# FORECASTING ANALYSIS ON THE SATISFIED SUPPLY AND DEMAND INDUSTRIAL PRODUCTS AND SERVICES WITHIN THE SINGLE MARKET

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**Abstract**

The market sistem is recognized as the most efficient way to organize a modern and dynamic economy. European Single Market and the Internal Market is today the largest market in the world. The European Union produces over 30% of global GDP, thus becoming a leading player globally. Single Market is based on removing barriers and simplifying existing rules to enable each individual consumer and trader in the EU to take maximum advantage of the opportunities it offers, thus having direct access to 27 countries and 480 million people. From the perspective of its position as the world's main economic entity, the European Union has a poignant interest in ensuring favorable conditions for the development of world trade. Under this context, the paper presents a statistical analysis of supply and demand for industrial products and services at national level and 8 regions, applying a methodology for forecasting hierarchical structure.

**Keywords:** Single Market, demand, supply, industrial, service, forecast.

## Introduction

The member states can restrict the free movement of goods only under special conditions, as for example – on matters regarding the public health, the environment or the consumer protection.

Risks vary and can change in accordance with the product domain. The pharmaceuticals and the construction materials show, for sure a higher risk then the office equipment or the pastes ones, for example. To minimize the risks and to ensure a legal safety, the member states have auxiliary technical rules in the EU legislation for the high risk domains.

The less risky domains have not been included in the European legislation. This „unharmonized" trade is grounded on rules/principles of „mutual recognition", rule that shows that the goods are produced and traded in a member state and have to enjoy free movement in the entire EU.

Almost half of the goods exchanges of EU is covered by harmonized rules, while the other half is provided by the domains with „unharmonized" rules, given usually by the national regulation or those not already adopted (Pîslaru,2008).

## 1. Supply and offer met by industrial goods on the Single Market

The European Single Market is formed of 27 member states (EU-27) and registered in 2005 the highest GDP of an economy from the whole world, namely $120,000 billion, 25% of this value representing the contribution of the goods market. The direct foreign investment outside EU on the Single Market reached, in 2006, 145,000 billion €, and the direct foreign investment within EU represented 82% of the total investment in 2005.

The trade with goods and services between EU countries represented two thirds of the EU total trade, being vital for each member state. In 2005, the trade between the member states represented more than the half of each member country trade, in some cases exceeding 80% of the respective country trade.

*Table no.1: Trade with goods and services between EU countries, as a share of each country trade*

| Country | % | Country | % |
|---|---|---|---|
| Belgium | 75.1 | Luxembourg | 82.4 |
| Czech Republic | 78.4 | Hungary | 71.7 |
| Denmark | 71.5 | Malta | 60.1 |
| Germany | 64.8 | Holland | 68.1 |
| Estonia | 72.0 | Austria | 77.2 |
| Greece | 56.1 | Poland | 74.3 |
| Spain | 71.6 | Portugal | 79.9 |
| France | 68.0 | Slovenia | 71.4 |
| Ireland | 62.4 | Slovakia | 79.2 |
| Italy | 60.0 | Finland | 63.7 |
| Cyprus | 59.3 | Sweden | 64.4 |
| Latvia | 76.7 | Great Britain | 57.0 |
| Lithuania | 58.6 | | |

*(Sursa: The Single Market for Goods, European Communities, 2007)*

The intra-industries weight of the trade, where a country is an importer as well as an exporter of the same good (or different kind of the goods), increased significantly from 1995 to 2005, so that the unbalanced average index reached 57% in 2005.

The European Union is the first exporter and the second importer of the world. The EU foreign trade balance registered a negative result in 2006, namely - $193 billion. The United States of America and China are the main foreign trade partners of the European Union.

The analysis of the foreign trade of the European Union allows the measuring the competitivity of the EU economic branches, compared to the industries from other parts of the world. The EU six sectors where there is a real comparative advantage are: pharmaceuticals, tools and equipment industry, the aero-space one, unferrous minerals industry, editing and printing field and the scientific instruments. These six sectors represent 34% of the total industrial exports.

At present, the 27 member states have developed an European Union manufacturing industry with an added value of 1,629.9 billion €, the spread of this value in accordance with each branch/field/good type showing that the basic metals and the metallic goods contributed greatly at the amount (13.6% of the total added value of EU-27 manufacturing industry), having a high rate of employment in the field ( 14.6% in EU total). The food goods, electrical and optical equipment for transportation contributed, also, greatly to obtain this added value (over 10% each in EU-27 total value). Moreover, 7 of the 14 considered domains contributed, also, with about 80% to the above-mentioned total added value. It is interesting to see that domains with a not too high rate of employment have, also, contributed with over 10% to the Union manufacturing industry added value, as the case of the chemicals and natural fibres, but also the refined oil and nuclear fuel registered the highest rate of productivity (with an employment rate of 0.55, but an added value of 2.4 of the EU-27 manufacturing industry). There is, also, the reverse side (high employment rate, but low real contribution to the total added value), as it is the case of the textile industry, but the field of activity with the lowest rate of productivity is that of leather goods.

Figures regarding the retail on the European market have been worked out to obtain average retail sales per capita, per groups of goods and services, as it will be shown:

Group “***Alim.1***” includes retail sales in unspecialized shops, where food, beverages and tobacco prevail;

Group “***Alim.2***” includes retail sales of food, beverages and tobacco, in specialized shops;

Group “***Nonalim.1***” includes sales, maintenance and repair services for motor vehicles;

Group “***Nonalim.2***” includes wholesale trade, except the motor vehicles and motor cycles;

Group “***Nonalim.3***” includes retail trade, with the exception of motor vehicles and motor cycles, repairs of personal and home goods.

## 2. The application of DISPERSION ANALYSIS (ANOVA) for testing the existence of some statistically significant differences between average per capita sales in European geographic areas, per goods and services categories.

### 2.1. Method presentation

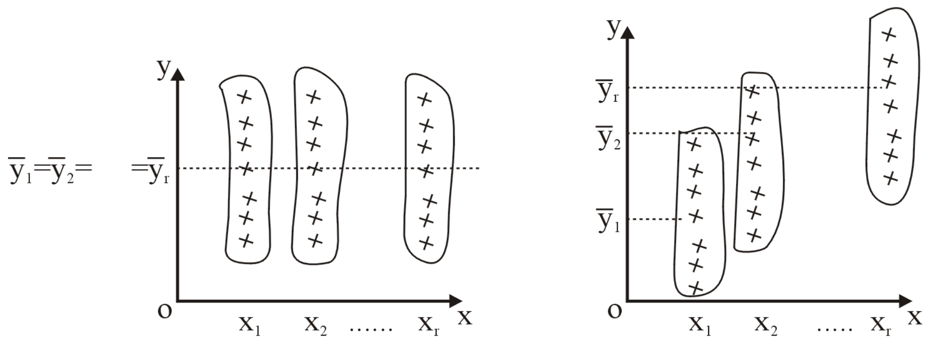
The dispersion analysis, known also under the variant name (ANOVA), was introduced by the statistician R.A. Fisher and allows the comparison of two or more avarages of quantitative data communities.

The dispertion analysis model does not want to explain the relation between variables, but to analyse, for each level of the causal factor/s the associated distinct population and the possible differences that occur between populations, namely to study the effect of the independent variable/s on the dependent one.

The dispersion analysis can be done by an unifactorial model, or by bi- or multi-factorial ones. In the case of the unifactorial model, the populations can be classified using single criteria named, **factor**. Each population is named a level of the factor (there are *r* levels).

*Figure 1*

**Unifactorial dispersion analysis model**




**a) equal group averages;** **b) unequal group averages;**

In the **dispersion analysis** the zero hypothesis is tested : *the population avarages are equal*

$$H_0: \mu_{y1} = \mu_{y2} = ... = \mu_{yr},$$

With alternative hypothesis: *at least two averages of population are not equal*

$$H_1 : \mu_{yi} \neq \mu_{yi}, \qquad (i \neq j)$$

It is tested, in other words, if the differences between the group averages of the sample are too high to be assigned only to hazard. If the test result shows that the averages are significantly different, the conclusion is that the X factor has an impact on the Y variable.

The statistical test is developed in accordance with the following argument. If the zero hypothesis is true, the averages of those *r* populations should be all, equal. We expect then that the averages of the *r* samples to be about equal. If the alternative hypothesis is true, there are high differences between some averages of the samples.

The set of data for the unifactorial dispersion analysis lies in the values of the Y variable for the independent *r* groups. The groups' capacities can be different $n_1 \neq n_2 \neq ... \neq n_r$ (table 1):

***Table 1 Data systematization for ANOVA***

| | Groups by the cause factor | | | |
|---|---|---|---|---|
| | Gr. 1 | Gr. 2 | . . . . | Gr.r |
| | $y_{11}$<br>$y_{12}$<br>.<br>.<br>$y_{1n_1}$ | $y_{21}$<br>$y_{22}$<br>.<br>.<br>$y_{2n_2}$ | . . . . .<br>. . . . .<br><br><br>. . . . . | $y_{r1}$<br>$y_{r2}$<br><br><br>$y_{rn_r}$ |
| Average | $\bar{y}_1$ | $\bar{y}_2$ | . . . . . | $\bar{y}_r$ |
| Group capacity | $n_1$ | $n_2$ | . . . . . | $n_r$ |

**The suppositions** applied to the F test in the unifactorial dispersion analysis offer a sound frame for the statistical inference based on the studied data, namely:

- those $r$ groupes of the sample are aleatory and independently extracted from the $r$ groups of the general community ;

- each group of the general community has a normal distribution, and the average square digressions are equal $\sigma_1 = \sigma_2 = ... = \sigma_r$.

The statistical test F for the unifactorial dispersion analysis is the ratio of variability indices for the two sources of variation: the variation between the groups divided by the variability within the groups. It can be explained as measuring how much higher is the averages variability of the group compared to what we have expected if they were only aleatory different. To test the zero hypotheses, we shall value the group averages and the total average of the general community based on the sample data.

$$\overline{y}_i = \frac{\sum_{j=1}^{n_i} y_{ij}}{n_i}, \qquad i = \overline{1,r}$$

$$\overline{y} = \frac{\sum_{i=1}^{r}\sum_{j=1}^{n_i} y_{ij}}{n} = \frac{\sum_{i=1}^{r} \overline{y}_i n_i}{n}, \quad n = \sum_{i=1}^{r} n_i .$$

The variation between the groups, given by the influence of the casual factor, named also **factorial variance**, is the amount of square average group dispersions from the general average:

$$S_1 = \sum_{i=1}^{r} \left(\overline{y}_i - \overline{y}\right)^2 n_i .$$

From this results that, if $\overline{y_1} = \overline{y_2} = ... = \overline{y_r} = \overline{y}$ then $S_1 = 0$.
The variation within the groups, named also, **residual variance**, is the amount of the square individual values of the dispersions from the group averages:

$$S_2 = \sum_{i=1}^{r}\sum_{j=1}^{n_i} \left(y_{ij} - \overline{y}_i\right)^2 .$$

The total dispersion of the individual values against the general average $\overline{y}$ is given by the **total variance**:

$$S = \sum_{i=1}^{r}\sum_{j=1}^{n_i} \left(y_{ij} - \overline{y}\right)^2 .$$

The argument of the dispersion analysis is based on the partition of the amount of the dispersion squares:

$$\sum_{i=1}^{r}\sum_{j=1}^{ni}\left(y_{ij} - \overline{\overline{y}}\right)^2 = \sum_{i=1}^{r}\left(\overline{y_i} - \overline{\overline{y}}\right)^2 n_i + \sum_{i=1}^{r}\sum_{j=1}^{ni}\left(y_{ij} - \overline{y}_i\right)^2 \Rightarrow S = S_1 + S_2$$

To make these values of the variance comparable, we shall ratio each of them to the freedom degrees, changing thus the sum of squares in the average of the dispersion squares.

For the factorial variance $S_1$, the number of the freedom degree is $r$-1 and this thing means that we measure the variability of $r$ averages but a degree of freedom is lost, as the total average was valued.

For the residual variance ( within the groups) $S_2$, the number of the freedom degrees is $n$–$r$; this thing means that we measure the variability of all $n$ values, but we loose $r$ freedom degrees, as the averages of the freedom degrees, $r$ groups were estimated.

We obtain, thus, the rectified factorial dispersion :

$$s_1^2 = \frac{S_1}{r-1} = \frac{\sum_{i=1}^{r} \left(\overline{y}_i - \overline{y}\right)^2 n_i}{r-1}$$

and the rectified residual dispersion :

$$s_2^2 = \frac{S_2}{n-r} = \frac{\sum_{i=1}^{r}\sum_{j=1}^{ni} \left(y_{ij} - \overline{y}_i\right)^2}{n-r} .$$

The F statistics for the unifactorial dispersion analysis has the following form:

$$F = \frac{s_1^2}{s_2^2} = \text{variability between the groups/variability within the groups},$$

with freedom degrees (r – 1) on numerator and (n – r) on denominator.

The statistic test E is achieved comparing the estimated value of the statistic F with the critic value (tabled) $F_\alpha$ for (r–1) and (n–r) freedom degrees and the chosen probability of 100 (1-α)% guarantee of the results. The result is significant if:

$$F > F_{\alpha, (r-1),(n-r)} ,$$

As this thing shows greater differences between the groups averages than those caused by hazard. The critic area is so given by the values of F for which $F > F_{\alpha,r-1,n-r}$ . In this way,**if the F value is less than the critical value $F_\alpha$,** then one can make the following equivalent statements:

- $H_0$ zero hypothesis is accepted;
- $H_1$ alternative hypothesis is not accepted;
- the groups averages are not significantly different one from the other;
- the noticed differences between the groups averages can be caused only by hazard;
- the result is not statistically significant.

If the value F is greater than the critical value $F_\alpha$, then:

- $H_1$ alternative hypothesis is accepted;
- $H_0$ zero hypothesis is rejected;
- the groups averages are significantly different one from the other;
- the noticed differences between the groups averages are not due only to hazard;
- the result is statistically significant.

### 2.2. Application of the method on the data regarding the sales per capita in the European geographic zones, per goods and service categories

In our study, this method is applied for verifying if significant differences exist between European zones, regarding the average sales per capita for different goods categories. The European countries have been grouped by the region they are located in, in five regions:

Western, Eastern, Northern, Southern and Central. As an outcome of data processing regarding the sales value per capita, per each of the five above mentioned categories of goods and services, the following results were obtained:

a. Group "***Alim.1***"

As the estimated value of the Fisher test was of a 5.459 higher to the theoretical value Fcrit = 2.895, one can say, with a probability of at last 100-0.424 = 99.576% that there are significant differences between the average sales pe capita of the different European regions ( for the group 1 of food goods ).

ANOVA

| *Source of Variation* | *SS* | *df* | *MS* | *F* | *P-value* | *F crit* |
|---|---|---|---|---|---|---|
| Between Groups | 9432386 | 4 | 2358096 | 5.459103 | 0.004237 | 2.895107 |
| Within Groups | 8207179 | 19 | 431956.8 | | | |
| | | | | | | |
| Total | 17639565 | 23 | | | | |

b. Group "***Alim.2***

As the estimated value of Fisher test is of 4.722, higer to the theoretical value Fcrit = 2.895, one can say, with a probability of at last 100-0.814 = 99.186% that there are significant differences between the average sales per capita of the different European regions ( for the group 2 of food goods) .

ANOVA

| *Source of Variation* | *SS* | *df* | *MS* | *F* | *P-value* | *F crit* |
|---|---|---|---|---|---|---|
| Between Groups | 361591.4 | 4 | 90397.86 | 4.722542 | 0.008143 | 2.895107 |
| Within Groups | 363693.8 | 19 | 19141.78 | | | |
| | | | | | | |
| Total | 725285.2 | 23 | | | | |

c. Group "***Nonalim.1***"

Since the estimated value of Fisher test was of 3.621, higer than the theoretical value Fcrit = 2.895, it can be said, with a probability of at last 100-2.348 = 97.652% that there are significant differences between average sales per capita of the different European regions ( for the group 1 of non-food goods ).

ANOVA

| *Source of Variation* | *SS* | *df* | *MS* | *F* | *P-value* | *F crit* |
|---|---|---|---|---|---|---|
| Between Groups | 70460107 | 4 | 17615027 | 3.620884 | 0.023476 | 2.895107 |
| Within Groups | 92431991 | 19 | 4864842 | | | |
| | | | | | | |
| Total | 1.63E+08 | 23 | | | | |

d. Group "***Nonalim.2***"

Since the estimated value of the Fisher test was of 4.586, higher to the theoretical value Fcrit = 2.895, it can be said, with a probability of at last 100-0.924 = 99.076% that there are significant differences between the average sales per capita of the different European regions ( for group 2 of non-food goods )

ANOVA

| Source of Variation | SS | df | MS | F | P-value | F crit |
|---|---|---|---|---|---|---|
| Between Groups | 6.95E+08 | 4 | 1.74E+08 | 4.585767 | 0.009236 | 2.895107 |
| Within Groups | 7.2E+08 | 19 | 37883917 | | | |
| | | | | | | |
| Total | 1.41E+09 | 23 | | | | |

e. Group "***Nonalim.3***"

Since the estimated value of Fisher test was 5.028, higher to the theoretical value Fcrit = 2.895, it can be said, with a probability of at last 100-0.618 = 99.382% that significant differences are between the averages sales per capita of different European regions ( for group 3 of non-food goods )

ANOVA

| Source of Variation | SS | Df | MS | F | P-value | F crit |
|---|---|---|---|---|---|---|
| Between Groups | 54190980 | 4 | 13547745 | 5.028065 | 0.006179 | 2.895107 |
| Within Groups | 51194081 | 19 | 2694425 | | | |
| | | | | | | |
| Total | 1.05E+08 | 23 | | | | |

Since the fact that, on all studied groups of goods, the average sales in European geographical regions differ significantly between them, for higher probabilities than 95%, one can further use these averages as hierachization criteria of these regions.

**3. Hierarchization of the European geographic zones by average sales per capita, per goods groups and the sales variation coeficient. The ranks method.**

The used hierarchization crtieria were the average and the variance coeficient of the average sales per capita. The European countries were grouped in accordance with the geographical zone where they are located (Western, Eastern, Northern, Central and Southern region/zone). There were determined: the average value of sales per capita and the variation coeficient of sales, per the above mentioned categories of goods and services (available data for 2007).

***The variation coeficient*** is the synthetic indicator of the variation that measure relativelly and synthetically the degree of dispersion of values against the central trend of the series. It is determined as a ratio between the standard deviation and the arithmetic average; it can be expressed also in percentage, important being the fact that being independent of the measure unit of the studied characteristic, it can be used to compare the homogeneity or, on the contrary, the etherogeneity of two or more series, refering to different variables.

$$v = \frac{s}{\bar{x}} \cdot 100$$

where $\bar{x}$ represents the arithmetic average, and $s$ is the average square deviation ( standard deviation), determined by the relation:

$$s = \sqrt{\frac{\sum_{i=1}^{n}\left(x_i - \bar{x}\right)^2}{n}};$$

$x_i$ represents the value of sales per capita for „*i*" country, and $n$ is the number of the countries from a certain geographical region .

A smaller value of the variation coeficient points to a smaller degree of variation of the stastistic series and implicitly, a high level of non-homogeneity. Thus, if the value of the variation coeficient is less or at least equal to 30-35%, than the series is homogene and the average is representative for the values used for its calculation. But, if on the contrary, the value of the variance coeficient is over 65-70%, the series is heterogene, the calculated average loses its signification and is no longer representative.

The most favourable situation is given by the zone that has both a high value of average sales per capita, and a low degree of variation. That is why the five European regions formed a hierarchy by the two criteria, using the *ranks method.*

***The ranks method***

The ranks method assumes the assignation of rank numbers to each adminstrative-territorial unit ( in this case the geographic regions of Europe ), subsequently, in accordance with the value of each indicator considered a ranking criteria : the unit with the maximum qualitative achievement will get the rank 1, the following unit, the rank 2,3 …, n ( the „n" rank, equal to the number of the units of the studied series is assigned to the unit registering the minimum qualitative level of each variable ).

In the case of the statistical variables which state is as favourable as the registered values are high, the unit with the higest value of a characteristic gets the rank 1, the subsequent in a down order – rank 2 etc.( the share of the expences for buying food and beverages, the weight of expences on non-food goods, the weight of expences for services payment). In the case of the variables whose favourable status is in accordance with a minimum value of the characteristic gets rank 1, the subsequent in increasing order – rank 2 etc. The ranks can be marked:

$$\left\{R_i^{X_j}\right\}, \quad i = \overline{1,n}; \quad j = \overline{1,m};$$

and will represent the ranks granted to the statistical unit "*i*" by the value of the characteristic $X_j$. In our case, the statistical units are the European geographical regions ($n$=5), and $X_j$ will represent the ranking criteria – in this case the average sales per capita and the variation coeficient determined for each zone alone ($m$= 2).

Totalizing the assigned ranks a score is obtained. The score for each development region „*i*" will be calculated in accordance with the relation:

$$S_i = \sum_{j=1}^{m} R_i^{Xj}, \; i = \overline{1,n};$$

the administrative-territorial unit with the lowest score ( namely $\min\left\{S_i, i = \overline{1,n}\right\}$) has the best performance according to all studied criteria and gets the final rank of 1. With the increase of the score, the final rank is growing too, to the rank "n", given to the administrative-territorial unit that obtained a maximum score.

It is true that this method offers facility and rapidity in application, but it also has a main drawback, the double levelling of the size of the variable of differences between units, by their substitution with an arithmetic progression with ratio 1. Thus, a good part of the information quality is lost, the different distances between the subsequent units being systemastically replaced with the difference 1 between the subsequent ranks.

As a consequence of this method application, the following resultS were ontained:

a. For the *group* "***Alim.1***" of products sold in non-specialized shops, where the food, beverages and tobacco are prevailing.

The zone with the most favourable status from the ranking criteria point of view is that of the Western Europe, which has the highest value of the average sales per capita and a degree of their variation sufficiently low (28%), reflecting the fact that this zone is homogenous from the point of view of the analysed characteristic. At the opposite pole the Eastern zone is located , which, besides the fact that is characterized by the lowest value of sales value per capita, is also heterogenous from this point of view, with great differences from one country to another ( variation coeficient = 74%) (see table 2)

*Table 2*

| **Zone** | **Average (euro/capita)** | **Variation coeficient (%)** | **The granted rank by** | | **Score** | **Final rank** |
|---|---|---|---|---|---|---|
| | | | **Average** | **Variation coeficient** | | |
| *West* | 2518.028 | 28.00 | 1 | 2 | 3 | 1 |
| *East* | 527.6711 | 74.28 | 5 | 5 | 10 | 5 |
| *North* | 2093.859 | 41.57 | 2 | 3 | 5 | 3 |
| *Center* | 1204.022 | 50.08 | 4 | 4 | 8 | 4 |
| *South* | 1520.396 | 7.98 | 3 | 1 | 4 | 2 |

b. For group“***Alim.2***”, of food products, beverages and tobacco, sold in specialized shops.

As regarding the analysed criteria, on the first two places are the Western region and the Southern one. There are although, some differences between them: the Sothern region of Europe has the highest average of sales per capita, but also a some higher degree of variation, while the Western zone of Europe has a lower average of sales but a higher degree of homogeneity ( the variation coeficient is the lowest:23.58%). On the last place there is again the Eastern region of Europe having the most unfavourable status of both indicators (see table 3).

*Table 3*

| **Zone** | **Average (euro/capita)** | **Variation coeficient (%)** | **The granted rank by** | | **Score** | **Final rank** |
|---|---|---|---|---|---|---|
| | | | **Average** | **Variation coeficient** | | |
| *Vest* | 301.2428 | 23.58 | 2 | 1 | 3 | 1,5 |
| *Est* | 60.5638 | 79.51 | 5 | 5 | 10 | 5 |
| *Nord* | 233.4467 | 64.29 | 3 | 3 | 6 | 3 |
| *Centru* | 156.6741 | 79.39 | 4 | 4 | 8 | 4 |
| *Sud* | 468.1788 | 44.71 | 1 | 2 | 3 | 1,5 |

c. For group “***Nonalim.1***” – of the sales, maintenance and repair services for motor vehicles

Taking into consideration the used criteria, the zone with the most favourable position is the Southern one, as, although it has not the highest average sales value for this group of products and services, it is, nevertheless, the second one in size after the Western zone.The Southern zone has, however, the advantage of a higher degree of the sales homogeneity. On the last place it is, again, the Eastern European zone (table 4).

*Table 4*

| **Zone** | **Average (euro/capita)** | **Variation coeficient (%)** | **The granted rank by** | | **Score** | **Final rank** |
|---|---|---|---|---|---|---|
| | | | **Average** | **Variation coeficient** | | |
| *Vest* | 6620.26 | 65.85 | 1 | 5 | 6 | 3,5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Est* | 956.7523 | 64.52 | 5 | 4 | 9 | 5 |
| *Nord* | 3728.81 | 56.90 | 2 | 3 | 5 | 2 |
| *Centru* | 2150.367 | 55.19 | 4 | 2 | 6 | 3,5 |
| *Sud* | 2883.498 | 15.53 | 3 | 1 | 4 | 1 |

d. For group "***Nonalim.2***", wholesale trade, except motor vehicles and motor cycles.

For this sales group and regarding the set forth criteria, the most favourable situation is that of the Northern and Soutern zones of Europe. Between them, nevertheless, there is a difference, the one that while the Northern zone is distinguished by a higher value of average sales per capita, it has a variation coeficient sufficiently high, giving it a low level of homogeneity. In the Southern zone the situation is quite the contrary, it distinguishing itself by a very low variation of sales. The Central zone is on the last place ( table 5 ).

*Table 5*

| ***Zone*** | **Average (euro/capita)** | **Variation coeficient (%)** | **The granted rank by** | | **Score** | **Final rank** |
|---|---|---|---|---|---|---|
| | | | **Average** | **Variation coeficient** | | |
| *Vest* | 21407.89 | 54.98 | 1 | 4 | 5 | 3 |
| *Est* | 4117.148 | 54.96 | 5 | 3 | 8 | 4 |
| *Nord* | 11381.95 | 50.48 | 2 | 2 | 4 | 1.5 |
| *Centru* | 7058.124 | 60.22 | 4 | 5 | 9 | 5 |
| *Sud* | 8248.654 | 16.43 | 3 | 1 | 4 | 1,5 |

e. For group "***Nonalim.3***" – retail sales, except motor vehicles and motor cycles, repairs of personal and home goods.

Using the ranking method, it resulted that the Western zone of Europe is placed in the best situation, characterized, at the same time, by a high average of sales per capita, and a low degree of variation ( implicitly, a high level of sales homogeneity between the countries of this region ). At the other end it is the Eastern region of Europe, where the both statistical indicators used as ranking criteria have the most disadvantageous values (table 6).

*Table 6*

| ***Zone*** | **Average (euro/capita)** | **Variation coeficient (%)** | **The granted rank by** | | **Score** | **Final rank** |
|---|---|---|---|---|---|---|
| | | | **Average** | **Variation coeficient** | | |
| *Vest* | 6443.857 | 19.69 | 1 | 2 | 3 | 1 |
| *Est* | 1436.083 | 73.34 | 5 | 5 | 10 | 5 |
| *Nord* | 5068.64 | 44.16 | 2 | 3 | 5 | 3 |
| *Centru* | 3328.441 | 45.87 | 4 | 4 | 8 | 4 |
| *Sud* | 4927.595 | 18.25 | 3 | 1 | 4 | 2 |

**4. The ranking of the European countries by the average sales per capita, per product groups, using the ranking method and that of relative differences against the maximum performance.**

Ranking criteria: sales per capita, per product groups.

A. Used method: ***Ranking method***

The method was applied on these initial data (2007)-see Table 7

*Table 7*

| **Country** | ***Sales per capita per products and services group*** |
|---|---|

| | (Euro/capita) | | | | |
|---|---|---|---|---|---|
| | ***Alim.1*** | ***Alim.2*** | ***Nonalim.1*** | ***Nonalim2*** | ***Nonalim.3*** |
| Belgium | 2521.36 | 401.18 | 7006.59 | 18715.59 | 6440.60 |
| Bulgaria | 234.55 | 34.84 | 634.07 | 3707.95 | 809.85 |
| Czech Republic | 972.91 | 116.12 | 1668.52 | 6556.81 | 2652.06 |
| Denmark | 3078.00 | 286.60 | 7545.42 | 21053.98 | 7445.84 |
| Germany | 1530.94 | 177.29 | 2143.53 | 8551.10 | 4314.95 |
| Irland | 2658.79 | 313.38 | 3691.90 | 13254.64 | 5879.08 |
| Greece | 1488.17 | 698.11 | 2685.87 | 9156.41 | 5994.31 |
| Spain | 1528.04 | 591.48 | 3064.15 | 9465.89 | 4970.63 |
| France | 3067.40 | 235.37 | 2836.94 | 10332.58 | 6360.83 |
| Italy | 1678.87 | 313.52 | 3406.46 | 7874.98 | 4951.98 |
| Latvia | 991.92 | 31.75 | 1241.73 | 5605.98 | 2097.69 |
| Lithuania | 835.88 | 10.28 | 1319.41 | 3429.39 | 1743.90 |
| Luxembourg | 2961.77 | 294.80 | 12607.34 | 38061.50 | 8039.64 |
| Hungary | 1228.15 | 137.34 | 2347.33 | 5717.24 | 3030.20 |
| Holland | 1521.58 | 273.62 | 4030.18 | 18521.90 | 4934.35 |
| Austria | 1802.45 | 388.36 | 3366.35 | 14977.92 | 5643.82 |
| Poland | 657.15 | 125.81 | 733.23 | 3859.19 | 1746.82 |
| Portugal | 1386.51 | 269.61 | 2377.50 | 6497.34 | 3793.45 |
| Romania | 375.56 | 30.73 | 567.67 | 2086.69 | 846.34 |
| Slovenia | 1700.07 | 83.03 | 3482.00 | 5482.70 | 3544.77 |
| Slovakia | 305.37 | 28.21 | 829.76 | 3760.59 | 1690.09 |
| Finland | 2377.89 | 310.78 | 4115.35 | 11087.42 | 5769.38 |
| Sweden | 2009.47 | 397.57 | 4225.42 | 11814.92 | 5780.22 |
| Great Britain | 2705.06 | 283.77 | 3962.45 | 13427.34 | 6764.36 |

Source: Authors' calculation by EUROSTAT

The retail sales per capita, per the five above mentioned groups of goods and services were used as ranking criteria. Using this method, it resulted that the best situated European country is Luxembourg, followed by Denmark and Belgium. On the last place it is Romania, preceded by Bulgaria and Slovakia (table 8).

*Table 8*

| **Country** | **Ranks granted for:** | | | | | **Sum of rank** | **Final Rank** |
|---|---|---|---|---|---|---|---|
| | ***Alim.1*** | ***Alim.2*** | ***Nealim.1*** | ***Nealim.2*** | ***Nealim.3*** | | |
| Belgia | 6 | 3 | 3 | 3 | 4 | 19 | 3 |
| Bulgaria | 24 | 20 | 23 | 22 | 24 | 113 | 23 |
| Republica Cehă | 19 | 18 | 18 | 15 | 18 | 88 | 18 |
| Danemarca | 1 | 10 | 2 | 2 | 2 | 17 | 2 |
| Germania | 12 | 15 | 17 | 13 | 14 | 71 | 14 |
| Irlanda | 5 | 7 | 8 | 7 | 7 | 34 | 6 |
| Grecia | 15 | 1 | 14 | 12 | 6 | 48 | 10 |
| Spania | 13 | 2 | 12 | 11 | 11 | 49 | 11 |
| Franța | 2 | 14 | 13 | 10 | 5 | 44 | 9 |
| Italia | 11 | 6 | 10 | 14 | 12 | 53 | 13 |
| Letonia | 18 | 21 | 20 | 18 | 19 | 96 | 19 |
| Lituania | 20 | 24 | 19 | 23 | 21 | 107 | 21 |
| Luxemburg | 3 | 9 | 1 | 1 | 1 | 15 | 1 |
| Ungaria | 17 | 16 | 16 | 17 | 17 | 83 | 17 |
| Olanda | 14 | 12 | 6 | 4 | 13 | 49 | 11 |
| Austria | 9 | 5 | 11 | 5 | 10 | 40 | 8 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Polonia | 21 | 17 | 22 | 20 | 20 | 100 | 20 |
| Portugalia | 16 | 13 | 15 | 16 | 15 | 75 | 16 |
| România | 22 | 22 | 24 | 24 | 23 | 115 | 24 |
| Slovenia | 10 | 19 | 9 | 19 | 16 | 73 | 15 |
| Slovacia | 23 | 23 | 21 | 21 | 22 | 110 | 22 |
| Finlanda | 7 | 8 | 5 | 9 | 9 | 38 | 7 |
| Suedia | 8 | 4 | 4 | 8 | 8 | 32 | 5 |
| Marea Britanie | 4 | 11 | 7 | 6 | 3 | 31 | 4 |

B. Used method: ***Method of the relative differences of maximum performance***

Applying this method it results a clearer ranking of the administrative-territorial units. This method assumes, for each ranking criteria $X_j$, measuring the relative difference of each unit against the one that reaches the maximum level. This difference is given in relative dimensions of sub-unit co-ordination (since it is chosen as comparing base the most performing unit), in accordance with the relation:

$$d_i^{Xj} = \frac{x_i^j}{\max\left\{x_i^j, i = \overline{1,n}\right\}} \text{ with } i = \overline{1,n}; \quad j = \overline{1,m};$$

Where $d_i^{Xj}$ represent the relativ calculated difference (distance) for the statistical unit "$i$" and the characteristic $X_j$, and $\max\left\{x_i^j, i = \overline{1,n}\right\}$ is the maximum value of the characteristic $X_j$, among all „$n$" statistical units..

The relative dimensions of co-ordination that charecterize the same administrative-territorial unit are combined by the calculation of their geometrical average that expresses the relative difference against a hypothetic unit defined by having at the same time maximum performance by all criteria (table 18).

$$\overline{d}_i = \sqrt[m]{\prod_{j=1}^{m} d_i^{Xj}}, \; i = \overline{1,n};$$

Where $\overline{d}_i$ represents the average relative difference for the statistic unit "$i$".

Depending on the size of the resulted relative average differences, the final ranks are given (namely the territorial unit with the highest relative average difference gets the rank 1 – this being the closest to the hypothetic unit, with maximum performance- and the territorial unit with the lowest relative average difference – receives the „n" rank, being the farthest from the unit with the maximum performance). By the ratio between the relative average difference of each unit and the relative average difference of the most performing one by the studied criteria, the place of the respective territorial unit „i" is obtained against the most performing unit:

$$Poz_i^{\%} = \frac{\overline{d}_i}{\max\left\{\overline{d}_i, i = 1, n\right\}} \cdot 100$$

*Table 9*

| Country | Relative difference for: | | | | | Relative average difference | Final rank | Difference against the maximum performance unit (%) |
|---|---|---|---|---|---|---|---|---|
| | *Alim.1* | *Alim.2* | *Nealim.1* | *Nealim.2* | *Nealim.3* | | | |
| Belgia | 0.819 | 0.575 | 0,556 | 0,889 | 0,801 | 0,715 | 3 | 76,00 |
| Bulgaria | 0.076 | 0.050 | 0,050 | 0,176 | 0,101 | 0,081 | 23 | 8,57 |
| Republica Cehă | 0.316 | 0.166 | 0,132 | 0,311 | 0,330 | 0,235 | 18 | 24,98 |
| Danemarca | 1.000 | 0.411 | 0,598 | 1,000 | 0,926 | 0,744 | 2 | 79,11 |
| Germania | 0.497 | 0.254 | 0,170 | 0,406 | 0,537 | 0,342 | 15 | 36,38 |
| Irlanda | 0.864 | 0.449 | 0,293 | 0,630 | 0,731 | 0,554 | 5 | 58,95 |
| Grecia | 0.483 | 1.000 | 0,213 | 0,435 | 0,746 | 0,507 | 10 | 53,89 |
| Spania | 0.496 | 0.847 | 0,243 | 0,450 | 0,618 | 0,491 | 12 | 52,18 |
| Franța | 0.997 | 0.337 | 0,225 | 0,491 | 0,791 | 0,494 | 11 | 52,52 |
| Italia | 0.545 | 0.449 | 0,270 | 0,374 | 0,616 | 0,433 | 13 | 46,07 |
| Letonia | 0.322 | 0.045 | 0,098 | 0,266 | 0,261 | 0,159 | 19 | 16,87 |
| Lituania | 0.272 | 0.015 | 0,105 | 0,163 | 0,217 | 0,108 | 21 | 11,50 |
| Luxemburg | 0.962 | 0.422 | 1,000 | 1,808 | 1,000 | 0,940 | 1 | 100,00 |
| Ungaria | 0.399 | 0.197 | 0,186 | 0,272 | 0,377 | 0,272 | 17 | 28,96 |
| Olanda | 0.494 | 0.392 | 0,320 | 0,880 | 0,614 | 0,507 | 9 | 53,91 |
| Austria | 0.586 | 0.556 | 0,267 | 0,711 | 0,702 | 0,534 | 7 | 56,80 |
| Polonia | 0.213 | 0.180 | 0,058 | 0,183 | 0,217 | 0,155 | 20 | 16,47 |
| Portugalia | 0.450 | 0.386 | 0,189 | 0,309 | 0,472 | 0,343 | 14 | 36,53 |
| România | 0.122 | 0.044 | 0,045 | 0,099 | 0,105 | 0,076 | 24 | 8,08 |
| Slovenia | 0.552 | 0.119 | 0,276 | 0,260 | 0,441 | 0,291 | 16 | 30,94 |
| Slovacia | 0.099 | 0.040 | 0,066 | 0,179 | 0,210 | 0,100 | 22 | 10,62 |
| Finlanda | 0.773 | 0.445 | 0,326 | 0,527 | 0,718 | 0,532 | 8 | 56,54 |
| Suedia | 0.653 | 0.569 | 0,335 | 0,561 | 0,719 | 0,550 | 6 | 58,49 |
| Marea Britanie | 0.879 | 0.406 | 0,314 | 0,638 | 0,841 | 0,570 | 4 | 60,64 |

Using this method, similar results to those of ranks method were obtained. Thus, the country with the most advantageous situation according to the five considered criteria was again Luxembourg, followed by Denmark and than by Belgium. On the last place are the same 3 countries as with the previous method: Romania (place 24), Bulgaria (place 23) and Slovakia (place 22 . France was two places higher at this apllication of the relative differences method than the place obtained by ranks method, while Holland – is two places lower.

## Conclusions

Taking into consideration the large variation of the main trade activities, we can promote the hypothesis that, in the future, due to the different conditions of the national markets, these activities will form the nucleus of the domestic trade for Romania. Consequently, the matrix type method can be used to forsee the future evolution of the turnover of a company with a stable structure. The phenomena future evolution depends on, in a chances approach, the former structure.

In consequence, we consider some aspects that should be a priority for the governmental institutions when trying to establish certain generic directions for the economic domestic trade co-operation. This could be, *inter alia*:

- The international trade co-operation – is it seen as an instrument for the trade contribution to the economic development and European integration?
- Is the increased commercial efficiency considered a priority in the efforts of economic promotion?
- Are there indices systems for the estimation of the efficiency and the commercial capitalization of the international economic co-operation activities?
- Was the final impact of the privatization process (component of the reform) – valued in the terms of economic development of the trade relationship?
- Is there a connection between efficiency, both at micro-economic level, and macro-economic, liberalism and protectionism one?
- How much liberalism and protectionism is needed for a suitable integration in the international trade activities?

It is said that, after the transition years, it would be normally that Romania would pass to a new qualitative approach, as a result of a better understanding of the market mechanisms and requirements, the local (national) needs and priorities.

Of course, there are many concerns regarding the progress, the trade activity favourable to the general economic development, the framework where the economic international co-operation gets a greater importance.

Another conclusion is that Romania has certain specific natural resources and very well trained specialists that would facilitate the economic development*,* using policies mainly structured on effiency criteria. O altă concluzie este aceea că România are anumite resurse naturale specifice şi specialişti foarte bine pregătiți care ar putea facilita, prin politici structurate în principal pe criterii de eficiență.

The EU integration process is the first step to the integration into the global economy, and the aspirant countries, present more or less in the competition, have to draw up rigorously thier future role and their actions in the global market (markets).

**BIBLIOGRAPHICAL REFERENCES**


1. Bârsan M., (1999) - "*Integrarea economică europeană",* vol. II, Editura Fundației CDIMM, Baia Mare–[Barsan, 1999];
2. Bob C. A. Grigorescu A., – *"Structura exporturilor: analiză, prognoză, utilizarea integrată a metodelor matriceale"*, în Revista de Comerț nr. 9, Bucureşti, Septembrie 2002 - [BG, 2002];
3. Ciupagea Constantin (coord.) - *Proiect SPOS 2007 – Studii de strategie şi politici, Studiul nr. 7- "Politica industrială a României în perioada post-aderare"*, Institutul European din România, Bucureşti, 2007 – sursa: http://www.ier.ro/
4. Costea C., Saseanu A., s.a. (2009)„*Economie comertului intern si international*", Editura Uranus, Bucuresti - [CS, s.a., 2009];
5. Danciu V., Grigorescu A. (2000), *"Marketing – Metodologie şi practică"*, Editura Dacia Europa Nova, Lugoj – [DG,2000];
6. Ciucur D., Gavrilă I., Popescu C.,(1999), "*Economie, Manual universitar"*, Ed.Economică, Bucureşti, – [Ciucur,1999].
7. Hill E., O'Sullivan T. (1997) – "*Marketing"*, Editura Antet, Bucureşti, – [Hill,1997];
8. eavengood, S. and Reeb, J.- *Controlul procesului statistic – Partea a III-a: Analiza Pareto şi foile de verificare [versiunea electronică], ianuarie 2002* [LR, 2002] http://eesc.orst.edu/agcomwebfile/edmat/EM 8771_E.pdf
9. Kotler,Ph.(1994), "*Principles of Marketing"*,Editura Teora, Bucuresti, – [Kotler,1994].
10. Levitt T.(2004)," *Marketing Myopia",* (HBR Classic) – [Levitt,2004];
11. Pîslaru Livia – articol *"Politicile Uniunii Europene"* EurActiv, 18 februarie 2008 – sursa: http://www.euractiv.ro
12. Schmidt, S. – "*Forecasting state retail sales: Econometric vs. time series models*", The Annals of regional Science, vol. 14, no 1/march, 1980, p. 91-93
13. www.eurostat.com/; http://ec.europa.eu
14. http://epp.eurostat.ec.europa.eu