates by World Bank and covering nearly 93% from the punctual cases. For the forth indicator, both the GDP and the budget balance are estimated in national currency and for the fifth indicator both GDP and current account balance are estimated in USD.

The values for Romania (table 2) are gathered from Statistical yearbook, Annual Reports of Romanian National Bank and information provided by Finance Ministry. For year 2004, the values represent forecasts expressing in September – October 2004 by some public institutions, officials of some associations and economic analysts, through mass-media or in specialty articles. The reference years from the interval have been marked the end of the electoral period.

Table 2

Indicator	1990	1992	1996	2000	2004
1. growth rate of real GDP	-5,6	-8,8	3,9	2,1	5,0
2. unemployment rate	0	8,2	6,6	10,5	6,8
3. inflation rate	5,1	210,4	38,8	45,7	11,5
4. share in GDP of the consolidate public budget balance	1,0	-4,7	-3,8	-4,0	-2,1

This paper was recommended for publication by Prof. Vasile ILIE, PhD

5. share in GDP of the current account balance	-8,7	-8,0	-7,3	-3,7	-6,6

The considered indicators define a R^5 space. If the multi-criteria analysis is extended to more indicators, then is defined R^n space generally, where each indicator represent a dimension. The image of a space like this is considered to be a "sectored" circle through range, on each range stand for an indicator. Because their measure units, as well as their dimension are different is proceeded to the standardizing for each indicator in the $[0;1]$ interval. In the sense of above work hypothesis accepted in this study, the standardization relations are presented in the table 3.

Table 3

Indicator	Relation of setting rates quotas
1. growth rate of real GDP	$(25+x)/35$
2. unemployment rate	$(20-x)/20$
3. inflation rate	$(500-x)/499$
4. share in GDP of the consolidate public budget balance	$(12+x)/16$
5. share in GDP of the current account balance	$(10+x)/14$

In this table x represents the value to the moment t of the concerned indicator, the variable $t = 1,2,3,4,5$ representing successively years 1990, 1992, 1996, 2000 and 2004.

The representation of each indicator is realized through the standardize value, on two of the circle range with the maximum value in the centre of the circle and with the ideal value on their perimeter. It can be defined into these one sector two triangles:

- one to the maximum dimension, ideal, consisted in those two ranges and in the cord that stretch circle arc resulted from the intersection of two those ranges with the circle perimeter;
- the second, consisted in the straight segment from each of those two ranges where the standardize values of those two indicators delimits on the range of each indicator, to this adding the straight segment that units the top of these segments.

The triangle area (ii) expressing the contribution to the economic growth of those two indicators that defines the triangle. In the general case, the representation of the economic growth is a hyper-polygon in the R^n space, reduced to a hyper-pentagon in the conditions of study hypothesis. The measure of this growth is the hyper-polygon area resulted from adding the areas for those n triangles that build it. For multi-annual comparing, this area may be standardized in accordance with the ideal situation that is in accordance with the area of the regular hyper-polygon of the R^n space, which on the limit $(n \to \infty)$ is even the circle area. In the work conditions of this analysis is referred to the regular pentagon area.

It must be mentioned that for each indicator the representation of their maximum value is even the range length on which the indicator is stand for. Both the ideal value of the economic growth (the area of the regular hyper-polygon from the R^n space) and the effective value of the economic growth (the area of the hyper-polygon defined by the setting rates quote of the indicators) are in function of the circle range. The standardization of the effective value of the economic growth in relation to their ideal value is realized through those two values reference. The result does not depend on the range size but is a percent, a share from ideal value that permits annual compares.

The study may be deepen through determining of the factors contribution (in the sense of factorial analyses) to the realization of the effective level of the economic growth registered in one of the years to the analysed temporal series. The area of each n triangle that constitutes the economic growth hyper-polygon may be separated in two components: the contribution of each of those two indicators that defines the concerned triangle. This separation can be realized on the base of the share that has the standardization value of each of those two indicators in the sum of this two standardized values. Each indicator contributes through two triangles: for examples the indicator i $(i = 1,n)$ has a contribution to the economic growth in combination with indicator $i+1$ (the indicator that follows in the analyse order) as well as indicator $i-1$ (the indicator prior to the analyses order). Adding the contribution of this indicator from those two triangles is obtained the total contribution of the indicator i to the economic growth. Then, is divided this value to the hyper-polygon area and is determined, in percent, the measure of the contribution of i factor to the measure of the economic growth at the t moment.

For the general case and a specified moment t are defined n triangles $T_{i,i+1}$, $(i = 1,n)$, thus if $i+1 > n$ the defined triangle is $T_{n,1}$. Each triangle $T_{i,i+1}$ has three sides, thus:

- the side i of the size $x_i * R$ representing standardized value of the indicator i; we are identifying in continuation as a letter ;

 This paper was recommended for publication by Prof. Vasile ILIE, PhD

- the side $i+1$ of the size $x_{i+1} * R$ representing standardized value of the indicator $i+1$; we are identifying in continuation as b letter;
- the side „base"; we are identifying in continuation as f letter and their size is:

$$f = R * \sqrt{x_i^2 + x_{i+1}^2 - 2 * \cos\frac{360}{n} * x_i * x_{i+1}}$$

where R is the circle range.

It is calculated the triangle area:

$$AT_{i,i+1} = R^2 * \sqrt{p * (p-a) * (p-b) * (p-f)}$$

where $p = \frac{a+b+f}{2}$.

The polygon area is: $AP = R^2 * \sum_{i=1}^{n} AT_{i,i+1}$.

The measure of the economic growth is:

$$\delta = \frac{AP * R^2}{AP_n * R^2} = \frac{AP}{AP_n}$$

where AP_n is the area of the regular polygon area of n sides, that is the ideal measure of the economic growth, similarly determined of AP and where the sides measures are: $x_i = x_{i+1} = R$.

The contribution of one factor, for example x_i to the economic growth is realized in combination with other two factors, respectively x_{i-1} and x_{i+1}. The expression of this contributions is founded through the triangles areas $AT_{i-1,i}$ and $AT_{i,i+1}$, and is determined for each case after the relation:

$$\frac{x_i}{x_{i-1} + x_i} * AT_{i-1,i}$$

respectively

$$\frac{x_i}{x_i + x_{i+1}} * AT_{i,i+1}$$

that is in total, for example C_i:

$$C_i = \frac{x_i}{x_{i-1} + x_i} * AT_{i-1,i} + \frac{x_i}{x_i + x_{i+1}} * AT_{i,i+1}$$

to which the percent expression in the measure of the economic growth is: $\frac{C_i}{AP}$

where $\sum_{i=1}^{n} \frac{C_i}{AP} = 1$ and $\sum_{i=1}^{n} \frac{C_i}{AP_i} = \delta$.

In the conditions of the hypothesis used in the realization of this study, the standardized values for those five indicators are (table 4):

Table 4

Indicator	Standardize values				
	1990	1992	1996	2000	2004
1. growth rate of real GDP	0,544286	0,462857	0,825714	0,774286	0,857143
2. unemployment rate	1	0,59	0,67	0,475	0,66
3. inflation rate	0,991784	0,580361	0,924248	0,910421	0,978958
4. share in GDP of the consolidate public budget balance	0,8125	0,45625	0,5125	0,5	0,61875
5. share in GDP of the current account balance	0,092857	0,142857	0,192857	0,45	0,242857

Table 5

Year	Pairs of factors					Sum of the factors pair contribution	Measure of the economic growth
	1&2	2&3	3&4	4&5	5&6		
1990	0,263579	0,471621	0,383192	0,035877	0,024521	1,17879	49,58%
1992	0,129860	0,162827	0,125915	0,030995	0,031443	0,48104	20,23%
1996	0,263076	0,294470	0,225247	0,047001	0,239466	1,06926	44,97%
2000	0,174893	0,205643	0,216466	0,106994	0,165688	0,869684	36,58%
2004	0,269013	0,307245	0,288043	0,071457	0,098988	1,034746	43,52%

The AP_5 value is 2,377641288 representing the ideal economic growth. The cipher 1,2,3,4,5 through which are identified the factors, correspond to their order number in the previous tables.

The value of the contribution of one factor i through those two combinations where they enter $(i-1, i)$ and $(i, i+1)$, as well as on the total is presented in the table 6:

Table 6

Year	Factor's contribution				
	1 – TOTAL through 1&2 through 5&1	2 – TOTAL through 1&2 through 2&3	3 – TOTAL through 2&3 through 3&4	4 – TOTAL through 3&4 through 4&5	5 – TOTAL through 4&5 through 5&1
1990	0,115	0,406365	0,445472	0,204755	0,007198
	0,093997	0,169582	0,234838	0,172558	0,003680
	0,021003	0,236783	0,219634	0,032197	0,003518
1992	0,080730	0,154855	0,151238	0,078024	0,015193
	0,057089	0,072771	0,080743	0,054420	0,007391
	0,025641	0,082084	0,070495	0,023604	0,007802
1996	0,339488	0,241598	0,315616	0,114497	0,058061
	0,145232	0,117844	0,170716	0,080347	0,012851
	0,194256	0,123754	0,144900	0,034150	0,045210
2000	0,213183	0,137003	0,274865	0,133051	0,111582
	0,108396	0,066497	0,135137	0,076738	0,050681
	0,104787	0,070506	0,139728	0,056313	0,060901
2004	0,229119	0,240754	0,360011	0,162867	0,041995
	0,151985	0,117028	0,183519	0,111551	0,020141
	0,077134	0,123726	0,176492	0,051316	0,021854

The dynamic of the economic growth measure and of the factor contribution share is presented in the table 7:

Table 7

Indicator	**1990**	**1992**	**1996**	**2000**	**2004**
Measure of the economic growth (%)	49,58	20,23	44,97	36,58	43,52
Factors share (measure of the economic growth = 100) 1. growth rate of real GDP	9,76	16,78	31,73	24,51	22,14
2. unemployment rate	34,47	32,19	22,59	15,75	23,27
3. inflation rate	37,79	31,44	29,52	31,61	34,79
4. share in GDP of the consolidate public budget balance	17,37	16,22	10,71	15,30	15,74
5. share in GDP of the current account balance	0,61	3,17	5,43	12,83	4,06

From this analyse has detached some conclusions:

1. in 1990 the economic growth evaluated through those five indicators is realized on a level of approximate 50% from their ideal value; this level is posible to be reached in 2004, more sure in one of the next years.
2. the evolution tendency of the economic growth is fluctuating on the electoral period, with a peak in 1996 (approximate 45%) and another appropriate, but lower in 2004 (43,5%), on a average of 39%; that means a measure of the economic growth of approximate 2/5 from the ideal.
3. the contribution of the financial-monetary factors to the economic growth is included between 46% (in 1996) and 60% (in 2000), that means that in 1996 – 2000 interval financial monetary politics was more efficient or in decisional-politic plan was more insisted on the economic financial-monetary factors.
4. the amplitude factor in the economic growth is inflation rate that generally contribute with approximate 1/3 towards economic growth; and the most dynamic factor is the increase rate of the real GDP that gains in the 1996 – 2000 interval approximate 12 percents and pass from a contribution of approximate 1/10 in economic growth to a contribution of more than 2/10.
5. from the studied factors, the first four factors explain in quasi-totality the economic growth measure, respectively 95% and more.
6. in the perspective of a medium horizon of is expected a keeping up of the economic growth because of the contribution of the consolidate budget share in GDP because this will be stabilized around the value of 2,0 – 3%. Thus, the improvement of the economic growth will follow to be realized on the base of the politics related to the increase rate of the real GDP, inflation rate and unemployment rate.

References:

This paper was recommended for publication by Prof. Vasile ILIE, PhD

1. Alesina A., Perotti R. – Fiscal expansions and fiscal adjustment in OECD countries, NBER, 1995;
2. Croitoru L., Târhoacă C. – Fiscal Policy in Romania, CEROPE, Bucharest, 1999;
3. Kosterna U. – The fiscal policy stance in central and eastern Europe in comparison to UE countries, „Economic Policy Initiative", 1997;
4. Moşteanu T., Stroe R., Alexandru F., Moşteanu R., Armeanu D., Tâțu L., Câmpeanu E. – Fiscal and Budgetary Policy for economy reforming and improvement of the Economic Growth, Economic, Bucharest, 2003;
5. Stroe R., Tâțu L. – Aspects of the budgetary politics application in the medium term development strategy, „Finance and History", ASE, Bucharest, 2003;
6. Văcărel I. – Fiscal and Budgetary Policy for economy reforming and improvement of the Economic Growth, Economic, Bucharest, 2003.