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**Model for Qualitative Static and
Dynamic Evaluation of Performance of
the Export Sectors in Romania during
2009 - 2012**

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Dr. Gregory T. Papanikos
President
Athens Institute for Education and Research

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**Model for Qualitative Static and Dynamic Evaluation of
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Abstract

The approach considered by the team of authors is justified by the fact that the period 2009 - 2012 was characterized by an economic crisis that Romania has experienced to the fullest, and because it is important to identify the sectoral behavior of Romanian companies in the foreign markets in this period.

The measure of external sectoral competitiveness of the Romanian companies is given by their presence in the foreign markets, measured by the value of sales in these markets. The model proposed by authors assesses the static and dynamic behavior of the companies in the Romanian export sectors relative to the national average. The research aims to identify by an appropriate model the strong sectors that were responsible for success, as well as the poor performing sectors that may turn into significant vulnerabilities in the future.

The results show that during the crisis, on the background of a significant overall increase in the index values of Romanian exports in the export structure prevailed the sectors that may be considered as relative or significant strengths and the sectors with clear opportunities for success, while the sectors with potential vulnerabilities became sectors that in previous years held top positions in the structure of exports and still have significant shares in value added and employment structure, which may foreshadow serious adjustment and social problems in the future. Also, there is a significant change in structure in 2012

Romania's export specialization as compared to 2008, namely the advance of technologically advanced sectors and the decline of energy-intensive and/or OPT-based sectors.

Keywords: competitiveness, export performance, static and dynamic evaluation, Romania

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Why such a research?

Competitiveness of a country encompasses a double dimension:

a. Increasing the presence of the country in world markets: struggle to win more consistent market segments for excess products (which first implies their external competitiveness).

The phenomenon was called “aggressiveness” by specialists and refers to promotion on the external markets of both goods and services produced by a country and to implantation of its investments in foreign territories and the attempt to establish its national cultural values in the international arena.

b. Opening domestic markets to global competition: liberalization of interfacing systems between the national and the international economy obtained by active policies to attract foreign investment in terms of predictability of business environment of the host countries. This dimension has been called "attractiveness".

The measure of external sectoral competitiveness of the Romanian companies is given by their presence in foreign markets, quantified by the value of sales in these markets.

The approach taken by the team of authors is justified by the fact that the period 2009 - 2012 was characterized by an economic crisis that Romania has experienced to the fullest, and also because it is important to identify the sectoral behavior of the Romanian companies in the foreign markets in this period.

Interest in this issue also results from the following data on the Romanian economy during the period 2009 - 2012:

- indices of GDP variation,
- variation indices of gross value added in industry,
- variation indices of export value.
- The data are presented in Table 1.

Table 1.

No.	Index name	2009	2010	2011	2012	2009 / 2012
1	Gross domestic product	0.934	0.989	1.022	1.007*	0.951
2	Gross value added in industry	0.986	1.040	1.001	0.990*	1.016
3	Export	0.862	1.285	1.212	0.995	1.336

* Provisional data.

Source: National Institute of Statistics.

The results constitute a “premiere” in Romania after 1989 because:

• For a significantly subunit index of GDP during 2009 - 2012, the industrial gross value added index is higher than one. This is due to the paradox recorded in 2010, when, for the first time, a decrease in GDP was accompanied by an increase by 4% in gross value added in industry.

• In the crisis period 2009 - 2012, the volume index of Romanian exports increased by 33.6%, with a peak of 1.285 in 2010!

The important conclusion that emerges from the data is that in terms of aggressiveness the competitiveness of Romania increased during 2009-2012.

The current research aims to identify the causes of this situation, defining by an appropriate model the sectors that were strengths and responsible for this success, as well as the weaknesses, sectors with performance that may turn into significant vulnerabilities in the future.

Model for static and dynamic evaluation of performance of the export sectors of Romania in the period 2009 - 2012

We characterize the international trade of Romania by two basic dimensions:

- The value of exports, in EUR million, denoted by Ex,
- The coverage of imports by exports, denoted by Ga.

The model assesses statically and dynamically the behavior of companies in the Romanian export sectors relative to the national average. In this way, we highlight the "strong" and "weak" sectors in terms of external competitiveness in the period 2009 – 2012.

The model has two components: static and dynamic.

The static component evaluates the state of exports, E_{xi} , and of coverage of imports by exports, G_{ai} , positioning each sector relative to the national average in 2012.

The dynamic component evaluates the state of indices of annual change in exports, I_{VExi} , and of indices of annual variation of coverage of imports by exports, I_{Gai} , compared to the national values of the same indices.

In both evaluations, the values higher than the national average are considered positive indicators, and those below the national average, negative.

The scale of the model is an ordinal Likert scale.

For the static evaluation, five classes are used, defined as in Table 2.

Table 2.

No.	Class	Significance	Number of points
1	A ⁺	Significantly favorable state	+2
2	A	Favorable state	+1
3	B	Neutral state*	0
4	C	Unfavorable state	-1
5	C ⁻	Significantly unfavorable state	-2

* The neutral state occurs when the sectoral value ranges within limits of $\pm 0.5\%$ of the national average.

Dynamic evaluation uses a dynamic state diagram, which positions in each year the class of sector classification as according to the ratios of the two indices of sectoral variation, I_{VExi} and I_{Gai} , to the national average. The scale used in each year ranges from 1 (class C⁻) to 5 (class A⁺).

The average of dynamic evaluation is calculated as $Ed = \frac{\sum_{i=1}^4 Ni}{4}$, defining

$$\frac{\sum_{i=1}^4 Ni}{4}$$

for each sector five classes with the meanings given in Table 3.

Table 3.

No.	Class	Significance	Ed value
1	A ⁺	Significantly favorable state	[4,5 ; 5]
2	A	Favorable state	[3,5 ; 4,5)
3	B	Neutral state	[2,5 ; 3,5)
4	C	Unfavorable state	[1,5 ; 2,5)
5	C ⁻	Significantly unfavorable state	[1,0 ; 1,5)

The overall assessment of the behavior of a sector in terms of international trade relative to national average is done by synthesizing the results into a matrix divided into five areas, as shown in Figure 1.

Figure 1.

A⁺	IV		+		III
A			+		
B	-	-	V	+	+
C			-		
C⁻	I		-		II
	C⁻	C	B	A	A⁺

The significance of the evaluation matrix is as follows:

Area I - unfavorable static and dynamic states,

Area II - static state significantly favorable as compared to dynamic state,

Area III - favorable static and dynamic states,

Area IV - dynamic state significantly favorable as compared to static state,

Area V - neutral static state and/or dynamic state.

Area I identifies the sectors that are deemed as 'weaknesses'.

Area III identifies the sectors that are deemed as 'strengths'.

Area II identifies the sectors with significant potential vulnerabilities.

Area IV identifies sectors with important opportunities for success.

Area V identifies the neutral behavior in relation to the national average at least for a state, and the possible strengths or weaknesses for the other states. Sub-areas denoted by "+" mean relative strengths and the ones denoted by "-" mean a relative weaknesses at the level of one of the criteria.

The novelty of the proposed evaluation model is that the matrix representation is a temporal SWOT (strengths, weaknesses, opportunities, threats) analysis.

Thus, the performance of a company, of a sector of the economy, or of a country is simultaneously characterized by a static and dynamic diagnosis. Evaluations are always reported to references with distinct values in each analyzed period (month, quarter, semester, or year).

The reference values of the model are shown in Table 4.

Table 4.

No.	Name	Symbol	2008	2009	2010	2011	2012
1	Export, EUR mil.	Ex					45056.2
2	Coverage of imports by exports	Ga					0.824
3	Average sector* export, EUR million						1802.2
4	Volume indices of exports	I _{VEx}	-	0.862	1.285	1.212	0.995
5	Index of coverage of imports by exports	I _{Ga}	-	1.268	1.067	1.034	1.000

* 25 goods export sectors were selected. Sectors without export or with export values less than 0.15% of the total value of exports were excluded.

To obtain the two evaluations, the following steps must be carried on:

a. Compare the values of two dimensions selected for assessment of static state in 2012, each sector with the benchmark values. The results rank the sector within one of the five classes of static evaluation, Es (A⁺, A, B, C, and C⁻).

b. Compare the values of the two indices of variation with national averages for each of the years from 2009 to 2012. Average of number of points scored according to grading from 1 (class C⁻) to 5 (class A⁺) ranks the sector into one of the five classes of dynamic assessment, Ed.

c. The classes of static and dynamic assessments are marked in the evaluation matrix.

Finally, the overall evaluation, Eg, ranks the analyzed sectors in one of the five above-defined zones¹.

¹Detailed results are presented in annexes available upon request. They could not be presented in the paper, because of publishing requirements.

Overall static and dynamic qualitative assessment of performance of the export sectors of Romania through their inclusion in the evaluation matrix

The matrix in Figure 2 is a summary of the overall performance of the export sectors of Romania according to the static and dynamic components, Es and Ed.

Figure 2.

Ed						
A ⁺	10 <i>IV</i> 21		+	<i>III</i>	22	
A	25 23		16 20 31 + 28 26	27	1 29	
B	17 13 32 11 -	-	30 12 99* <i>V</i>	+	24 +	
C			- 15		19	
C ⁻	<i>I</i>		35 -	<i>II</i>	14	
	C ⁻	C	B	A	A ⁺	Es

Goods not elsewhere classified.

a. 'Strengths' export sectors, falling into the third area of the overall evaluation matrix:

Sector 01: Agriculture, hunting and related services

With 1.666 rate of growth of exports in 2012 as compared to 2008 and an above unit coverage of imports by exports (1.452 in 2012), the sector demonstrates the huge potential of Romanian agriculture for exporting agricultural products with low processing.

Sector 22: Manufacture of rubber and plastic products

The sector has a growth index of exports of 1.913 in 2012 as compared to 2008 and has the highest constancy in dynamic performance, achieving in each year of the analyzed period values of the two criteria that exceed the national average.

Sector 27: Manufacture of electrical equipment

The sector has the third share of exports of the 25 sectors covered, and an index of exports growth of 1.457 in 2012 as compared to 2008. Performance of the sector in 2012 and in the period from 2009 to 2012 allowed the inclusion of the sector in area III - Class A of the evaluation matrix.

Sector: 29 Manufacture of motor vehicles, trailers and semi-trailers

The sector is the export leader of Romania, with 16.795% a share of total exports. The growth index of export volume amounted to 1.748 in 2012 as compared to 2008. Dynamic evolution has undergone some changes as compared to the national average, while allowing the sector classification in Class A.

The Automobile Dacia SA Company, a subsidiary of the Renault Group, is the leader of the Romanian exporters.

b. Export sectors with "neutral state" and relative strengths of dynamic component, falling into the V+ sub-areas of the overall evaluation matrix.

Sector 16: Wood processing, manufacture of wood and cork products, except for furniture; manufacture of articles of straw and plaiting materials

The relatively small share of the sector in the 25 analyzed sectors is matched by one of the highest rates of coverage of imports by exports (3.935 in 2012).

The dynamic performance of the sector was mostly higher than the national average.

Sector 20: Manufacture of chemicals and chemical products

The very high share of exports as compared to the national average is accompanied by a very low coverage of imports by exports (0.466 in 2012). The dynamic performance allowed for including the sector into class A. The vulnerability of exports and, further, of coverage of imports by exports, rests in making efficient the Olchim Rm. Vâlcea Company, the second Romanian exporter during the period 2008-2010.

Sector 24: Metallurgy

The share of exports is the fourth of the 25 analyzed sectors. The peculiarity of the sector is the major annual variation of dynamic assessment in relation to national averages. Conjectural vulnerability determined by variations in export demand is evident.

Sector 26: Manufacture of computer, electronic and optical products

The large share of exports of the 25 sectors and the growth rate of exports of 1.571 in 2012 as compared to 2008 are, unfortunately, accompanied by a significant decrease in the coverage of imports by exports, which reached in 2012 a value significantly lower than the national average (0.618).

The peculiarity of the dynamic evolution lies in the severe worsening of criteria values related to the national average in 2011 and 2012, due to the relocation outside Romania of Nokia's subsidiary in Cluj. Only the maximal evaluations obtained in 2009 and 2010 determined the dynamic performance to be included in class A.

In the absence of Nokia (the second largest exporter of Romania in 2010), the future of the sector exhibits uncertainty regarding exports. One may note that the value of exports decreased by 31.5% in 2012 as compared to 2011, which requires strong government policies to attract strategic investors, usually reputed multinational companies.

Sector 28: Manufacture of machinery and equipment, n.e.c.

The relatively large share of the sector in the total of 25 sectors is accompanied by a very low degree of coverage of imports by exports (0.628 in 2012).

After the first two years with very positive development in relation to national averages, it followed a period of worsening of criteria values, which, however, allowed classification of the sector into class A. The importance of the sector requires government policies to attract foreign investors, usually reputed multinational companies.

Sector 31: Manufacture of furniture

The relatively small share of the sector in the total exports of the 25 analyzed sectors is compensated by a high value of coverage of imports by exports (4.212 in 2012).

Dynamic assessment records some variations that place the sector into class A.

c. Export sectors with "neutral" state and relative weaknesses of static or dynamic components, falling into the V sub-areas of the global assessment matrix

- 11 - Manufacture of beverages
- 13 - Manufacture of textiles
- 17 - Manufacture of paper and paper products
- 32 - Other manufacturing, n.e.c.

The four sectors are virtually in identical situations. The shares of exports in 2012 were less than the national average and the values of coverage of imports by exports were significantly lower than the national average. Consequently, all sectors were covered by class C of the static evaluation.

The dynamic performance is neutral in relation to the assembly of the 25 analyzed sectors, making them fall into Class B.

- 15 - Tanning and dressing of leather, manufacture of luggage, handbags, saddlery and harness; dressing and dyeing of fur
- 35 - Production and supply of electricity, gas, steam and air conditioning

The two sectors are virtually in identical circumstances in 2012. They have lower shares of exports relative to national average and values of coverage of imports by exports above the national average. As a result, the static assessment places them into class B.

Overall dynamic performance is below the national average, which led to the classification of these sectors into class C (code 15) and C⁻ (code 35).

d. Export sectors with "neutral" state framed into the V area of the overall evaluation matrix

12 - Manufacture of tobacco products

30 - Manufacture of other transport means

99* - Goods not elsewhere classified

Overall, each of the three sectors has neutral static and dynamic performance as compared to national averages and is ranked in both assessments in class B, in the V area.

e. Export sectors with unfavorable static state and favorable dynamic state, framed into the IV area of the overall evaluation matrix

Sector 10: Food industry

With a share of exports still low as compared to the national average and with a lower coverage of imports by exports (0.402 in 2012), the sector obtained static assessment into class C⁻. However, what is essential in the case of this sector is the dynamic performance superior to national averages in both criteria, achieving the overall score 4.5, and, thus, falling into class A⁺.

For the entire period 2009 - 2012, the results of the sector are exceptional:

- The export volume index is 2.840 in 2012 as compared to 2008!
- The coverage of imports by exports is 2.69 in 2012 as compared to 2008!

Food industry is a very important opportunity for success in the foreign markets and support should be particularly provided, because by processing the primary products of agriculture the "systemic personality of the Romanian economy, namely agriculture and food industry", is strengthened. We mention that the food industry is the manufacturing leader of Romania, covering about 25% of gross value added of industry.

Sector 21: Manufacture of basic pharmaceutical products and pharmaceutical preparations

The sector has low share of exports as compared to the national average, a low coverage of imports by exports (0.361 in 2012) and, consequently, is framed into Class C⁻ of static evaluation.

The dynamic performance is superior to national averages in each year, obtaining the average 5 and being classified into class A⁺.

During 2009 - 2012, the sector:

- Reached an index of exports growth of 5.490 in 2012 as compared to 2008!

- The coverage of imports by exports has risen from 0.09 in 2008 to 0.361 in 2012.

There is no doubt that the creation of new capacities and development of the existing ones in the industry is a clear opportunity for success in order to increase Romania's external competitiveness.

Sector 23: Manufacture of other non-metallic mineral products

The lower values for the two static evaluation criteria in relation to national averages led to framing the system in class C⁻ of the static evaluation.

Significant improvement in dynamic performance in 2012 as compared to 2011 allowed for framing the sector into class A⁺ of the dynamic assessment.

Strengthening the sector is important as a sign of revival of the internal and external construction market.

Sector 25: Metallic construction and metal products, except for machinery and equipment

As in the previous cases, the values of the two criteria frame the sector into class C⁻ of static evaluation.

The dynamic performance of the sector is, overall, higher than the national average and frames the sector into class A.

The sector is also an export opportunity for the Romanian companies that may gain access to a market that has no significant entry barriers.

f. Export sectors with favorable static state and unfavorable dynamic state, falling into the second area of the overall evaluation matrix

Sector 14: Manufacture of wearing apparel

The sector has a large share of exports as compared to the national average and a high coverage of imports by exports (3.10 in 2012). Static evaluation frames the sector into class A⁺. It should be noted that for a long period, 1991 - 2004, the sector was "strength" of the manufacturing industry and its export.

Lately, due to Asian competition and the withdrawal of OPT, the dynamic performance of the sector worsened, which is confirmed in the period 2009 - 2012 by obtaining a C⁻ classification in the dynamic assessment.

We emphasize that the export volume index of the sector during 2009 - 2012 is below unit (0.950)! In the future, manufacture of wearing apparel may be an important potential vulnerability of the Romanian exports.

Sector 19: Manufacture of coke and refined petroleum products

As in the previous case, the two criteria frame the sector into class A⁺ of static evaluation. Dynamic performance is lower than the national averages, which led to the assignment into class C of dynamic assessment.

Weak performance of the sector during the period 2009 - 2011 is reflected by:

- The export volume index of 0.726 in 2012 as compared to 2008!
- The coverage of imports by exports, reduced from 2.12 in 2008 to 1.00 in 2012.

The results are the product of crisis and market conjuncture. Subsidiaries of multinational companies account for about 100% of the exports of the

sector, so that strategic analyses in companies in their home countries should lead to improvement of situation.

g. In the period under review, no Romanian export sector has been falling in zone I, with unfavorable static and dynamic states.

Finally, we present in the tables below and in Figure 3 the value and share of exports by performance criteria during the period 2009-2012.

A. Sectors that can be considered as strengths or relative strengths:

Table 5.

NACE Code	Code significance	Export value
22	Manufacture of rubber and plastic products	2196.2
27	Manufacture of electric equipment	3530.4
01	Agriculture, hunting and auxiliary services	2279.5
29	Manufacture of motor vehicles, trailers and semi-trailers	7567.2
24	Metallurgy	3127.7
16	Wood processing, manufacture of wood and cork products, except for furniture; manufacture of articles of straw and plaiting materials	1556.5
20	Manufacture of chemicals and chemical products	2187.4
31	Manufacture of furniture	1403.3
28	Manufacture of machinery and equipment n.e.c.	3590.5
26	Manufacture of computer, electronic and optical products	2760.1
Total		30198.8
Share, %		67.25

B. Sectors with significant opportunities for success

Table 6.

NACE Code	Code significance	Export value
10	Food industry	1226.9
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	916.5
25	Metallic construction and metal products, except for machinery and equipment	1371.1
23	Manufacture of other non-metallic mineral products	307.7
Total		3822.2
Share, %		8.51

C. Sectors in neutral state

Table 7.

NACE Code	Code significance	Export value
30	Manufacture of other transport means	1268.3
12	Manufacture of tobacco products	473.1
99*	Goods not elsewhere classified	1247.0
Total		2988.4
Share, %		6.65

D. Sectors with potential vulnerabilities

Table 8.

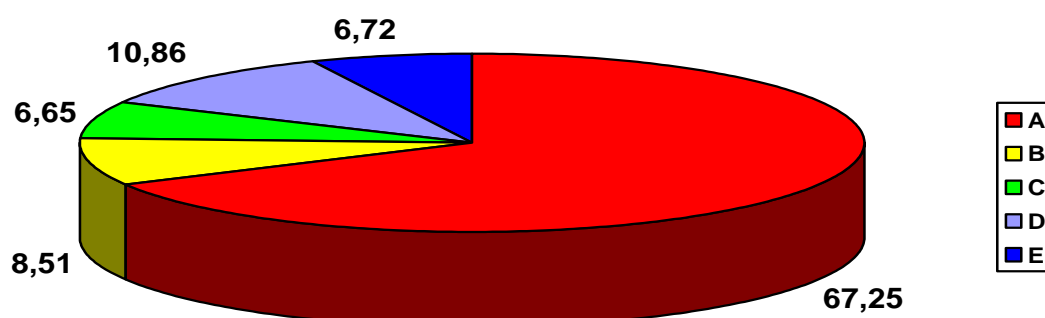
NACE Code	Code significance	Export value
14	Manufacture of wearing apparel	2678.3
19	Manufacture of coke and refined petroleum products	2200.0
Total		4878.3
Share, %		10.86

E. Sectors with relative weakness

Table 9.

NACE Code	Code significance	Export value
11	Manufacture of beverages	86.7
13	Manufacture of textile products	893.8
17	Manufacture of paper and paper products	236.2
32	Other industrial activities n.e.c.	400.4
15	Tanning and dressing of leather, manufacture of luggage, handbags, saddlery and harness; dressing and dyeing of furs	1334.1
35	Production and supply of electricity, gas, steam and air conditioning	66.6
Total		3017.8
Share, %		6.72

Figure 3.



We highlight a fundamental structure change in Romania's export specialization in 2012 as compared to 2008.

In 2008, the top three export sectors in Romania were:

NACE 29 - Manufacture of motor vehicles, trailers and semi-trailers, with 4329 million EUR,

NACE Code 24 – Metallurgy, with 3107 million EUR,

NACE 19 - Manufacture of coke and refined petroleum products, with 3029 million EUR.

Total: 10465 million EUR.

We note the presence of two energy-intensive sectors in the second and third position.

In 2012, the Top 3 changed substantially:

NACE Code 29 Manufacture of motor vehicles, trailers and semi-trailers, with 7567.2 million EUR,

NACE 28 - Manufacture of machinery and equipment, n.e.c., with 3590.5 million EUR,

NACE 27 - Manufacture of electrical equipment, with 3530.4 million EUR.

Total: 14688.1 million EUR.

Instead of the two energy-intensive sectors, appear machinery and equipment and manufacture of electrical equipment, sectors with advanced technology levels.

The volume index of export growth of Top 3 in 2012 as compared to Top 3 in 2008 is 1.404, far above the national average.

4. Some considerations concerning the volume indices of Romanian exports to foreign markets in the period 2008-2012

During the period 2008 - 2012, the volume index of Romanian export was **1.336**. The distribution of the index values by foreign markets is the following:

1. European Union	1.330
2 EFTA countries	1.069
3. Other European countries	1.209
4. Asia	1.423
5. Africa	2.124
6. America	1.464
7. Oceania	1.078
9. Non-specified countries	0.886

There is a significant increase in the exports to Africa, America, and Asia and significant reductions in the growth index of exports to European countries (EFTA and other countries in Europe), as well as to Australia.

It would be required to step up efforts for reaching new markets in the European countries where decreases in export volume indices as compared to the national average were recorded.

Referring to the European Union, we find important differences to the average of Romania's export volume index. 15 countries recorded higher export volume indices than the national average. 11 countries have registered lower values than the reference value. In alphabetical order, these countries are:

1. Austria	1.325
2. Bulgaria	1.242
3. France	1.264
4. Greece	0.884
5. Ireland	0.953
6. Italy	1.043
7. Luxembourg	0.980
8. Malta	0.710
9. Netherlands	1.308
10. Portugal	1.293
11. Slovenia	1.060

In these countries, measures to promote Romanian exports must be stepped up, particularly in France and Italy, strong, traditional trade partners of Romania.

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