Institutul Național de Statistică Societatea Română de Statistică

# REVISTA ROMÂNĂ DE STATISTICĂ - SUPLIMENT -

# **ROMANIAN STATISTICAL REVIEW** - SUPPLEMENT -

- Scientific research Themes/Studies
- Papers at the National Seminary "Octav Onicescu"

2014 / Nr. 1

Autorii poartă întreaga răspundere pentru conținutul materialelor publicate, revista și Societatea Română de Statistică fiind exonerate de orice răspundere.



ISSN 2359-8972

# Table of Contents

The Population and the Labor Force Market	7
Prof. Constantin ANGHELACHE PhD.	
Prof. Gabriela Victoria ANGHELACHE PhD.	
Assoc. prof. Alexandru MANOLE PhD.	
Lecturer Mădălina ANGHEL PhD.	
Bogdan DRAGOMIR PhD. Student	
Alexandru URSACHE PhD. Student	
Virgil Madgearu – Promoter of Romanian Cooperative Doctrine and	
Movement1	8
Prof. Dan CRUCERU, PhD	
The Use of Intermediate Management Balances as a Performance	
Management Tool in Electricity Companies2	4
Lecturer Mihaela DUMITRU PhD.	
Assistant Marian ȚAICU PhD.	
Associate Professor Gheorghe SĂVOIU PhD.	
Considerations Regarding Hazardous Climatic Processes in South – Western Romania for the 2013 Spring and Summer	6
C.S. II. MPP1. Ion MARINICĂ PhD.	
Ing, C.S. I, Victor Viorel VĂTĂMANU, PhD.	
Assistant Dana Maria (Oprea) CONSTANTIN PhD.	
Andreea Floriana MĂRINICĂ	
Model of Regression used to Analyze the Macroeconomic	
Correlations	2
Prof. Constantin ANGHELACHE PhD.	
Prof. Radu Titus MARINESCU PhD.	
Adina Mihaela DINU PhD. Student	
Daniel DUMITRESCU PhD. Student	
Diana Valentina SOARE PhD. Student	
Advertising Influence on Market4	8
Advertising Influence on Market	8

Revista Română de Statistică – Supliment nr. 1/2014

Statistical Indicators of Stock Assessed as a Percentage of GDP, and Consequences of Abusing the Logic of Statistical Thinking
Reduction of Pollution Effect in Constanta through Sustainable Rehabilitation of Water Purification System
Assistant Elena GRIGORE PhD.
The Regression Model used to Analyze the Correlation between Production and Labor
Lecturer Mădălina Gabriela ANGHEL PhD. Assoc. prof. Alexandru MANOLE PhD. Zoica DINCĂ (NICOLA) PhD. Student
A Set of Ten Relevant Statistical Indicators of Romania's External Debt Today
Sun Tzu – The Art of War Interpretation for Business
The International Trade Evolution
Econometric Model Applied in the Analysis of the Correlation between Some of the Macroeconomic Variables
Towards a Modern MENTORING

Aspects Regarding the Multiple Regression Used in Macro-economic
Analysis
Prof. Constantin ANGHELACHE PhD.
Assoc. prof. Alexandru MANOLE PhD.
Ligia PRODAN PhD. Student
Andreea Gabriela BALTAC PhD. Student
Zoica DINCĂ (NICOLA) PhD. Student
A Study on the Relationship between Fiscal Pressure
and the Business Confidence Index107
Prof. Georgeta VINTILA PhD.
Ioana Laura ȚIBULCĂ PhD.
Development Issues on the EU Internal Market
Assoc. prof. Ioana Nely MILITARU PhD.
Model based on Linear Regression Function
Prof. Constantin ANGHELACHE PhD.
Prof. Radu Titus MARINESCU PhD.
Assoc. prof. Emanuela IONESCU PhD.
Ligia PRODAN PhD. Student
Alexandru URSACHE PhD. Student
GDP and Foreign Investments Evolution126
Prof. Constantin MITRUȚ PhD.
Adina Mihaela DINU PhD. Student
Ligia PRODAN PhD. Student
Bogdan DRAGOMIR PhD. Student
Logistics, Management and Efficiency130
Prof. Mircea UDRESCU PhD.
Sandu CUTURELA, PhD. Student
Using Linear and Non-linear Models in Macroeconomic
Analyses137
Prof. Constantin ANGHELACHE PhD.
Ligia PRODAN PhD. Student
Daniel DUMITRESCU PhD. Student
Diana Valentina SOARE PhD. Student
Georgeta BARDAŞU (LIXANDRU) PhD. Student

Revista Română de Statistică - Supliment nr. 1/2014

Can the Corporate Tax Burden be used to predict the Evolution
of Business Confidence?143
Professor PhD. GEORGETA VINTILĂ
PhD. IOANA LAURA ȚIBULCĂ
Production of Services in Romania
Prof. Constantin ANGHELACHE PhD.
Assoc. prof. Alexandru MANOLE PhD.
Assoc. prof. Aurelian DIACONU PhD.
Andreea Gabriela BALTAC PhD. Student
Cristina SACALĂ PhD. Student

### The Population and the Labor Force Market

Prof. Constantin ANGHELACHE PhD.

Academy of Economic Studies, Bucharest "Artifex" University of Bucharest **Prof. Gabriela Victoria ANGHELACHE PhD.** Academy of Economic Studies, Bucharest **Assoc. prof. Alexandru MANOLE PhD.** "Artifex" University of Bucharest **Lecturer Mădălina ANGHEL PhD.** "Artifex" University of Bucharest **Bogdan DRAGOMIR PhD. Student** Academy of Economic Studies, Bucharest **Alexandru URSACHE PhD. Student** 

Academy of Economic Studies, Bucharest

#### Abstract

The occupied population includes all persons – both employees and freelancers – who develop a productive activity within the production limits of the European Accounts System.

Employees represent all the persons working mainly on the basis of a formal or informal contract, for other resident institutional entity, in exchange for wages or some equivalent pay. The number of employees, the second curve, shows a level oscillating between 6.4 million in quarter II 2009 and 6.6 million in trimester III 2009, 6.5 million in trimester III 2010, 5.9 millions in trimester II 2011, reaching the level of 6.1 million in trimester I 2012.

Key words: employees, population, occupation, labor force, productivity

The curve of the following chart shows the number of occupied population, by trimesters, in 2008-2013. The occupied population was some 9.6 million people, with high values in quarter 3 2008 (9.6 million), respectively quarter III 2009 (9.5 million), to reach 9.1 million persons in trimester III 2010. In 2012, 1<sup>st</sup> Quarter, the total occupied population was 8,997 million persons, of which 6,049 employees and 2,948 free lancers).

This number differs significantly form the one of employees that is currently operated with. It includes the number of employees determined in compliance with the accounts, that take into consideration, both data sources used to determine the cost of labor force occupation, such as the Survey on labor force in households (AMIGO); the Inquiry regarding the cost of labor force (S3); Annual structural survey in enterprises (ASA); and also administrative data sources (information provided by the Ministry of Foreign Affairs, Ministry of Labor, Family and Equality of Chances, Ministry of Interior and Administrative Reform etc.); accounting situations of commercial companies.



Occupied population according to the methodology of the European Accounts System, 1995

Data source: National Institute of Statistics.

I state that the number of employees includes those working in the hidden economy, established according the computation methodology.

Another category is represented by the independent workers (freelancers), they being the sole owners or co-owners of the entities without judicial personality they work in. In this category, can also be included: family workers, non-paid and home workers that manufacture for market; workers that exert, both individually and collectively, productive activities regarding exclusively the final consumption or formation of capital on their own account. Their number oscillated between 2.5 million in 2009 and 3.1 million in 2008, to reach 2.4 million in 2010, 2.6 million in 2011 and 2.49 million in 2012.

The occupied population, according to the SEC methodology, is the sole indicator that indicates the human potential of the occupied labor force that can be used to determine the social productivity of labor as a ratio between the GDP and the occupied population.

The evolution of the productivity of labor is, within the series, fluctuant enough, from positive elevated levels, such as in quarter III 2008, of 10.7%, to constant decreases starting quarter I 2009 until quarter I 2010, to record a comeback to a positive trend, of 1.6% in quarter II 2010 against the previous year, of 1.9% in quarter III 2010 against quarter III 2009. In 2011 and during the six months of 2012, the productivity have not manifested significant oscillations, but recorded a low level.

Real hourly productivity marks, in principle, the same evolution as the real productivity per occupied person.

In the analysis of the occupied population, it can be observed the percent evolution of the structure occupied regarding the great employees categories and individual entrepreneurs.

In this context, according to the European Account System edition 1995 also, the employees hold a weight of some 70% out of the occupied population.

On activity branches, the greatest weight is held by agriculture, with 27.6%, followed by industry, with 22.5% and transports with 21%.

The indicator occupied population of Romania compared to other countries proves a concerning discrepancy in negative way and where I think the attention of decisional factors must be focused.

In 2011, Romania, with a rate of occupation of 60.7%, was among the countries with values below EU27 average (for which, the value of the indicator was 64.5%).

The greatest values of the occupation ratio in 2011 were recorded in: Netherlands (76.3%), Denmark (74.1%), Sweden (72.9%), Austria (71,4%) and Germany (71.0%).

In most EU27 member states, the occupation ratio in 2011 was increasing against the previous quarter, excepting four member states, in which case slight declines were observed (between 0.1 and 0.4 percent points): Portugal, Lithuania, Luxembourg and Belgium. At the level of EU27 the increase against the previous quarter was +0.7 p.p.

Against the same period of 2009 the occupation ratio was in decline in most European states. At the level of EU27 the decrease was -0.5 p.p. The exceptions are 6 member states, for which the occupation ratio remained at the same level or increased slightly (at most 1.0 p.p.) – among these, Romania. In the case of Romania, the increase of  $\pm 0.7$  p.p. recorded in 2011 against 2010 produced on the background of occupation characteristics of our country, where the agricultural sector continues to hold a significant weight.

In Europe, the most significant declines in 2011 against 2010 were recorded in: Estonia (-3.9 p.p.), Lithuania (-3.3 p.p.), Bulgaria (-3.0 p.p.) and Latvia (-2.1 p.p.).

In 2011, in Romania, the weight of employees in total occupied working age population was 66.1% - one of the most reduced in Europe (the next-to-the-last place, after Greece). In the same time, the weight of non-employees in agriculture (mainly employees on their own and family non-paid workers) was 26.2% - the greatest in Europe.

The increase of occupation in 2011 against the previous periods occurred on the background of transition towards agriculture, phenomenon visible from:

- Reduction of employees weight (by 2.1 p.p. smaller in 2011 against 2010);
- The increase of the weight of non-employees in agriculture (mainly workers on their own and family workers): by 3.0 p.p. against 2008 and by 1.8 p.p. against 2009.

According to the provisional results of the Survey on Labor Force (AMIGO), in 2011, the occupation ratio of the working-age population was 60.5%; increasing by +0.3 p.p. against the end of 2010. Regarded through the prism of distribution by development regions, the smallest occupation ratio was recorded in the Center region (53.2%) and the greatest in the North East region (65.3%).



Territorial disparities of the occupation ratio (%)

Data source: National Institute of Statistics.

Occupation rates greater than the national average (60.1%) were recorded only in two regions where the agricultural sector is significant – North-East (65.3%) and South (63.2%), and also in Bucharest Ilfov (62.8%) where labor force is drawn into the services sector. The highest growths, established by chain indexes, were recorded in the North East region and South Muntenia, and the highest decreases were emphasized in Bucharest Ilfov and South-West Oltenia.

Information regarding the "budget sector" must be carefully analyzed, because the data refer to the statistics from economic activities (aggregated on homogenous activity) according to CAEN Rev.2.: pubic administration, education, respectively health and social assistance (including private education – some 2%, respectively some 4.5% for health and social assistance), excluding the armed forces and assimilated personnel (MApN, SRI, MAI etc.).

These statistics do not take into account the financing form, their purpose being to provide information on economic activities, according to CAEN Rev.2.

The budgetary sector was characterized, during the period 2009 - 20121 by continuous decreases of the number of employees. The most accentuate declines were recorded in 2010 and during the first nine months of 2011.

The effective of employees at the end of 2011, belonging to the budget sector, reached almost 947 thousand persons, the declining trend continues. Thus, in the public administration were 199.0 thousand persons, in education 377.4 thousands and in health and social assistance 357.8 thousands.

Comparatively to the end of 2010, the effective of employees decreased by 59 thousand persons. Out of these, some 40% came from the public administration and 60%, in almost equal proportions, form education, respectively health and social assistance.

Also, declines in the effective of employees recorded in the public administration units can be found in the secondary activities developed by these entities: cultural, sport, and recreational activities, landscape design and services for buildings, agriculture, water supply, sanitation, waste management, decontamination, constructions, transport and storage, production and supply of electrical and thermal energy, gases, hot water and air conditioning, lease and sublease of real estate goods etc.

As for the evolution of average monthly salary gains during the period 2009 - 2011, they were characterized, mainly, by declines from one month to another, excepting the months when annual and occasional premiums were granted, according to the national law, sums from other funds.

Following the application of legal provisions (Law 118/2010 regarding some measures for the recovery of budgetary equilibrium), of reduction by 25% of salary gains for the personnel in the budgetary sector, in trimester III 2010 the lowest values of the net average salary gain for the last years were recorded, that is: public administration 1404 lei, education 1063 lei and health and social assistance 1036 lei.

In October 2010, in all the activities of the budget sector, salary gains were recorded, due to the payments of occasional premiums (including holiday wages), of sums from other funds (including the previous periods), of cumulating functions for teachers, also for payments of supplementary hours worked in some medical facilities. Also, the increase of salary gain was influenced by the firing of personnel with small wages from the sector.

However, compared to June 2010 (the month that preceded the application of Law no. 118/2010), the net average salary gains from October, were 18% - 21% below the level for June.

Compared to previous October, net average nominal salary gains from October 2010 was 24% lower in education, 22% lower in health and social assistance and 20% lower in public administration. In 2011, the salaries held at these levels, as we expect their block in 2012, or even their reduction, if the effects of the crisis will impose.

The effect of economic crisis was felt in the demand for labor force in the budgetary sector. In 2011 the lowest values of the vacant work places ratio was recorded, since 2095 until present, in public administration, respectively health and social assistance.

Compared to the previous year, in 2011, the vacant work places ratio decreased in health and social assistance (by 0.20 p.p.), public administration (by 0.11 p.p.), and in education it increased (by 0.12 p.p.).

The evolution of the vacant work places ratio was more accentuated in health and social assistance (by 2.53 p.p.), followed by public administration (0.67 p.p.), and for education the ratio kept unchanged.

In 2011, little more that 10% of the total vacant work places were recorded in each of the activities: public administration (2.7 thousand vacant places), respectively health and social assistance (2.4 thousand vacant places), while in education the demand for work places was of some one thousand. Comparatively against the previous periods, in health and social assistance, the most significant decrease of number of vacant places recorded: by 7.8 thousand vacant places, representing more than two-thirds (67.5%) of the number of vacant places that diminished within a year in the whole economy, respectively with 0.8 thousand vacant places against the previous trimester.

In public administration, in 2010-2011, the number of vacant work places decreased by 0.7 thousand, and against 2009, by 2.2 thousand. In education, a slight increase of the demand for work places recorded, as against the previous year, following the start of the new school year. In 2010, the weight of employees in pubic administration, defense and social security in the public system was 7.8%, decreasing by 0.3 p.p. from 2009. At the level of EU, the indicator had the value of 8.4%. Among the European countries, the evolutions against 2010 are divergent: as the decrease trend is observed in 12 countries, increase in 12 while in 3 countries the weight of administration employees remained constant against the same period of the previous year. In 2011, with only 6.3% of the employees working in the field of health and social assistance, Romania was placing among the last 4 countries in Europe. Lower weights were recorded only in Cyprus (4.4%), Latvia (5.4%) and Bulgaria (5.6%). Amongst the European countries, the highest weight was recorded in Denmark (20.2%). At the level of EU27, the value of the indicator was 11.2%. Against the previous year, in almost all European countries the increase trend can be observed; 5 countries make exception: Cyprus, Belgium, Sweden, Finland and Luxembourg. In Romania the increase was by +0.2 p.p.

Regarding the weight of the employees in education in total employees, the value recorded in 2010 was 6.3%. This value, even in slight increase (+0,3 p.p.) against the previous year, is the smallest in Europe. The highest values of the indicator were recorded in: Lithuania (12.5%), Sweden (12.0%), United Kingdom and Latvia (in both countries 11.8%) and the smallest (apart from Romania) in: Germany (6.6%), Bulgaria (6.8%).

The increasing trend against the same period of the previous year can be observed in almost all European countries (excepting 4 countries). The information corresponding to the financing form are managed by the Ministry of Finance, according to the provisions of OUG no. 48/2005, with subsequent completions and modifications. In the basis of this ordnance, the main credit orders for the public institutions financed from the state budget, social security budget, special funds

budget and of the autonomous public institutions integrally financed from own revenues, submit, monthly, to the Ministry of Public Finances, for the previous month, situations regarding the monitor of the number of posts and personnel expenses, for their own apparatus and for public institutions in their subordination, co-ordination or authority, regardless the financing model. The number of posts occupied in the budgetary sector, according to the MPF, was in December 2010 of 1,190.5 thousands, decreasing against the previous periods.



Evolution of the number of occupied posts in the budgetary sector during the period December 2008 – December 2011

Also, as an effect of OUG no. 48/2010 for the modification and completion of some normative in the health domain, for de-centralization, starting August 2010, some hospitals in the own network of the Ministry of Health passed to the sanitary network of the public administration authorities, effecting a transfer of occupied posts from central public administration to the local one.

A direct effect of the economic crisis, the phenomenon of decline for the number of employees was accentuated during the period 2009 – June 2012.

To be remarked the fact that the monthly data regarding the number of employees and net or gross average salary gains are aggregated on the homogenous activity of the units; it means that for the units that developed more activities (secondary) apart from the principal one, secondary activities are included, each one of them, to the economic activities according to proper CAEN Rev.2.

Unlike industry and services, activity sectors that recorded decreases of the number of employees in the last month of each quarter compared to the corresponding month of the previous quarter, in agriculture and constructions, slight increases occurred, due to the seasonal character of these activities. Until trimester II 2010, the most significant decreases in the number of employees occurred in the sectors with preponderant number at the level of national economy,

Revista Română de Statistică - Supliment nr. 1/2014

Data source: National Institute of Statistics.

that is, industry and commercial services. In September against June 2010, the effective of employees in social services, respectively commercial ones, known the greatest declines (by 29.0 thousand persons, respectively by 18.7 thousand persons). The decrease of the number of employees continued in 20111 - June 2012 also.

Comparative to January 2011, the effective of employees decreased in all activity sectors, exception some slight increases recorded in agriculture in March, June and September 2011.

In October 2011, as against the previous month, the decline trend of the number of employees continued in all sectors. Significant are the decreases of the effective of employees in the social services sector (-10.9 thousand persons), respectively commercial services (-9.3 thousand persons). These declines, have represented 68% of the total decrease of the number of employees compared to the previous months.

For an extended presentation of the infra-annual statistic indicators, they were estimated monthly, on property forms: public property includes the entities with full of partial state ownership; private property includes the entities with major private ownership, full private and integral foreign (co-operative and community entities were excluded) and the public ownership of national and local interest. During 2011, the number of employees fell by some 214 thousand persons, mainly inside units with private property. Meanwhile, the private sector, has, as number of employees, the major weight in economy, some 67. In the private sector, in 2011, the most accentuated decrease of the number of employees was recorded (-116 thousand persons).

In 2011, the decrease of the effective of employees had a slower rhythm compared to the previous year, but moved from the private sector towards the public one.. As number of employees, these units hold 25% of the total number of employees in economy. The decrease of the number of employees in the public administration entities, of local and national interest, in October 2011 against the beginning of the year represented 39% out of the total decrease.

Regarding the whole public sector, (public property + public property of national and local interest), which holds some 31% of the number of employees, the decrease was by 31 thousand persons in October 2011 against January 2010.

The number of insurants includes the persons with full or part time contracts that are in the declaration regarding nominal situation of insurants provided by employers. The insurants who, during the month, had only unemployment support or compensating payments, are not included, even if they are present in the nominal declaration received from employers. Only those insurants are included, who had been declared with a number of worked days equal to the month's number of work days, which had not benefited from medical allowances. The age groups are calculated for the respective reference month.

To allocate on groups of gross salaries realized, the incomes were cumulated for the insurants with more contracts.

The number of insurants with contract suffered continuous decreases, both as total and as age groups. So, only during the period June-December 2011, the number of employees fell by 97 thousands.

Regarding the repartition of employees on age groups, along the entire analyzed period, the major weight is held by the employees within the 30 - 44 years group. Under the aspect of employees' repartition on intervals of gross realized salary gains, in June 2008, those making gross gains less or at most equal to 600 lei represented 22% of total, while 66% made gross salary gains between 601 and 3000 lei. To be noted that in June 2008, the average gross salary per economy was 500 lei. During the period June 2010 – June 2012, the weight of employees that realized gross gains below or equal to 730 lei grew, reaching some 21%. Meanwhile, the weight of employees that made gross salary gains between 731 and 3000 lei went little over 75% of the total employees. As for the weight of employees with gross gains realized above 8001 lei, it remains constant across the period analyzed and represented some 1.45%. In 2012 the most vacant workplaces at 1000 unemployed BIM were in Netherlands. The evolution of unemployment entries was oscillating, recording a minimum point in November 2008 (51,242 persons) and a maximum in January 2012 (87, 314 persons).

The index of real salary gains follows closely the evolution of the index for the average net nominal salary gain, as it results from the chart that emphasizes the trends recorded in the last two years. The phenomenon is explained by the decrease of the inflation growth rate that is taken into consideration at the determination of the real salary gain. During the year, fluctuations of the salary gain are recorded, mainly determined by the grant of occasional premiums (13<sup>th</sup> salary, holiday premiums, premiums in March/April, or December, for religious feasts). They influence the increases of decreases depending on the period in which they are granted, leading, eventually, to the blur of the fluctuations of the monthly salary gain at the level of the entire year. The salary gain, both in nominal and real terms, was lower in most months in 2011, compared to the previous month, (exception -March, when premiums were granted for the Easter, leading to an increase of the nominal and real salary gains as against the previous month). On activities of the national economy, the maximum values of the net average salary gain are in the financial brokerage (with percentage between 115 - 146% above economy average). At the opposite pole, with the lowest net average salary gain, are placed the hotels and restaurants activities (with percentage between 41 - 43% below economy average). To be noted that both sections hold similar percentage as numbers of employees at the level of the national economy (some 2-3% each).

In 2011, compared to the previous year, the net average salary gain had a slightly decreasing trend, for most economic activities (excepting those pertaining to the budgetary, hotels and restaurants, real estate transactions and shows, cultural and recreational sectors).

In 2011, the average net salary gain realized on various activities of the national economy has recorded, both increases and decreases, in almost equal measure. So, in the economic sector, slight increases were recorded, the greatest

being in the activity of production and supply of electrical and thermal energy, gases, hot water and air conditioning (+1.8%). At the opposite pole, with the most significant decrease of the net average salary gain, was the extractive industry (-18.9%), because of the premiums granted for "oilers' day" in the previous month).

In the public property units (fully state-owned or state-owned majority), the average net salary gain has the highest values. The lowest average net salary gains are recorded in the privately-owned entities (privately-owned majority, fully private, fully foreign), that hold the majority weight of the number of employees (some 63%). Exception, since July 2010, following the application of the Law 118/2010, the lowest level of the average net salary gain was in the public entities of national and local interest. The number of pensioners with pensions above 1000 lei represented, at the analyzed moment, just the fifth part (21.1%) of the total social security pensioners. The average number of social security pensioners had a descending quarterly evolution, from 2002 until 2012.

	years	Average number of pensioners			Average pension					
		- thousands-			Lei/month			Trim. I 2012 against Trim. IV 2011		
		Trim. I	Trim. II	Trim III	Trim. IV	Trim. I	Trim. II	Trim III	Trim. IV	
Pensioners -total	2012	5531	5493	5469	5455	766	769	771	786	
(I+II+III)*)	2013	5433	5413			795	807			101,5
1.1. Social	2012	5523	5486	5462	5448	767	770	772	787	
insurance pensioners - total of which:	2013	5426	5407			796	796			101,5
- state social	2012	4720	4703	4693	4693	777	778	778	779	
insurance pensioners	2013	4683	4679			800	812			101,5
- Social insurance	2012	642	624	610	597	313	313	314	314	
pensioners from the former agriculturist's system	2013	584	570			323	328			101,5
- Social insurance	2012	2	2	3	2	500	540	512	543	
pensioners from the evidence of the State Secretary for Cults	2013	2	2			599	598			99,8
<ul> <li>Social insurance</li> </ul>	2012	2	2	2	2	1902	1897	1886	1903	
pensioners from the evidence of the Advocates Insurance House	2013	2	2			1906	1986			104,2
1.2. Beneficiari	2012	1	1	1	1	193	194	194	195	
es of pension- type social support -**)	2013	1	1			200	203			101,5
1.3. I.O.V.R.	2012	7	6	6	6	239	238	237	236	
Pensioners	2013	6	5			235	234			99,6

Average number and average monthly pension of pensioners and social support beneficiaries

<sup>1)</sup> including taxes and social health contributions related to retirement income (O.U.G. no.87/2000 and OUG no.107/2010).

<sup>\*)</sup> Including people retired from the Ministry of National Defense, Ministry of Interior, Romanian Intelligence Service.

\*\*) Paid from the Social Insurance Fund.

Data source: National Institute of Statistics. Monthly Statistical Bulletin no. 7/2013, p. 133

In quarter II 2012, the number of social security pensioners has followed an ascending trend, reaching 5531 thousand persons.

As for the state social security pensioners, after being on a continuous ascending trend, since quarter II 2007 (4641 thousand persons), since quarter III 2010, recorded a decrease, to 4759 thousand persons, in 2011 and 4720 thousand persons in quarter I, 2012.

In 2011, comparative to the corresponding quarter of the previous year, the social security pensioners had the possibility to spend averagely with only 26 lei (+3.6%) additional.

In 2012, the index of the real pension decreased as against the previous year (96.0% from 118.1%); subsequently, the purchasing power of the social security pension declined. In quarter I, 2012, the average pension was 766 lei/month.

In the analyzed period, some 3/4 of the total departments have recorded a greater number of pensioners compared to the employees. In the top of this group, there are Giurgiu and Teleorman where the report pensioners/employees was almost 2 (1.9) pensioners for one employee.

The Bucharest municipality was at the opposite pole, recording the lowest value of the report (0.6).

The departments in which the ratio is 1 to 1 represents a tenth from the total.

According to the provisional results of the Survey on Family Budgets realized by NIS in 2010, the average monthly total revenues for a household were 2257 lei, a value relatively constant during 2007-2012. The structure of the money incomes of households reveals the same trend as the total revenues.

In 2011, the average total revenues for an urban household were by 32.3% higher.

#### References

- Anghelache, C-tin (2013). *România 2013. Starea economică sub povara efectelor crizei*, Editura Economică, București
- Anghelache, C-tin (2012). *România 2012. Starea economică în criză perpetuă,* Editura Economică, București
- Anghelache, C-tin (2010). *România 2010. Starea economică sub impactul crizei,* Editura Economică, București
- Anghelache, C-tin (2011). *România 2011. Starea economică în malaxorul crizeii,* Editura Economică, București
- Anghelache, C-tin (2008). *Tratat de statistică teoretică și economică*, Editura Economică, București
- *Anuarul statistic al României*, edițiile 2002, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013
- \*\*\* Buletinul Statistic nr. 1-12/2002, 1-12/2003, 1-12/2004, 1-12/2005, 1-12/2006, 1-12/2007, 1-12/2008, 1-12/2009, 1-12/2010, 1-12/2011, 1-12/2012 şi 1-12/2013 editat de Institutul Național de Statistică

### Virgil Madgearu – Promoter of Romanian Cooperative Doctrine and Movement

#### Prof. Dan CRUCERU, PhD

"Artifex" University of Bucharest

#### Abstract

In the theory and practice of cooperation, various concepts and directions are encountered, according to the attitude towards the principles and bases of organization of the capitalist society. Generally, a fundamental separation is made between the rural and urban middle class cooperation, which is accounted to be settled on capitalist principles, and between the consumption and worker's manufacturing cooperative, which has developed in the name of another social ideal, testifies the belief that its organization is antagonic to the capitalist regime and aims towards another order of the society.

Key words: economy, cooperative, development, capital, interest, labor

Professor Virgil N. Madgearu was born in Galati, on December 14<sup>th</sup>, 1887. He attended primary education courses at the "Vasile Alecsandri" local school and then pursued further education in Germany, at the University of Leipzig, taking, during the summer of 1911, the PhD exam in economic and financial sciences, with the thesis "On the industrial development of Romania".

During the next year, he studies in London the lectures of economic-social sciences and develops practice at one of the London banks.

Back in Romania, he fully enters in the action to realize the preoccupation he thoroughly studied in the theoretic plan during his academic journey.

From this period, the first works dedicated mainly to the Romanian social problems date back: "În chestiunea meseriașilor" (1911), "Cercetări despre industria la domiciliu" (1914) "Ocrotirea muncitorilor în România" (1915). In 1914 he published an interesting and original work: "Structura și tendințele băncilor populare".

One year before, at the Congress of the Romanian Society of Agriculture, he presented a report with the title "Asociațiile de interes agricol" (Associations of agricultural interests), with some anticipations on the role of agricultural cooperation, later these anticipations were developed.

In April 1918, when the greatest part of our country's territory was under foreign occupation, V. N. Madgearu, together with Ion Răducanu and Victor Slăvescu begin editing the journal "Independența economică", which played an important role in promoting the cooperative doctrine in Romania.

The idea according to which the structure of the Romanian Popular Banks is capitalist and therefore they cannot be employed in the service of labor's interests, presented since 1912 in the "Tovărășia" journal, has not found approval in any of the existing economic circles.

That's what V. N. Madgearu wrote, not on the basis of theoretical considerations, but on the direct intuition of cooperative realities: "In most of the Popular Banks, the characteristic in their leadership is the spirit: the strive for maximum dividends.

This spirit proves to us that the Popular Banks are driven by the will of the few, who form the "Interested Capital", and not by the will of the many loaners, who either are not societary, or have a capital that is too small, but most likely, have little light to have a decisive word".

"The official circles of cooperation have contested, in form, the soundness of this statement: before the war, in the preface of the yearbooks, through the annual accounts that are published. In fact, however, they gave it the best confirmation, through the administrative or legislative measures they were compelled to adopt. Indeed, through these measures, the cover of the State on the Romanian cooperation became more and more overwhelming, starting from the very idea - although good intended and reclaimed by social realities in rural areas to annihilate the influence of the capitalist elements, elements that possessed the de facto power, because they owned the greatest part of capitals in Popular Banks."<sup>1</sup>

Virgil N. Madgearu is preoccupied also by the problem of cooperative society definition. That's what he wrote in the work "*Reforma Cooperatiei*" (*The reformation of cooperation*)":

"A real reform of the legal settlement of the cooperation cannot be conceived without stating the meaning of the cooperation concept, the nature of this organization and its purpose in the economic development of the company".

This difference has prevented the establishment of a joint principle as foundation of the whole cooperation. The existence of more currents in the cooperative movement provides, actually, the impression that nor the conscience does exist, that the different types of cooperatives are only different form of manifestation for the same and single idea.

In reality, the various cooperative organizations, born isolate, of special needs, in various forms and in the middle of heterogeneous social categories – peasants, workers, craftsmen, etc. – they haven't yet realized anywhere a full coordination of their aims and did not reach agreement on the same action program. No system of reports were reached between the various types of cooperatives, to product a reciprocal completion of their action and thus make disappear the emphasis on some antagonisms of interests of passing nature and to recognize the joint idea, from which the entire movement arose."<sup>2</sup>

At the base of formation of cooperative companies, V. N. Madgearu places the interests of labor. They "have prompted the men to associate, so through

<sup>&</sup>lt;sup>1</sup> V. N. Madgearu, Structura și tendințele băncilor populare în România, în Problemele cooperației române, ed. cit., p. 53

<sup>&</sup>lt;sup>2</sup> V. N. Madgearu şi Gr. Mladenatz, Reforma cooperației, Ed. Cultura Națională, Colecția actualități, 1923, p. 21

cooperation the purpose of the labor is to be realized, that are no other than a progressive fulfillment of needs. Only cooperation made ease the rise of labor productivity, which interests alike all those working. The interest of the labor cannot be therefore any other than the most rational and productive organization of labor, meant to secure, to all individuals involved in the manufacture, in the society, welfare and prosperity. Over the historical development, the owners of material means appear more and more, in opposition of interests to the popular masses, whose life spring is the labor. The antagonism of interests between ruling classes and working ones forms, in definitive, the most part of human history.

The ruling classes have created various and numerous economical organizations for themselves, to realize their interest, to ensure their domination and exploitation of labor. Toward these, working classes were not able, especially in the economic field, to form but too late organizations that were to protect their interests. But such assemblies are to be found everywhere, their aim is no other then liberation from the economic domination of the ruling classes. **This is the fundamental meaning of modern cooperatives**. They are organizations, made by men driven together by the same interest of labor, whose action is led by the principle of labor. Even the history of modern cooperative development proves that in all environments the interests of men, whose existence was based mainly on labor, have prompted the formation of the first cooperatives, which had the meaning to free their members from the economic dependency, of the loan shark, landowner, trader, industrial entrepreneur<sup>13</sup>

And that's how he further defines the cooperative societies: "Cooperatives thus appear, as economical associations of labor, unlike anonymous capital companies, who are associations of capital, or as **a form of economic association**, **dominated by the labor's point of view.** 

The point of view of labor can manifest itself both in cooperatives, who are founded in order to potent the individual action at the achievement of income, both in the cooperatives whose mission is the economic organization of income's consumption. But according to the heterogeneity of the two economic functions, each of them shall print a special character to the cooperatives meant to fulfill them, even if there is not excluded for them both to merged in the same cooperative, as is the case of rural consumption cooperatives, supply and sale in consumption.

The function of income achievement and the function of income consolidation form the borderline between cooperatives meant to potentiate and rationalize the production activity and the cooperatives whose call is the systematic organization of income consumption.

But because the productive activities, in which the labor is a decisive factor and has a special interest, are numerous and various, the cooperatives in this

<sup>&</sup>lt;sup>3</sup> Idem, p. 26

category are of many types, than the cooperatives for systematic organization of income consumption."<sup>4</sup>

With all formulated critics, the victory of the cooperative cause was sensed. That was the answer of professor Virgil N. Madgearu, published in the journal *Independența economică* (*Economic Independence*) in 1922: "how can be explained then the good results achieved? A clairvoyant policy of the state began since the great Haret. In truth, the State, by the help of a illuminated tutelage exercised on the cooperation, he made to appear a tight collaboration between the cooperative power, represented by the small bourgeoisie of villages and the moral force, represented by the healthy energy of peasantry and its soul exponents – teachers and priests.

But implicitly, we must admit, that the results of a complex of circumstances have not been able to lead us to a real cooperation in our country, but to a compromise of economic organization, made of: capitalist, solidarism and statist elements.

This is, upon us, the true on the nature of our cooperative organization of yesterday and today.

Can this organization transform tomorrow into a real cooperation? Our firm belief is yes. And the beginning is to be made by the state as well, by changing the legal clothing that became too tight, even choking for the entire economical and spiritual life of villages."

The reports between state and cooperation, a problem widely disputed during that time, represents for V.N. Madgearu the assuming of a clear and precise position: in these relationships the nature of cooperation is fixed as independent organization. That's what he wrote, in the study quoted above: "The conduct line of the State towards cooperation is drawn by the nature, principles and evolution trends of this social-economic movement".

"First, the State cannot overlook the fact that the basis of cooperation is its autonomous being and anywhere the autonomy of cooperatives is not respected, their independent administration, no real and sustainable cooperation exists. The creation of the cooperatives and their development is linked to conditions, which are outside the powers of the State.

There is no other determination for establishing and leading cooperatives than the interest of the members. The spirit that lives in a cooperatives, is made by the very interest that prompted their establishment, and its activity is as much prosperous, as the conscience of the members is more powerful, their will and determination to promote the joint interests, more diligent.

The State, cannot contribute directly, to the creation of these conditions for the formation of cooperatives and everywhere it was attempted to hasten the establishment of cooperatives, the result was that the majority didn't have their own force and have degenerated in pseudo-cooperative forms, falling prey to the interests in gaining of some speculators turned into cooperative leaders ".

<sup>&</sup>lt;sup>4</sup> Idem, p. 26-27

"So before anything else, the State must respect the autonomy of cooperative organizations ".

"But, if the State cannot fulfill a function of creating cooperatives, it is no less true that the State, as lawful expression of the society, is indicated to elaborate a law of the cooperation, according to the nature, principles and needs of this institution, securing the freedom of movement needed for their unimpeded development, but restraining it from all directions, in which cooperatives would be exposed to degenerate, becoming capitalist organizations in cooperative clothes, or travelling on outward paths, in damage of most cooperatives.

By that it does not mean that the State can determine the evolution path of the cooperation, but only open it, to restrain it, to prepare free access and prevent deviations due unfriendly attraction forces.

To the same purpose, the State is called to attempt a guidance, education and propaganda action, which ensures the cultivation and penetration of the cooperative spirit in all working layers of the population ".

"In cannot be overlooked that the modern State is essentially a product of the political trends and ideas of bourgeoisie, so of a social class whose existence and economic development rests on the interests of the capital, so it not fits into its preoccupations to ease the creation of an economic order based on the principle of labor. This clears enough the absence of a cooperative legislation, adequate to the nature, principles and trends of the cooperation.

Thus, where the political evolution has transformed the authoritarian State into a democratic lawful State, the labor's point of view will spare no time for manifesting in the area of cooperation and confirm the recognition of the public interest character of the cooperative movement. Especially, in the states where the agrarian structure, based on labor property, eases the development of a class of free peasants, the peasant cooperatives, together with the cooperation of organization of towns labor class' consumption, will have to acquire the image of a public interest institution".

In the reports between the law democratic State and cooperation, V. N. Madgearu proposes a normal path and relation: "The state, that had an agrarian, industrial, commercial policy, will inaugurate a **policy of cooperation**. This can manifest in the first row by the code of cooperation. It creates a right, which eases for the labor the administration of own interests and capitalizes them in organizations adequate towards the interests of capital.

These organizations, products of the individual, associate initiative, are autonomously administrated, but the law, filled by the principle of labor and the cooperative spirit, borders by coercive and penal measures the unfriendly trends, that would have the nature to produce sick manifestations.

In the second row, the **policy of cooperation** is embodied in the State's actions to organize the guidance and education of cooperatives. The authoritarian state, the secular advocate of the domination and exploitation interests, did not have the call to fulfill this mission. The law democratic state, which has interests to support the organization of labor in the national economy, would not be absent

from the fulfillment of this mission, which is part of the very conditions of normal existence and evolution. Does not belong, to a policy of cooperation, an active and direct concurrence of the State towards cooperation? What nature can it be of and what would be its consequences on the cooperation?

The State could endow the cooperation with a fund, put for free at the disposition of the latter. Such mean could be used, to encourage the development of some forms of cooperation, which were not yet attempted and can be assumed to be helpful. But experience proved that some endowments of the State were not followed by a strengthening of the cooperative movement, so they cannot be included into the preoccupations of the cooperative policy. The State is able to subsidy the cooperative institutions by taking all burden upon itself, totally or partially, for the guidance, education and control expenses."<sup>5</sup>

The interest of professor Virgil N. Madgearu for cooperative activity is political, economic and social alike. In this respect, his theoretical conception is transposed into the political program of the National Peasants' Party and, likely, is expressed through the contribution in the elaboration of the Cooperative Code in 1928 and, then, of the Law regarding the organization and functioning of the cooperation, promulgated in 1933.

A special attention is granted by professor V. N. Madgearu, to the cooperation in general and, especially, to the agricultural cooperation. So, in the paper elaborated together with professor Gr. Mladenatz, **The Reform of Cooperation**, in 1923, it was shown that "the economic needs of the new agrarian regime call for a development of the cooperative movement, that is to ease the rational organization of the production and to ensure its full capitalization, and the social necessities call for the set of a new path for the cooperation of economic organization of the labor classes 'consumption".

This thesis, the development of some forms of agricultural cooperation – manufacturing and capitalization – in rural areas, and in a more filmy form, of a consumption cooperation in towns, is meant to serve too the cause of the "alliance". In its name, there are called for some extra – economic motivations, otherwise present themselves, of an at least psychological interest, if not sociologic, even if in the end they will prove to be fully unfounded.

#### References

Cruceru, D. (2014) – Cooperația în România. Istorie și actualitate, Editura Artifex, București

- V. N. Madgearu, *Structura și tendințele băncilor populare în România*, București, Edit. Inst. de Arte Grafice Tipografia Românească, 1914
- V. N. Madgearu, Gr. Mladenatz, *Reforma cooperației*, Ed. Cultura Națională, Colecția actualități, 1923

<sup>&</sup>lt;sup>5</sup> Idem, p. 32-33

### The Use of Intermediate Management Balances as a Performance Management Tool in Electricity Companies

Lecturer Mihaela DUMITRU PhD. Assistant Marian TAICU PhD. Associate Professor Gheorghe SĂVOIU PhD. University of Pitești Faculty of Economic Sciences

#### Abstract

Starting from the assumption that the company is a place where material chances take place, and inputs thus become outputs, in the countries that use the continental accounting system, comparisons in time and space concerning the company results are made based on intermediate balances of administration. The analysis of the company performance based on intermediate balances of administration makes it possible to highlight the manner in which value is created and transferred within the company. This paper presents an analysis of expenses and incomes' concentration based on Gini Struck coefficient. The results of this analysis represent the basis for a number of strategic managerial decisions. The article aims at presenting the relevance of intermediate balances of administration for the decision-making process within electricity companies.

**Key words:** *intermediate management balances, added value, performance, energy, Gini Struck coefficient.* 

JEL classification: M40, M41, C40

#### Introduction

Starting from the assumption that the company is a good place where goods are turned into other goods, and thus inputs become outputs, in the countries that use the continental accounting system, the comparisons in time and space concerning the company results are based on intermediate management balances. The accounting indicators that are usually used reflect the profit or loss of the accounting period in real terms, and have two main shortcomings, as deemed by I. Vasile (2005, p.84):

- the indicators are determined starting from the assessments of the incomes and expenses of the entity based on evaluations that can sometimes be questionable;

- given that the currency influence of the operations is neglected, determining the incidence of the results on the self-financing capacity and on the cash of the entity in the traditional accounting assessment is not allowed.

The Romanian accounting system does not provide the obligation of the entities to prepare this statement, but the latter is useful for analysis, because it contains certain specific indicators that are not directly found in the profit and loss account, the balance sheet or the annexes to the balance sheet, such as the margin, the output of the accounting period, the value added, the gross operating surplus.

In order to enrich the information content, the intermediate management balances divide the net result in partial results that allow a better analysis of the company performance on several levels.

Basically, the intermediate management balances (IMB) are indicators determined in cascade (Iacob C., 1996) in the form of money accumulation margins, designed to perform a specific function the remuneration of the factors of production and of financing of future activity, which highlights the stages of the formation of the net result of the accounting period in close connection with the structure of the incomes and expenses of the company activity.

Achieving this objective requires, according to the author G.Vintilă (2002, pp.31-32), a pre-treatment of the profit and loss account to reveal in order to highlight the manner of operation and the profitability of the company, as commercial margin, output of the accounting period, value added, gross operating surplus, operating result, current result and net result of the accounting period.

In the final part of the paper, in order to improve and optimise the contents and the results, the authors use an analysis of expenses and incomes' concentration based on Gini Struck coefficient.

#### 1. The importance of intermediate management balances

The balances in "cascade" allow for highlighting the connection between the operational function and the financial one of the company and can be divided in two categories: IMB – activity and IMB – profitability.

In the lower part of the intermediary management balances table two residual cash balances are determined (the self-financing capacity and the selffinancing), indicators of interest in the financial analysis due to their significance and usefulness in assessing the financial performance and in the calculation of significant financial ratios.

In relation to the method of calculating the indicators included in this table we are mentioning that there are two trends of opinion: the French school specific trend, and the American school one, respectively. What distinguishes these two trends is the determination of the indicators.

Thus, a brief presentation by comparison of the two trends leads us to highlight accumulation margins calculated based on the functional classification of the elements within the profit and loss account (according to the International Financial Reporting Standards), respectively of the intermediate management balances (according to the French opinion).

Table 1 presents these accumulation margins according to the French point of view.

Incomes	Expenses	IMB
(1)	(2)	(1-2)
Goods sales	Cost of sold goods	Commercial margin (Mc)
Sold production + Stored		Production of the accounting
production + Fixed-assets		period (Qex)
production		
Qex + Commercial margin	Consumptions from third	Value added (VA)
	parties	
VA + Operating subsidies	Other taxes and duties	Gross operating surplus
	(without profit tax and VAT)	(EBE)
	Staff expenses	
EBE + Incomes from	Depreciation and operating	<b>Operating result (Rexp)</b>
operating provisions + Other	provisions	
operating incomes	Other operating provisions	
Rexp + Financial incomes	Financial expenses	Current result (Rcrt)
Extraordinary income	Extraordinary expenses	Extraordinary result (Rex)
Total result $(Rt) = Rcrt +$	Profit tax	Net result of the accounting
Rexp		period after tax (net profit or
_		loss)

 Table no. 1: Table of the intermediate management balances

Source: A. Işfănescu, V. Robu – Analiza economico-financiară, ASE Publishing House, Bucharest, 2002, page 138

On the other hand, according to the IFRS point of view, accumulation margins per se are as in Table 2.

Incomes	Expenses	IMB
(1)	(2)	(1-2)
Operating incomes		Operating incomes
Operating incomes	Variable expenses	Variable cost
		margin/contribution
		margin (MCV)
MCV	Fixed expenses (excluding	Profit before interest, tax
	depreciation)	and depreciation
		(EBITDA)
EBITDA + Write-back of	Depreciation and provision	<b>Operating result (RE)</b>
provisions	expenses	
RE + Financial incomes	Financial expenses	<b>Result before tax (EBT)</b>
EBT + Extraordinary incomes	Extraordinary expenses + Profit	Net result (Rn)
	tax	
RE + Financial incomes +	Financial expenses (excluding	Result before interest and
Extraordinary incomes	interest) + Financial expenses	tax (EBIT)
$Rn + Interest (1-\tau)$		<b>EBIT</b> (1-τ)
Rn + Interest		EBIT – Profit tax

Table no. 2: Accumulation margins according to IFRS

Source: I.Stancu – Finanțe, fourth edition, Economic Publishing House, Bucharest, 2007, page 725

#### 2. Calculation of intermediate management balances

**The commercial margin** is also referred to as trade mark-up and is specific to commercial entities, but also to those with a mixed industrial and commercial activity, representing the surplus recorded from good sales compared to the respective goods costs.

Commercial margin (Mc) = Goods sales (Vm) – Costs of sold goods (Cmv)

Commercial performance can be assessed with the help of this indicator. The evolution of the commercial margin of CNTEE Transelectrica SA in the period 2007-2011 is presented in Table 3.

						-RON-
No.	Period	2007	2008	2009	2010	2011
1.	Goods sales	1,998,336	2,046,175	2,080,226	850,845	4,183,103
2.	Cost of sold goods	3,276,911	1,458,844	1,726,068	910,838	3,451,806
3.	Mc (1-2)	-1,278,575	587,331	354,158	-59,993	731,297

Table no. 3: Evolution of the commercial margin

Source: Authors' data taken from the financial statements of CNTEE Transelectrica SA for 2007-2011

Chart The evolution of the commercial margin at the analyzed company is presented in Figure 1.



Figure no. 1: Evolution of the commercial margin in the period 2007-2011

Source: Authors' data taken from the financial statements of CNTEE Transelectrica SA for 2007-2011

**The output of the accounting period** reflects the total volume of the production activity of an entity in a certain period of time (month, quarter, semester or year).

The output of the accounting period (Qex) includes the following components:

Revista Română de Statistică - Supliment nr. 1/2014

- value of the sold production (Qv), expressed in selling prices without VAT;

- fluctuation of the stored production ( $\Delta Qs$ ), i.e. that stocks of finished products, semi-finished and unfinished products and unfinished production at the end of the year, assessed in production costs;

- value of the capitalized production (Qi), i.e. Self-made tangible and intangible assets but also the internal consumption of semi-finished and finished products in the own production, assessed in production costs.

Taking these specifications into account, the calculation model or formula of the output of the accounting period is as follows:

#### $\mathbf{Qex} = \mathbf{Qv} \pm \Delta \mathbf{Qs} + \mathbf{Qi}.$

We support the opinion that, within the analysis, special attention should be paid to the changes occurred in the increase or decrease of finished products, semi-finished products or unfinished production stocks, which is reflected into the quality of the activity and of the production obtained, but also in the compliance with the contracts concluded with various beneficiaries.

The production of the accounting period has a number of shortcomings, including elements with heterogeneous content that are evaluated both at their selling price and in the production costs, which does not allow for the correct delimitation of the ratio between living and materialized labor or for the accurate assessment of the own effort in the completion of the production schedule and in assessing economic and financial performance of the company.

Finally it is very important to assess the share of each of the components within the production of the accounting period. The evolution of the production of the accounting period at SNTEE Transelectrica SA in the 2007-2011 period is presented in Table 4.

						10010
No.	Period	2007	2008	2009	2010	2011
1.	Qv	2,288,988,875	2,922,462,045	2,483,047,147	2,544,873,785	3,108,959,675
2.	Qce <sub>1</sub>	0	0	0	0	0
3.	Qce <sub>0</sub>	0	0	0	0	0
4.	PfMf <sub>1</sub>	253,057	0	0	13,287,445	0
5.	PfMf <sub>1</sub>	0	0	0	7,905,892	0
6.	Qs (2-3+4-	253,057	0	0	5,381,553	0
	5)					
7.	Qi	3,276,911	1,458,844	1,726,068	910,838	3,451,806
8.	Qex	2,285,458,907	2,921,003,201	2,481,321,079	2,549,344,500	3,112,411,481
	(1+6+7)					

Table no. 4: Evolution of the production of the accounting period

Source: Authors' data taken from the financial statements of CNTEE Transelectrica SA for 2007-2011

where: Qce - work in progress , PfMf - finished products and goods

The evolution of the production of the accounting period at the analysed company is presented in the chart in Figure 2.

-RON-

**The value added** is a synthetic indicator that shows the surplus value or the value newly created by the production activity of the entity in a certain period of time.

The use of the indicator in the system of indicators of the production and marketing activity allows for the more accurate assessment of the wealth created by the capitalization of the resources of the entity. Thus, the likelihood of artificially increasing the workload by the repeated circulation of a product between entities for processing is eliminated. It also expresses in a better manner the own effort of each entity in the creation of the gross domestic product, it allows for a more accurate assessment of the economic efficiency, it stimulates the reduction of the material expenses, the more effective use of the means of production and of the labour.

Figure no. 2: Evolution of the value of the production of the accounting period



Source: Authors' data taken from the financial statements of CNTEE Transelectrica SA for 2007-2011

The level of this indicator for the period 2007-2011 at the analysed company is presented in Table 5.

						Ron
No.	Period	2007	2008	2009	2010	2011
1.	Qex	2,285,458,907	2,921,003,201	2,481,321,079	2,549,344,500	3,112,411,481
2.	Costs of raw	6,631,646	7,445,473	6,258,696	6271,404	6,494,934
	consumables					
3.	Other	1,613,124,016	2,056,647,954	1,756,249,489	1,785,823,048	2,164,496,180
	material					
	expenses					
4.	Other external	13,563,208	14,867,606	15,877,153	15,658,948	17,853,931
	expenses					
	(with energy					
	and water)					
5.	Costs of	227,867,069	258,933,133	222,585,481	206,752,290	268,668,767
	external					
	services					
6.	Cm					2,457,513,812
	(2+3+4+5)	1,861,185,939	2,337,894,166	2,000,970,819	2,014,505,690	
7.	VA (1-6)	424,272,968	583,109,035	480,350,260	534,838,810	654,897,669
a	A .1 9	1 1 6	1 0 1 1	6.01		

Table no. 5: Evolution of the value added

Source: Authors' data taken from the financial statements of CNTEE Transelectrica SA for 2007-2011

Revista Română de Statistică - Supliment nr. 1/2014

DOM



Source: Authors' data taken from the financial statements of CNTEE Transelectrica SA for 2007-2011

**The gross operating surplus (EBE)** shows the gross economic result obtained from the operating activity of the entity (Radu et al, 2004, p. 236). It is an intermediate management balance connecting the management indicators and the traditional profitability indicators. Its level can be determined by two methods: the subtractive method and the additive method.

**The subtractive method** is the method highlighted in TSIG i.e. by deducting the remuneration of the state and of the staff from the amount of the value added and of the operating subsidies:

# EBE = (VA + Operating subsidies) – (Other taxes and duties + Staff costs)

The additive method starts from EBE to which a number of elements is added, as follows:

#### EBE = Operating result + Costs of depreciation and operating provisions + Other operating expenses – Incomes from operating provisions– Other operating incomes

There is also the version of determining EBE by comparing the operating incomes involving immediate or term revenues (Ve\*), with the operating expenses that generate immediate payments or payments on due date (Ce\*):

 $EBE = Ve^* - Ce^*$ 

In such circumstances, EBE may be characterised as a money surplus potentially arising from the current business of the entity, being actually a difference between the potential money income and the money costs likely to be incurred.

On the other hand it is an indicator expressing the profitability of the core business of the entity, because it is the carrier of the funds allowing for the provision of the reproduction of the means and the depreciation of those that contributed with capital to financing the business of the entity.

In conclusion, it is a potential money indicator due to the existence of the gaps between the payments and revenues from the use of the stable liabilities (suppliers, employees, government budget) and respectively, from the commercial loans granted to customers, and can be accurately ascertained only at the end of the period: it is generated throughout the whole accounting period, but it is affected, at the same time, by the uses outside the operation (financing investments, reimbursing financial debts). Thus, even in the absence of the gaps between payments and revenues, its increase cannot be clearly identified on the increase of the availability balance. In this case a number of rates can also be determined depending on the components (Stark and Pântea, 2001, p. 110).

						-RON-
No.	Period	2007	2008	2009	2010	2011
1.	Rexp	158,791,036	204,179,037	100,025,587	79,554,641	159,473,510
2.	Expenses (acc.6811+6813)	205,021,365	239,604,066	250,299,066	271,444,428	298,545,261
3.	Expenses (acc.654+6814)	212,143	905,001	5,437,526	51,837,223	13,709,587
4.	Expenses (acc.6812)	7,299,039	10,143,197	1,680,050	846,929	47,200,772
5.	Costs of depreciation and operating provisions (2+3+4)	212,532,547	250,652,264	257,416,642	324,128,580	359,455,620
6.	Other operating expenses	270,074,267	284,340,956	249,767,135	233,168,732	292,931,890
7.	Incomes (acc.7813)	0	0	0	0	4,168
8.	Incomes (acc.754+7814)	1,138,710	76,380	141,950	601,167	4,830,250
9.	Incomes (acc.7812)	37,831,415	3,798,656	10,939,471	4,522,655	37,111
10.	Income from operating provisions (7+8+9)	38,970,125	3,875,036	11,081,421	5,123,822	4,871,529
11.	Other operating incomes	57,804,569	30,807,076	32,607,561	37,207,774	38,650,972
12.	EBE (1+5+6-10-11)	544.623.156	704.490.145	563.520.382	594.520.357	768.338.519

 Table no. 6. Evolution of EBE

Source: Authors' data taken from the financial statements of CNTEE Transelectrica SA for 2007-2011

The evolution of EBE can be presented as a chart as in Figure 4.

Revista Română de Statistică - Supliment nr. 1/2014



Figure no. 4: The Evolution of EBE

Source: Authors' data taken from the financial statements of CNTEE Transelectrica SA for 2007-2011

# **3.** Using Gini-Struck coefficient for analysing concentration or diversification of incomes and costs

We consider useful the method of statistical analysis of concentration or diversification for expenses and incomes (Săvoiu et al, 2010). This method can also be used successfully used in the analysis of a market concentration or diversification and in the same time for analysing the concentration or diversification of exports and imports (Săvoiu et al, 2012). To demonstrate the methodology we will use data available for costs of depreciation and operating provisions and incomes from operating provisions, presented in table no. 6.

The values of Gini –Struck coefficient for costs and incomes are presented in table no. 7:

Table no. 7: The values	of Gini –Struck coefficient for costs and
	incomes

No.	Period	g%					gi <sup>2</sup>				
		2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
1.	Expenses										
	(acc.6811+6813)	96,46	95,59	97,23	83,74	83,05	0,93056	0,91378	0,94546	0,70133	0,68981
2.	Expenses										
	(acc.654+6814)	0,10	0,361	2,112	15,99	3,814	0,00000	0,00001	0,00044	0,02557	0,00145
3.	Expenses (acc.6812)	3,43	4,047	0,653	0,261	13,131	0,00117	0,00163	0,00004	0,00001	0,01724
4.	Costs of depreciation										
	and operating										
	provisions $(1+2+3)$	100	100	100	100	100	0,93174	0,91543	0,94595	0,72692	0,70850
5.	G-S coefficient	-	-	-	-	-	0,94742	0,934428	0,95860	0,76836	0,75017
6.	Incomes(acc.7813)	0,000	0,000	0,000	0,000	0,086	0,00000	0,00000	0,00000	0,00000	0,00000
7.	Incomes										
	(acc.754+7814)	2,922	1,971	1,281	11,73	99,15	0,00085	0,00038	0,00016	0,01376	0,98312
8.	Incomes(acc.7812)	97,07	98,02	98,71	88,26	0,762	0,94241	0,96096	0,97454	0,77911	0,00005
9	Incomes form operating										
	provisions (6+7+8)	100	100	100	100	100	0,943	0,96135	0,97470	0,79287	0,98318
10.	G-S coefficient	-	-	-	-	-	0,95650	0,97058	0,98084	0,83024	0,98730

Source: Authors'work

For the costs of depreciation and operating provisions in 2011, the Gini-Struck coefficient is calculated below:

$$G - S_{2011} = \sqrt{\frac{n \sum_{i=1}^{n} g_i^2 - 1}{n - 1}} = \sqrt{\frac{3x0,70850 - 1}{3 - 1}} = 0,75017$$

For the costs of depreciation and operating provisions, in the period 2007-2011, there was a decrease in the value of the Gini-Struck coefficient in the last two years, which proves a diversification trend.

The Gini-Struck coefficient for the incomes from operating provisions in 2011, is calculated below:

$$G - S_{2011} = \sqrt{\frac{n \sum_{i=1}^{n} g_i^2 - 1}{n - 1}} = \sqrt{\frac{3x0,98318 - 1}{3 - 1}} = 0,98730$$

We can notice a lower value of the G-S coefficient only in 2010. The high values of this coefficient in the other years are the proof of a high concentration of incomes from operating provisions.

The commercial margin has a fluctuating evolution. This evolution is normal because the business of the company is electric power transmission, not trading goods. The production of the accounting period is showing an uptrend in the last three years. This favorable evolution is due to the component representing the production sold which is also the decisive share in it.

The value added has a general growing trend at the analysed company. This favourable trend is duet to the two components: the production of the accounting period (Qex) and respectively the consumption of the intermediate materials coming from third parties (Cm). **In our opinion**, in the analysis of a company, special attention should be paid to the changes occurred in the increase or decrease of finished products, semi-finished products or unfinished production stocks, which are reflected into the quality of the activity and of the production obtained, but also in the compliance with the contracts concluded with various beneficiaries.

Cost reduction is a solution to maximize the value of the intermediate management balances. Brînză and Brînzea (2008) state that "The decisive role in minimizing costs is played by the increase of production factors efficiency used in terms of innovation and improvement of resources saving spirit". **In our opinion**, from all the indicators determined with the Table of intermediate management balances, the most representative is the **value added** that allows for the more accurate assessment of the wealth created by the capitalization of the human and financial resources of the entity. This indicator expresses in a better manner the contribution of each entity in the creation of the gross domestic product, it allows for a more accurate assessment of the economic efficiency, it stimulates the reduction of the material expenses, the more effective use of the means of production and of the human resources. Besides the profitability, managers must also take into account the risks undertaken by the company. In this respect, Gâdoiu and Clipici (2010) highlight that "The evaluation of the company performance represents an approach that requires careful analysis at the dual profitability – risk level, because, although the shareholders and managers of the company are certainly interested in the profitability of the company, more attention must be paid to the risks to which the company is exposed".

#### 4. Conclusions

The significance of the intermediate management balances is special and allows the assessment of three essential aspects:

- the business performance (using the indicators turnover, trading markup, production of the accounting period and the value added);
- the performance of the business entity by establishing a connection between the intermediate management balances and the profit and loss flow, starting from the value added, which can be found in the continuation of the "cascade" of the " intermediate management balances (gross operating surplus, operating results, financial results, current result, the extraordinary result, the gross result of year, the net result for the year);
- the financial performance with two residual cash balances (the self-financing capacity and the self-financing).

In today's world, characterized by high levels of competition in all economic fields, big part of the governments worldwide base their industrial strategies on criteria based on value added. The value added is not recorded in the profit and loss account but the latter (in the form used in our country) contains the items required to determine it. Fourth European Directive prescribes the data required to determine the value added, and the American Accounting Association in the USA recommended to companies to publish information about the value added.

The Gini-Struck coefficient can be used to track the evolution of incomes/costs and analysing their concentration or diversification.

The analysis of the company performance based on intermediate management balances allows for highlighting the manner in which value is created and transferred in the company and the results of this analysis are the basis for a number of strategic managerial decisions.

#### References

Brînză, D.E. Brînzea, M. (2008) – The Role of Reducing the Production Costs, Scientific Papers, Series I, Vol. X (2), http://www.usabtm.ro/pdf/2008/x2/management08\_71.pdf.

Gâdoiu, M., Clipici E. (2010) – Company performance evaluation – general information, Annals. Economic Science Series, XVI/2010, pp. 331-335.

Iacob, C. (1996) - Contabilitate aprofundată, Sitech Publishing House, Craiova.

- Işfănescu, A., Robu, V. (2002) Analiza economico-financiară, ASE Publishing House, Bucharest.
- Mironiuc, M. (2002) Analiza performanțelor economico-financiare ale întreprinderii. Soldurile intermediare de gestiune, Contabilitatea, expertiza şi auditul afacerilor, no. 5/2002.
- Radu, F., Cîrciumaru, D., Bondoc, D. (2004) *Analiza economico financiară a societăților comerciale*, Scrisul Românesc Publishing House, Craiova.
- Săvoiu Gh, Crăciuneanu V., Țaicu M. (2010) A New Method Of Statistical Analysis Of Markets' Concentration Or Diversification, Romanian Statistical Review, no. 2/2010, pp. 21-27.
- Săvoiu Gh., Țaicu M., Cudanov M. (2012) Romanian an Serbian Foreign Trade, Under the Impact of Recession, EU Post/Pre Accession and New Restructuring Process, Management Journal for Theory and Practice, Belgrade, pp. 25-31.
- Săvoiu, Gh. (2011) *Statistică pentru afaceri*, University Publishing House, Bucharest.
- Stancu, I. (2007) Finante, forth edition, Economic Publishing House, Bucharest.
- Siminică, M.(2008) *Diagnosticul financiar al firmei*, Universitaria Publishing House, Craiova.
- Stark, L. E., Pântea, I. M. (2001) Analiza situației financiare a firmei, Economic Publishing House, Bucharest.
- Vasile, I. (2005) *Gestiunea financiară a întreprinderii*, Meteor Press Publishing House, Bucharest.
- Vintilă, G. (2002) *Cuantificarea performanțelor activității întreprinderii*, Finanțe, credit, contabilitate.
- \*\*\* CNTEE Transelectrica SA 2007-2011, Financial Statements available on http://www.transelectrica.ro/2Investitori/anulcurent.php.

### Considerations Regarding Hazardous Climatic Processes in South – Western Romania for the 2013 Spring and Summer

C.S. II, MPP1, Ion MARINICĂ PhD.

Meteorological Centre Regional Oltenia Ing, C.S. I, Victor Viorel VĂTĂMANU, PhD. Meteorological Centre Regional Oltenia Assistant Dana Maria (Oprea) CONSTANTIN PhD. Univ. Bucharest, Fac. of Geography Andreea Floriana MĂRINICĂ

Bachelor of Sciences, Klimacampus, Hamburg Germania

#### Abstract

All through the year 2013 climatic variability was exceptional. The warm weather, maintained throughout the 2012 - 2013 winter season lasted 84 days with lowest temperatures predominantly positive and maximum values reaching up to  $10 - 14^{\circ}$  C at the end of January 2013, and has determined the vegetation phases to resume for some plant species, for autumn crops and some species of fruit tree like the apricot. On 18.III.2013, the apricot floral bobs were formed and blooming was imminent. Afterwards between 25 and 28.03 the late spring blizzard and snowfall, which developed a snow layer, represented a significant agro-climatic hazard. Within the 2-4.04 time frame the abundant and torrential rains led to the flooding along rivers and the outflow of water into agricultural crops. Flooding also occurred alongside the Danube. The intricate drought arisen within the 10.04. - 20.05 time period generated important production losses especially for the barley crop, particularly in the southern region. During the summer three intense heat waves were recorded which threatened the agricultural crops. This research is part of an extensive series of analyses regarding the climate variability in south-western Romania and aids researchers, undergraduates and postgraduates in the climate field (Mărinică et al. 2011, 2013).

**Key words:** *late spring blizzard, drought, torrential rain, heat waves.* **JEL Classification:** *Q 50, Q 54* 

1. The cold wave and late spring blizzard within the 25 - 28.03.2013 time frame.

Synoptic causes for the development of the cold wave.

The weather cooling transpired, starting from the 24.03 date, while during the night of 24/25.03, isolated, snowfall began to appear. Snowfalls throughout the region occurred on the following dates 25, 26, and 27.03. On the date of 24.03, as
in most part of the winter (January, February and 1 - 24.03) a snow layer was present only in the mountain area, however after these snowstorms, in Oltenia, in the morning of 28.03, the layer reached a thickness between 4 cm at Rm. Vâlcea and 21 cm at Târmigani in Mehedinți county, being the biggest in the country. At soil level, on the date of 25.03.2013 at 12 UTC, over the Mediterranean Sea a Mediterranean Cyclone was present, formed on 24.03 in the occlusion wave of the Atlantic Cyclone, which centre reached values of 990 hPa and was positioned in the southern half of Italy. A vast cyclonic field extended from the Canadian coast all the way through Bosporus controlling a large part of Atlantic Ocean and Mediterranean Sea, whilst over Greenland and Scandinavia hovered a vast and powerful anticyclone field with centre values of over 1050 hPa. In northern Africa and Small Asia, anticyclone segment over the Black Sea, with the one north of the continent.

The position of the Mediterranean Cyclone and the one in Eastern Europe Plain at the periphery of the Greenlandic Anticyclone with a Scandinavian dorsal established a veritable advection mechanism, in the inferior troposphere, of the extremely cold air from north of the continent towards Romania. This condition is a characteristic of the winter season and is rarely witnessed during spring, in March.

At an altitude level of 500 hPa, the extreme south and west of Europe was under the influence of a geopotential area with high values, while the major part of the continent was contained by a low geopotential area within which several closed nuclei were distinguished. Of interest for this particular snowfall event from the discussed period is the eye with a value of 520 damgp positioned above the Eastern Europe Plain and whose broad occlusion wave covered even the southern Italy (isobars of 554 damgp).

Following these conditions in the inferior troposphere, for Romania (and for Oltenia) the air circulation originated from the south-eastern sector, with a slightly warmer and humid mass air.

From an altitude standpoint our country was positioned in the anterior part of the geopotential conveyor belt, and the extremely cold air mass, with temperatures values under -10°C over Austria and Hungary was transferred towards south and then north above Romania.

This powerful advection of cold air affected the majority of Europe with the exception of the extreme west and south.

The far-reaching cyclonic segments situated at the periphery of the anticyclone field, interacting with the cold air mass within the anticyclone have conditioned abundant snowstorms over a large part of the continent.

The consequences of this intense weather cooling event were crucial for the spring weather in 2013, especially for the south-western region of the country.

Although the most part of March, the daily average temperatures were positive, within the 25 - 28.03.2013 time frame these have turned to be predominantly negative, which has led to the drastic fall of monthly averages, and

consequently made March 2013 appear normal from a thermal standpoint (N), even though between the 8 - 14.03.2013 interval the median exceeded  $10.0^{\circ}$ C. This drop in temperatures has also determined the recording of some parameters for spring bloom smaller than witnessed up until 25.03. For several species of fruit tree which had the floral bob already formed, the consequence was the loss of a considerable part, whilst the ones that endured and bloomed have not conjoined due to the destruction of stamens and the flower's pistil during the freezing period. For other tree species with buds that did not open a late blooming occurred, which took part in late April, as a result of the prolongation of cold weather in the first half of the month. Moreover development of spring crops was brought to a stall, especially those of vegetables, while the vegetable crops from the unheated solariums were destroyed. During this period March 2013 recorded the lowest daily mean temperatures. Also, the daily means for the whole region within this time period au registered between -0.9°C on 26.03 and -2.0°C on 27.03. Wind intensifications from some time periods have determined the destruction solarium foils consequently exposing the crops to the freeze. All these effects had economic consequences through delayed commercialization of vegetables on the market.

#### 2. Heat waves from summer 2013.

June 2013 registered a sole heat wave between the 17 - 23.06 interval, while during the night of 23/24.06 the weather cooled briskly, a cooling which continued and accentuated all the way through the end of the month, while in the last day the thermal maximum fell below  $20.0^{\circ}$ C in the most parts of Olteniei Plain considered the lowest maximum in the entire month. The heat wave reached a climax on the date of 19.06.2013 when the most monthly maximums of June were recorded, with values between  $31.6^{\circ}$ C at Polovragi and  $37.7^{\circ}$ C at Calafat (recorded on the 19.06.). The maximum monthly median displayed  $34.5^{\circ}$ C. Broil <sup>1</sup> phenomena started to form on the day of 16.06.

Tropical days occurred starting with the day of 10.06., while their number a revealed between 4 at Voineasa and 12 at Calafat.

Broil days were recorded first on 16.06, with a number reaching between 2 at Voineasa and 10 at Dr. Tr. Severin, whilst in the plain regions the number was amid 6 and 10 days.

Hot days were registered beginning with 17.06, numbering between 1 at Apa Neagră and 5 at Calafat in the farthest south-western areas.

The air temperature chart of variability (daily thermal minimums, daily medians and daily maximums) displays strong ascending linear tendencies for all those three parameters.

Synoptic causes of the heat wave.

<sup>&</sup>lt;sup>1</sup> The Broil phenomena is registered if the temperature of the air becomes  $\geq$ 32.0°C, the phenomena is an *agroclimatic risk* determining under conditions of edaphic draughtiness the twisting of leaves and the drying of some especially the ones at the base. Under conditions of intense draughtiness causes the plants to dry etc.

The heat wave was generated by the presence of a blockage atmospheric circulation. The positioning of the blockage above the central basin of Mediterranean Sea, over Central and South-Eastern Europe has determined the advection of tropical warm air of Saharan origins over a major part of the continent, inclusively Romania.

The fall in temperatures caused by the cooling during the night of 23/24.06, in relation to monthly maximums recorded values between  $11.4^{\circ}C$  at Polovragi and  $19.6^{\circ}C$  at Caracal, while in most parts of Olteniei Plain was > 16.5°C. This aspect is regarded a climatic anomaly, considering the fact that the following month, July, was considered the warmest month of the summer.

In July 2013 a singular heat wave within the 24 - 30.07. period was recorded, while through the night of 30/31.07. the weather cooled rapidly.

The territorial distribution of monthly temperatures averages show that in the western regions the weather was the warmest.

The maximum intensity of the heat wave took place on the day of 29.07. when the thermal maximums of July were achieved, which displayed values between  $34.7^{\circ}$ C at Voineasa and  $39.8^{\circ}$ C at Bechet, the latter being the thermal maxima of the 2013 summer for the entire country not only for Oltenia.

Synoptic causes of the heat wave.

The heat wave was developed, as well as in June, by a blockage atmospheric circulation. The positioning of the blockage above the central basin of Mediterranean Sea, over Central and South-Eastern Europe has determined the advection of tropical warm air of Saharan origins over a major part of the continent, inclusively Romania. The warm air infiltrated all the way up northern Scandinavian Peninsula, whilst the area of maxim intensity was positioned on the Adriatic Sea coast, Serbia and Banat.

On August 2013 a solitary heat wave occurred between the 2 - 14.08 time frame, with a slightly decrease on the date of 11.08.

The air temperature chart of variability (daily thermal minimums, daily medians and daily maximums) suggest strong descending linear tendencies for all those three parameters.

The monthly maximum temperature values in August were recorded on the following dates 3, 8, 9 and 14.08, the utmost registered at the end of the first decade of the month on the dates of 8 and 9.08. recording between  $33.9^{\circ}$ C at Voineasa and  $38.3^{\circ}$ C at Bechet. The average of monthly maximums was  $35.6^{\circ}$ C. Broil days occurred in the 1 – 6.08. time frame, numbering between 6 days at Voineasa and 25 at Calafat. Hot days transpired in the intervals 2 – 14.08. and 19 – 20.08, and their number revealed between 5 at Rm. Vâlcea and 15 at Bechet. The maximum values of temperature  $\geq 37.0^{\circ}$ C (extreme working conditions outdoors) were registered within the periods: 7 – 9.08. and 13 – 14.07., while their number ranged between 1 at Apa Neagră and Băileşti and 5 at Bechet.

Synoptic causes of the heat wave.

The heat wave was produced, as in July, by an atmospheric circulation of blockage. The positioning of the blockage above the central basin of Mediterranean

Sea, over Central and South-Eastern Europe has determined the advection of tropical warm air of Saharan origins over a major part of the continent, inclusively Romania. The warm air penetrated up to southern Scandinavian Peninsula, whilst the area of maximum intensity hovered over the Adriatic Sea coast, Serbia, Hungary and western Romania.

#### Conclusions

The spring and summer of year 2013 were marked by the intense climatic variability, which determined important climatic fluctuations with swift changes from a warm and droughty weather to one excessively rainy and cold.

Within the 25 - 28.03.2013 time frame, the weather cooling, due to a cold wave which arose after a lengthy period of warm winter, has inflicted important devastation over the spring crops and economic damage.

This specific period represented o negative thermal oscillation which developed over the length of five days and which brought back winter over a large part of the continent, starting with United Kingdom (particularly Scotland), where over 2 000 people died as a result of low temperatures, then France, Hungary, Russia, Ukraine, and even across the ocean, USA, where schools have closed.

In the summer of 2013 the weather was warm and characterised by three heat waves from the following time periods: 17 - 23.06, 24 - 30.07 and 2 - 14.08, which summed up a total of 27 days.

At the end of each summer month significant weather cooling occurred, resulting in a diminution of monthly averages: 24 - 30.06, 30 - 31.07 and 26 - 31.08. after which continued slowly along the whole month of September overlaying with the normal climatic cooling and accentuating it, reaching the maximum phase in the 4 - 5.10.2013 interval.

The droughty periods were discontinued by short intervals within which rainfalls were recorded, in most part frail and covering small area, but with some significant and even abundant quantities of rainfall.

The warmest month of the summer was July, when the edaphic drought and atmosphere reached the climax.

The droughty weather (DW) displayed a spatial-temporal expansion of 50.0%, the rainy weather (RW) of 35.4%, and the normal weather (NW) of 14.6%.

The warm weather (WW) had a spatial-temporal expansion of 73.7%, while the normal weather (NW) had one of 26.3%.

#### References

Marinică I., Elena Mateescu, V. V. Vătămanu (2011), *Câteva considerații privind condițiile agroclimatice din vara 2011 în Oltenia*, Revista Română de Statistică Romanian Statistical Review –Supliment- Institutul Național de Statistică, Societatea Română de Statistică, Comunicări de la Seminarul Național "Octav Onicescu" organizat de Societatea Română de Statistică and alte teme de cercetare științifică concretizate în articole. 2011/Tr.III, pp. 135-

139. ISSN 1018-046x CNCSIS, Categoria B+, revistă cu referenți, http://www.insse.ro.

Marinică I., Andreea Floriana Marinică, Vătămanu V.V (2013), Exceptional climatic varuability in Oltenia in the spring of 2013, Analele Universită ii din Craiova, vol. XVIII (LIV) – 2013 Biology Horticulture Food Producessing Technology Environmental Engineering, Editura Universitară Craiova, pp. 553 – 558.

### Model of Regression used to Analyze the Macroeconomic Correlations

#### Prof. Constantin ANGHELACHE PhD.

Academy of Economic Studies, Bucharest "Artifex" University of Bucharest Prof. Radu Titus MARINESCU PhD. "Artifex" University of Bucharest Adina Mihaela DINU PhD. Student Daniel DUMITRESCU PhD. Student Diana Valentina SOARE PhD. Student Academy of Economic Studies, Bucharest

#### Abstract

The estimation of the regression function, can analyze a transformation of this function. The option for this transformation is grounded by the economic analysis which defines the parameters of interest. A procedure of adjustment is included, consisting of the elimination of the data placed at the limit of the support of the explanatory variables distribution. The adjustment can be inserted in the function as the form of a function with multiplying indicator.

**Key words**: regression, estimation, regression function, linear regression, correlation

There are many transformations which can be considered but we shall focus on a specific class characterized by the relation:

$$\lambda = \int g(z) w(z) dz.$$

In this formula,  $g(z) = E(\tilde{y} | \tilde{z} = z)$ , and  $\mathbf{w}(\mathbf{z})$  is a weight function which is either scalar, or vectorial and satisfies  $\mathbf{w}(\mathbf{z})=0$  if  $f_{marg}(z)=0$ , which is natural since  $\mathbf{g}(\mathbf{z})$  is defined only if  $f_{marg}(z)>0$ . The parameter of interest  $\lambda$  is scalar or vectorial.

This class of transformation is justified by the properties of the resulting estimator  $\lambda$  and, meantime, by its relevance as regards many issues of applied econometrics, which are special situations of these analyses.

Before entering into details, we notice the fact that this transformation does not insert the over-determination of the conditions on the variables distribution. We shall<sup>1</sup> estimate the mean of the regression differentials. We have seen that the parametrical estimation of a regression erroneously specified does not allow us to consistently estimate the differentials of this function in a certain point. In many econometrical issues, the differentials are parameters of interest. The estimation is possible but its rate of convergence is very slow and, consequently, requires a large sample. Nevertheless, in many applications it is enough to estimate the mean of the regression differentials, namely:

$$\lambda = \int \partial^{\alpha} g(z) v(z) dz$$

where  $\alpha$  is a multiple index of the derivation and  $\partial^{\alpha}$  is the derivation defined by this multiple index. The function v(z) is a density on the explanatory variable which can be equal to  $f_m(z)$ , the density of the actual explanatory variable being studied. We shall analyze the under-additively test.

In order to illustrate this situation, let's assume that the function C is the function cost which associates an expected cost with the quantities of the different products z. The economic theory is interested in the under-additively C, namely it is:

$$C\left(\sum_{j=1}^{p} z_{j}\right) \leq \sum_{j=1}^{p} C\left(z_{j}\right)$$

Which means that, the cost of a company producing  $\sum_{j=1}^{p} z_{j}$ , is lower

than the cost of several companies each producing  $z_j$ . The above property must be true for each p and each sequence  $(z_1,...,z_p)$ . It is easy to show that this property is equivalent to the property which will be explicitly shown by the content. If  $\varphi$  is the density  $(z_1,...,z_p)$ ,  $\tilde{\varphi}$  the density of the sum  $z_1+...+z_p$  and  $\varphi_j$ the density  $z_j$ , than, it is equivalent with the fact that for each  $\varphi$ , we have:

$$\int C(u) \widetilde{\varphi}(u) du \leq \sum_{j=1}^{p} \int C(z_j) \varphi_j(z_j) dz_j.$$

w

The reciprocal is resulting by taking into account the distribution on  $(z_1,..., z_p)$  focused in one point. Now, we shall approach the under-additively test. The previous relation suggests that there is a  $\lambda$  defined, namely:

$$(z) = \widetilde{\varphi}(z) - \sum_{j=1}^{p} \varphi_j(z),$$

the sign of this parameter having to be tested.

<sup>1</sup> Romanian Statistical Review – Supplement December 2013

Revista Română de Statistică - Supliment nr. 1/2014

The estimation of  $\lambda$  defined can be made in two modes.

The first variant consists of the estimation of g followed by the calculation.

The second approach avoids the estimation g and is based on the particularity given by the utilized (final) function:

$$\frac{1}{n}\sum_{i=1}^{n}y_{i}\frac{w\left(z_{i}\right)}{f_{marg}\left(z_{i}\right)}.$$

This condition is seldom satisfied. We can replace  $f_{marg}$  with a parametrical or non-parametrical estimation.

Implicitly, we assume that **w** is given. In practice, **iv can be partially or totally unknown** (since it is, for instance, a function of  $f_{marg}$ ) and thus w must be replaced by an estimation.

The main asymptotic result is the convergence rate  $\hat{\lambda}_n$  at  $\lambda$ . Indeed, we know:

$$\sqrt{n}\left(\hat{\lambda}_n-\lambda\right)\to N(0,V),$$

in the frame regularity conditionings and under the condition that the bands width have an adequate asymptotic behavior. In order to limit the problems of dimensioning or to impose certain restrictions originating in the economic theory, we often assume that the conditioned probability g(z), which is a function of the variables q, depends in fact on the functions of a reduced number of variables and, possibly, on certain parameters.

In fact, there are two points of view being expressed: either we assume that g is actually restricted to this specific form or we are searching for the best approximation g through an element satisfying the considered restrictions.

#### Analysis of correlation between Total Production and Trade, repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants; information and communications computed using EViews

		-milions-		
Year	Trade, repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants; information and communications	Total production		
	Х	У		
1990	10.3	79.1		
1991	44.4	206.4		
1992	137.4	606.9		
1993	407.2	1906.5		
1994	842.9	4700.1		
1995	1314.7	6746.9		

Year	Trade, repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants; information and communications	Total production
	X	У
1996	2252.7	10197.1
1997	5143.3	23036.5
1998	8593.0	33711.2
1999	12888.8	48888.2
2000	18175.9	71990.9
2001	24804.4	106082.2
2002	30128.5	136922.3
2003	40096.3	166602.3
2004	50980.5	220931.3
2005	62566.8	244676.8
2006	76432.6	289695.6
2007	94375.8	350845.6
2008	119641.7	458535.5
2009	113880.1	450979.1
2010	87552.2	466397.0
2011	82014.0	487733.2
2012	89579.5	512112.2

Another important branch in correlation with the total production is represented by trade, repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants; information and communications.

The period analyzed is 1990-2012, and we can observe that the correlation between the two indicators is significant for 2008 and 2009, because the BRANCH evolution depends on the total production.

The evolution of labor force in the branch of trade, repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants; information and communications – in Romania during 1990-2012



Revista Română de Statistică - Supliment nr. 1/2014

Statistical tests over the correlations between total production and the labor force in the branch of trade, repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants; information and communications in Romania 1990-2012:



To estimate the regression model parameters we used the software Eiews 7.2 in which we defined an equation that has as outcome variables the labor force, and Total Production in the branch of trade, repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants; information and communications in Romania. Estimation method defined in the program is the method of least squares.

Correlation the labor force, and Total Production in the branch of trade, repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants; information and communications in Romania is graphically represented as such:



Revista Română de Statistică - Supliment nr. 1/2014

Based on the above, using Eiews 7.2 we obtained the following results:

Dependent Variable: TO Method: Least Squares Date: 02/17/14 Time: Sample: 1990 2012 Included observations:	DTAL_PRODU( 15:56 23	CTIE				
Variable	Coefficient	Std. Error	t-Statistic	Prob.		
RAMURA_4	4.410854	0.254122	17.35720	0.0000		
С	1190.431	14482.03	0.082201	0.9353		
R-squared	0.934838	Mean depend	ient var	177981.9		
Adjusted R-squared	0.931735	S.D. depende	nt var	188967.1		
S.E. of regression	S.E. of regression 49372.62 Akaike info criterion					
Sum squared resid	5.12E+10	Schwarz criter	24.63386			
Log likelihood	-280.1539	Hannan-Quin	24.55995			
F-statistic	301.2723	23 Durbin-Watson stat 0.42				
Prob(F-statistic)	0.000000					

The regression model has the following character	istics:

From the above, simple regression model describing the relationship between the three macroeconomic indicators that are are the subject of previously determined may be given in the form of equation as follows: LABOR = 1190.431 + 4.410854

#### References

Andrei, T., Stancu, S.; Iacob, A.I. (2008) - "Introduction to econometric pregnancies using Eviews", Economic Publishing House;

- Anghelache, G.V., Anghelache, C., Cruceru, D. (2011) "International Trade of Romania in 2011", ART ECO – Review of Economic Studies and Research, Editura Artifex, Vol. 2/No.4/2011, pp. 88-97
- Anghelache, C.; Bugudui, E.; Anghelache, C. S.; Deatcu, C. (2009) "Elements of theoretical and statistical economic Theory and case studies", Artifex Publishing House;
- Anghelache, C-tin, Capanu, I. (2004). Statistică macroeconomică, Editura Economică, București
- Anghelache, C-tin, Capanu, I. (2003). Indicatori macroeconomici. Calcul și analiză economică, Editura Economică, București
- Mitruț, C. (2008) "Basic econometrics for business administration", Editura ASE, București
- Thomas, R.L. (1997) "Modern econometrics an introduction", Editura "Financial Times Prentice Hall"

www.insse.ro

www.eurostat.eu

## Advertising Influence on Market

#### Assoc . prof. Dan NASTASE PhD

"Artifex" University of Bucharest

#### Abstract

A consistent advertising budget does not guarantee a successful advertising campaign. Two companies can spend the same amount of work and get results that completely different. Research demonstrates that creative messages may have greater importance for the success of advertising campaigns than money spent. No matter how big the budget, this activity can be successful only if the ads attract attention and effectively communicate messages.

**Keywords**: message, impact, advertising, market, actual consumer, environmental, commercial, assessment.

Advertising specialists face environment increasingly cluttered advertising. Average consumer may hear or watch numerous radio and television programs and has to choose between thousands of publications. Add to this the countless catalogs, advertising by mail and many other media. This creates major congestion problems themselves sponsors, advertising is extremely expensive. They can pay tens even hundreds of thousands of dollars for a 30 second commercial on a TV with a high rating. In addition, ads are interspersed with other ads and commercials, regardless of their broadcasting time. With the development of cable television network, a videotape recording systems and remote devices, the public can avoid watching commercials or noncommercial stations or " eliminating " them by pressing the " fast forward " while watching recorded programs . The remote control, people can instantly reduce TV sound during commercial or switch to other channels to see what can chase him. Thus, given the existence of hundreds of other messages that seek to attract consumers' attention and as a result of a message to keep their attention for too long, Advertising specialists faced with the challenging task of designing messages to capture and maintain attention audience, but to motivate to respond either in a perceptual or behavioral. The message sent by the public must be well designed, full of fantasy, exciting and rewarding for consumers. Achieving these goals requires imagination and innovative spirit. The creative strategy will play an increasingly important role in terms of advertising success. To develop this strategy, advertising specialists to go through a three-step process, consisting in the message, assessment and selection and execution of its message.

1. Message generation

The message is the idea that underlies communication. When designing the message, specialists must take into account the target audience (to whom it is addressed) and the objectives of the advertising (like the answer suggested by the message that it receives). Firms can adopt one of these creative strategies :

• The message focuses on brand positioning,

• Message draw attention to one of the motivations of individual consumer

• The idea could be exploited by formulating ways to increase product sales : existing users should be encouraged to use more product and those who use it will be encouraged to buy it

• Post idea might detach from the experience gained in-depth knowledge of consumer product use, especially buying process, consumption and the effect on them and the benefits sought by the consumer. Specialist advertising should be as close as possible to the consumer and track how it uses the product, using the qualitative research usually lasting such as observations and analysis at points of sale.

Specialists in advertising approach , therefore, the problem of finding different message that should attract the attention of the relevant public . Many of them start by talking with consumers , dealers , experts and competitors . Others try to and I imagine consumers using the product , so finding the benefits they seek to gain by buying and using it .

In general, specialists in advertising creates more message options. From a logical standpoint, it is normal to alternative themes began to generate the message, they are evaluated and of them to choose the preferred solution. The message will refer to the assessment.

2. Evaluation and selection message

How should we evaluate advertising messages ? These messages must fulfill three characteristics :

a. To have meaning , highlighting the advantages that make the product more desirable or interesting to consumers.

b. Be distinct consumers by communicating what the product is required to competing brands .

c. To be credible . This last feature is difficult to achieve because many consumers question the veracity of advertising in general. A study has found that a third of all consumers appreciate advertising messages as " untrustworthy ".

Therefore, specialists in advertising will have to treat each claim prior to see if it produces the maximum impact on consumers , if credible and interesting .

3. Execution message

Impact of message depends not only on what is said, but how it is said. Execution message aimed precisely these issues. It is a difficult operation for the reasons I mentioned above: lack of attention that consumers typically provide advertising, " crowded " means advertising and satutatia with competing messages. Specialist advertising must present the message in a way to attract attention and interest of target audience, ie to create their message to " capture " . Those who turn to advertising usually starts by mentioning the objective and appropriate approach desired ad :

Specialists in advertising must find the style, tone, words and format best suited for the execution of the message. His presentation can be made respecting the many styles of execution. Creative format affects both its impact and the cost of them. A unique creative design change may have a decisive influence on its effect. The illustration is the first thing readers see it and therefore it must be expressive enough to attract attention. Then, the title should actually make him the man to read complaint. Finally, the text, which is the main part of the ad should be simple but compelling. In addition, these elements must be combined in an efficient manner. Even so, a really great ad will be seen by fewer than 50 % of the people exposed to it, out of which about 30 % will remember the main point made in the title, about 25 % will remember the company name advertiser, and less than 10 % will read most of the text. Unfortunately, the ads that are not distinguished by anything not even be able to get this performance.

#### References

Balaure Virgil, - Marketing, Editura Uranus, Bucuresti, 2006;

Catoiu I - Marketing, , Editura Uranus, București, 2008;

- Constantin Coderie, Mircea Udrescu Mnagemetul vanzarilor, Edituta Axioma Print, Bucuresti, 2012;
- Dan Năstase Evaluarea risului in activitatea de marketing, Edituta Semne, Bucuresti, 2013;

Dan Năstase - Notiuni de marketing, Edituta Semne, Bucuresti, 2012;

## Statistical Indicators of Stock Assessed as a Percentage of GDP, and Consequences of Abusing the Logic of Statistical Thinking

#### Associate Professor Gheorghe SĂVOIU, Ph.D.

University of Pitești

#### Abstract

The macroeconomic indicators concern both the flows that are not fully or partially compensated over a time interval, which can be cumulated or integrated, and the stocks or funds identified in a particular moment. These indicators are addressed either as free real and nominal indicators, or as bound or nonautonomous financial indicators. Statistical and economic problems are methodologically distinguished by the need for connection (free real indicators are updated through the time bound indicators, while free nominal macroeconomic indicators are characterized by a certain autonomy in relation to real free indicators), and also by turning flows into stocks and stocks into flows. This paper details three distinct solutions for the transformation of stocks to flow, solutions of different degrees of generalization: economic, statistical and physical, and all of which are detailed below using debt and budget examples.

**Key words:** *stock, flow, debt, budget deficit, index, continuity equation.* **JEL code:** *C20, C43, F34, H60.* 

#### 1. Introduction: Theoretical and retrospective aspects

The issue of stock and flow indicators, and especially its approach in the light of specific adjustments, goes back a fairly long period in time, in the retrospective of statistical theory, and is solved by means of the restrictive economic thinking, as well as the specifically interrogative and investigative logic of the science of statistics, and finally by taking support on validation through the physical model. The economic process, as a quantified difference between two temporal stocks, and seen as equation of value by Nicolae Georgescu Roegen, also implies an apparently material flux; the solution he identified (in 1978) was entropy itself, but unfortunately it was he who also recognized that it does not enable economic theories to say what exactly will happen in the future, it does not confer prediction and does not seem to facilitate connections and temporal corrections. Periods of time or intervals overlap (extending the moments), while the moment in time or lack of extension become relative, and the real economic process becomes a compromise between these interval limits and moments (a fluctuating range of moments combining moments that are hard to define independently and rigorously in practice), in accordance with Bergson's opinion "what is real is something intermediate between divided extension and total lack of extension" (Bergson,1911), in which Georgescu-Roegen recognized the time interval and the moment of statistical thinking.

The theme of the statistical indicators of stock and flow, graphically expressed, becomes an attempt at separating, through statistical thinking, "the flowing water from the frozen water", and it seems rather hard to solve without some indications of physical thinking. The first statistician who tried to simplify it was Irving Fisher himself, through his famous formulation, which at the same time also generated various confusions: "*a stock refers to a point in time, and a flow to a time interval*" (Fisher, 1896) in most combinations of data and information that give rise to the concept of relative statistical indicator. The stock-flow antinomy is obvious, and it increases when, instead of the flow, a relative indicator is employed (e.g. flow rate).

## 2. The transformation stock - flow or flow – stock, from classical economics, through the statistical logic, to the thinking of contemporary physics

Consequently, the flow has come to be defined, in the modern type of statistics, as a difference of stocks in the relation

 $\Delta S = S(t+1) - S(t)$ 

(1)

or the stock in time has come to look like the logical consequence of the summation of a stock and a flow

 $\mathbf{S}(\mathbf{t+1}) = \Delta \mathbf{S} + \mathbf{S}(\mathbf{t})$ 

(2)

If any of the flow coordinates can be derived from the data concerning the stocks, according to the same relationship  $\Delta S = S(t+1)-S(t)$ , for the flows determined from the stocks, the issues seem somewhat more complicated in  $S(t+1) = \Delta S + S(t)$ , and the stocks cannot be determined without a baseline and outside an arbitrary constant (a threshold, limit, etc.) or with full knowledge of the value of stocks in some earlier time (John Hicks emphasized, in 1965, the equal contribution stocks and flows to the states of balance, and also the option to derive flows from the coordinates of the stocks, focusing on the stock models).

All the above aspects underline in fact the idea that the basic problem of the transfer flow–stock, and reciprocally, stock–flow, remains as complicated in both statistical and economic terms, because a flow does not necessarily represent an increase or decrease in the stock, the flow being essentially a notion under a qualitative impact, leading to the inclusion of a new variable, namely time, in order to turn the flow into what can be termed *a stock distributed on time*. Analogously, the new pair of variations ( $\Delta$ S) of the variable *S* and ( $\Delta$ t) of the time variable or *t* automatically generates flow rate ( $\Delta$ S / $\Delta$ t). It was indeed the very grounding of the answer given by Irving Fisher, an answer relatively better adapted to the problem of flow-stock transformation, in keeping with which a stock is not opposed by a flow ( $\Delta$ S), but rather the flow rate. Similarly, the classic answer given and by Georgescu-Roegen, in whose terminology and signification, the stock and flow are concepts that represent distinct "dimensionalities", and should be subject to different operations. When the classical logic of statistical thinking is violated, there appear a number of consequences that can radically depreciate the quality of both statistical indicators and temporal and spatial analyses of complex economic processes.

From natural reasons of managing real and financial flows (either autonomous or nominal), these flows are highlighted (observed, recorded, processed, stored, interpreted) by indicators, as quantitative (numerical) expressions of qualitative determinations conducted on a certain economic process. Hence, the flows are subsequently designated by the agency of the process categories or variables defining the business processes, and significant quantitative expressions become statistical indicators.

The stock of a given economic variable is described following a verification of attributes considered sufficient: I) the attribute invariance qualitative over time of the stock (a stock defines a temporally indiscriminate accumulation of a process, or defining variable of the process, and any change of the stock, having the sense of time variation, does not change its economic identity); II the attribute of qualitative invariance of the stock, in space or territory (there are no temporal strata in the structure of the stock, which is homogeneous in terms of quality); III) the attribute of causality of the stock relative to the flows (the initial stock cannot be defined by means of flows, or at least involves a limiting constant, in other words the initial stock can be considered "virgin" or describing at best a limit, a threshold or a reserve fund); IV) the attribute of artificial variation of the stock in the absence of any flow (any stock denominated in a currency that rises against another currency "grows" artificially or nominally, in much the same way as, when a currency depreciates, it decreases as artificially or nominally).

An example meant to clarify the difficulty of analyzing these developments in the complex economic universe is provided by the succession: Budget deficit ( $\Delta$ Budget as a flow indicator) => Public or external debt (DEBT as a stock indicator) => Gross Domestic Product (GDP as an indicator of flow).

Governments hold annual budgets of revenues and expenditures, positive flows and opposite, rarely fully compensated and generating deficits or negative flows.

Budget deficit ( $\Delta B$ ) = Income (VB) - Expenses (CB) (3)

Annually, trade balances of the national economies as flows partially offset by export and import can generate, and do generate, deficits:

Trade balance deficit ( $\Delta BC$ ) = Exports (X) - Imports (M)

Analogously, one can find current account deficits of the balance of payments, the notations being slightly different and the essence of the phenomenon analyzed remaining virtually always the same.

Current account deficit of the balance of payments ( $\Delta$ CCBPE) = Proceeds (A) – Payments (P)

(5)

(4)

A public deficit, be it a trade deficit or a current account deficit, is covered by loans, which can be seen in the evolution of the stock of (public, external, etc.) debt. To understand more quickly the consequences of abusing the logic of statistical thinking, one can reduce everything to the budget deficit, rewriting a defining relationship of the flow-stock and stock-flow type, between the budget deficit and the debt (by changing the notation in equations (1) and (2).

 $\Delta Budget = DEBT(t+1) - DEBT(t)$ 

the stock in time of public debt becoming the consequence of the summation of an initial stock and a flow called budget deficit.

As economic convergence is a fundamental process of integrating the economies of EU countries and the convergence indicator concerning the maximum or limiting value of public debt to GDP is 60%, one finally reaches the threshold analysis based on a double error: a) a stock indicator is incorrectly constructed, uncorrected and unconnected by means of a flow indicator; b) a stock indicator is related to a another indicator, this time a flow indicator, and the resulting relative flow is then expressed as a percentage. By abandoning the logic of statistical thinking, all of the above errors conduce to indicators of impaired informational content.

 $DEBT(t+1) = \Delta Budget + DEBT(t)$ (7) The convergence criterion of public debt = [DEBT (t+1):GDP]×100 = {[\Delta Budget + DEBT (t)]:GDP}×100 (8)

What does an accurate relationship look like, which also takes into account the logic of statistical thinking? This question allows for three distinct solutions of different degrees of generalization: economic, statistical and physical, all of which are detailed below.

I. The economic solution is based on the budgetary restrictions

Starting from the variation of debt as an indicator of stock between two points in time (t+1) and (t), assuming budget restrictions:

 $DEBT_{(t+1)} - DEBT_{(t)} = i_t \times DEBT_t + \Delta Budget_t$ (9) where:  $i_t$  is the nominal interest rate in the short term; following successive processing, one gets the relationship

 $DEBT_{(t+1)} = (1 + i_t) DEBT_t + \Delta Budget_t$ (10)

which is then divided by  $GDP_t$  to express percentages of the  $GDP_t$  in keeping with the standard of the convergence indicator:

 $[DEBT_{(t+1)}; GDP_t] = [(1+i_t) \times DEBT_t]: GDP_t + [\Delta Budget_t: GDP_t]$  (11) and as the pace of real GDP connects  $GDP_{(t)}$  and  $GDP_{(t-1)}$  in keeping with the relation for calculating real GDP index

 $GDP_{(t)} = (1+Rate I real GDP) \times PIB_{(t-1)}$  (12) A new relationship is obtained:

 $[DEBT_{(t+1):} PIB_t] = [\Delta Budget_t: GDP_t] + [(1+i_t):(1+I real GDP)] \times [DEBT_t:$ 

 $GDP_{(t-1)}]$ 

(13)

 $[DEBT_{(t+1)}:GDP_t] = [\Delta Budget_t:GDP_t] + [Index short term interest:Index economic growth] \times [DEBT_t:GDP_{(t-1)}]$ 

(14)

As can be seen, a factor emerged from the careful analysis of the economic process, a factor that connects the two concepts (flow and stock), a correction

factor of flow-to-stock and stock-to-flow transformation, which when the public budget is balanced ( $\Delta Budget_t = 0$ ),

 $DEBT_{(t+1)} > DEBT_{(t)}$  if short-term interest rate > rate of real GDP;  $DEBT_{(t+1)} = DEBT_{(t)}$ , if short-term interest rate = real GDP index;  $DEBT_{(t+1)} < DEBT_{(t)}$  if short-term interest rate < real GDP index.

This approach is accurate and realistic, which, according to the traditional transformation from flow to stock or from stock to flow did even not represent a hypothesis for analysis.

II. The statistical solution directly introduces an index of correction (by linking temporally and really the real stock-flow phenomenon), starting directly from the equation (7):

Debt(t+1) as % of available GDP (t) =  $\Delta$ Budget + DEBT(t) as % of available GDP (t-1)

(16)

(15)

Thus, the first solution is given by the correction of the value DEBT(t) with  $\beta = 1/[k]$ , where *k* is the ratio of real GDP index (an ascending or favourable dynamics of macro-results in connection decreases the value DEBT(t), while a decreasing or unfavourable trend increases the same value) and the index of short-term interest rate or the infra-annual index (things are now completely reversed: obviously, increasing the rate increases the amount of debt).

A second solution involves decomposing the real GDP index in two other indices, i.e. starting from the coefficient  $\beta = 1/[k]$ , where *k* is equal to a triple ratio of indices (I real GDP is substituted by the ratio of the calculation I real GDP = I nominal GDP: GDP deflator), namely:

 $\frac{DEBT_{(t+1)}}{GDP} \qquad \frac{\Delta Budget_{t}}{GDP_{t}} \qquad \frac{Index _{short term interest}}{Index _{nominal GDP}} \qquad \frac{DEBT_{t}}{GDP_{(t-1)}} \qquad (17)$ 

The correction, or connection from flow to stock, is now made by the agency of the interest index (directly correlated) of the nominal GDP index (correlated indirectly) and the deflator (directly correlated). They actually represent a specific macroeconomic phenomenon of connection of the triple indexing of the stock, subsequently aggregated with a macroeconomic flow that highlights three types of adjustments or connections generating errors if not used correctly.

III. The generalized approach, through the physical model, generalizes, simplifies, and confirms the need for correction.

Economic space and time are actually redefined by economic results and inflation (GDP becoming the macroeconomic space, and price, exchange rate or

Revista Română de Statistică - Supliment nr. 1/2014

interest redefining economic *time*; analyzes are relaxed by the instrumental use of the indices such as real GDP index and price index or interest index, etc.)

A physical flow may be defined by various parameters (mass, volume, power, speed, pressure, etc.), and the continuity equation is like:

$$\nabla (\rho \mathbf{v}) - (\mathbf{d}\rho): (\mathbf{d}\mathbf{t}) = 0 \tag{19}$$

And to turn the flow into what can be called *a stock distributed over a time interval*, then the continuity equation becomes

 $\rho_{(t+dt)} = d\phi + (1/k) \times \rho_{(t)}$ (20)

Specifically, for the variables q and t between times q (t) and q(t+1) the continuity relationship is identified

 $\Delta q_{(t+dt)} = q_{(t+dt)} - 1/_{(k)} \times q_{(t)}$ (21) benefiting from a correction of the form 1/k, or otherwise written as final variation

$$\nabla(\rho) - (\mathrm{d}q):(\mathrm{d}t) = 0 \tag{22}$$

A physical flow may be defined by various parameters (mass, volume, power, speed, pressure, etc.) and its continuity equation is given by:

$$(\partial \rho): (\partial t) + \operatorname{div} (\rho v) = 0 \tag{19'}$$

However,  $\rho$  being a spatial and temporal function:

 $\rho = \rho(x, y, z, t)$ 

equation (19) is converted to:

$$(1/\rho) \times (d\rho/dt) + div(v) = 0$$
 (20')

and speed may vary as a result of external constraints (flow) or as a result of volume deformation (deformation time, similar deformation or phenomenon such as the budget deficit in the economy).

The relationship between the final volume  $(\tau_1)$  following initial volume deformation  $(\tau_0)$  is:

 $(\tau_1) = D(x_1, y_1, z_1):D(x_0, y_0, z_0) = 1- [(Du:Dx) + (Dv:Dy) + (Dw:Dz)]dt+(Du:Dx)+(Dv:Dy)+(Dw:Dz)]dt^2$ 

(21')

where:  $D(x_1, y_1, z_1)$  şi  $D(x_0, y_0, z_0)$  are the transfer functions from one domain to another, and u, v and w are velocity components caused by deformation.

The final part  $[(Du:Dx) + (Dv:Dy) + (Dw:Dz)] dt^2$  as derived from 2nd order tends to zero and the previous equation change into:

$$(\tau_1 \cdot \tau_0): (\tau_0) = [(Du:Dx) + (Dv:Dy) + (Dw:Dz)] dt = div (v) dt$$
(22')  
Hence, the first relationship that characterizes the flow  
$$(1/\tau_0) \times [(d\tau): (dt)] = div (v)$$
(23)

and a second connection on the stock:

$$(1/\rho) \times [(d\rho) : (dt)] = div(v)$$
 (24)

From the obvious equality of the two previous relationships (23) and (24) to get the conversion stock flow or what might be called *a stock distributed to time* when continuity equation becomes

 $(1/\tau_0) \times [(d\tau) : (dt)] = (1/\rho) \times [(d\rho) : (dt)] = \text{div}(v) \text{ or } \nabla(v)$  (25)

Following a correction by a factor  $\beta$  = (1 / k), and the general relation becomes:

 $(1/k) \times (1/\tau_0) \times [(d\tau) : (dt)] = (1/\rho) \times [(d\rho): (dt)]$ (26)

It may be noted that this general relationship for analyzing debt (Debt) as a stock in relation to the budget deficit ( $\Delta$ Budget) is immediately deductible by a simple change of notation benefiting from the correction (1 / k):

 $(1/k) \times (1/Budget_0) \times [(dBudget) : (dt)] = (1/Debt_0) \times [(dDebt) : (dt)] (27)$ 

#### A final remark

The initiation and the completion of such an argument, focused on successive replacements of calculation relations and process economic investigation of the classic type, to which are also added a few corrections, adjustments or dynamic connections (capitalizing the method of the indices) is under the impact of the logic of statistical thinking, and generalizing the reasoning, based on the thinking of physics, leads to optimal solutions for transforming contemporary indicators from stock into flow and conversely.

#### References

- Bergson, H., (1911), *Matter an Memmory*, London, Matter and Memory. (Matière et mémoire 1896) Zone Books 1990, p. 32. Available on-line at <u>http://www.reasoned.org/dir/lit/matter\_and\_memory.pdf</u>
- Fisher, I. (1896), *What is Capital?* Economic Journal, Vol. VI, p. 514. Available on line at http://www.econlib.org/library/NPDBooks/Fetter/ftCIR7.html
- Nicholas Georgescu-Roegen, (1996), Legea entropiei și procesul economic, reeditare a ediției în limba română din 1978, Editura Expert, București, p. 29 / The Entropy Law and the Economic Process, new Romanian edition published after the 1978 edition, Expert Publishing House, Bucharest, p. 29

Hicks, J., (1965), Capital and Growth, New York, pag. 85.

- Săvoiu, G., (2007), *Statistica-un mod științific de gândire*. București, Editura Universitară.
- Săvoiu, G. (2013), Situații statistice financiar contabile și sisteme de indicatori statistici derivați, Ed. Universitară București, pag. 153 154.

## Reduction of Pollution Effect in Constanta through Sustainable Rehabilitation of Water Purification System and Related Management

#### Assistant Elena GRIGORE PhD.

University of Bucharest, Faculty of Geography, Meteorology – Hidrology Dept.

#### Abstract

At present human society is faced with a number of outstanding issues that require a quick and efficient fix, useful being the sustainable development concept and the application principles of management. Pollution returned, thereby, in the foreground, representing an issue of exceptional importance over time. Emissions of pollutants that end up in the Black Sea, from incompletely treated water discharge from treatment plants of Constanta, proven over time that are less spectacular than accidental oil pollution, lead to deterioration of quality and disruption of the natural balance (Biological Resources) of marine water. Being aware of this the management of Constanta develops and votes different local strategies for sustainable development and elimination of these issues of environmental pollution.

**Key words**: pollution source, treatment, rehabilitation, management, environment, urban-technical equipment.

#### JEL Classifications: Q 50, Q 54

Development of a human settlement, over time, imposes also the analysis of urban-technical aspects, because they are designed to ensure adequate standards of living, which should be designed also in order to protect the environment. Thereby, pollution becomes a real problem, consequences being visible, due to systems more or less modernized, which requires finding the best ways to combat it and restore, in this way, normal relations with the environment. For this reason specialists, appealing to the principles that support the sustainable development concept, confirms that should be developed and supported a useful system of relationships and responsibilities between man and environment. Also, for help, come the management principles, seeking to apply the strategic objectives of sustainable development. The urbanization process of Constanta is seen as a major source of environmental degradation, because after 1990, studies performed on the marine ecosystem confirmed the alteration of marine biotope through pollution due, mainly, to water purification activity and sewerage system. These activities alter the sea and lakes water, but also nearby beaches, by the pollution with dangerous bacteria and germs for human health, appearing, thereby, the discomfort of human organism.

Therefore, rehabilitation of sewerage infrastructure and wastewater treatment has become a necessity, a priority of local development strategies, the managerial appealing to financial resources of the work instrument I.S.P.A. 2000 / RO/16/P/PE/003, that would have allowed the reduction of pollutant emissions by reducing losses from canals and from discharging incomplete treated water from treatment plants. At present, existing treatment plants in Constanta and along the Romanian coast, are not operating at full capacity and are not fully equipped with modern monitoring, treatment and control technology.

Inventory executed by competent authorities regarding discharges of treated / untreated wastewater in the Black Sea, highlights the following wastewater origin: from sewage treatment plants (RAJAC - Constanta Autonomous County Water, discharging treated / insufficiently treated wastewater); port predominant activity units; the economic activities of processing, handling, storage, preparation and delivery of oil such as from Oilterminal through the deposit located in the northern city; from units producing electricity and heat; from tourism and recreation activity.

In the northern city, on the Tăbăcăriei Lake has been built Constanta North water treatment plant, the oldest station built in the municipality of Constanta, with the role to receive wastewater from Mamaia and from the northern city (lon Rațiu, Delfinariu, Ahile Mihail, Târgul de Vară, Suceava and Lăpuşneanu) (Foto 1). The station has, only, one mechanical treatment level and has a capacity of 1920 dm<sup>3</sup>/s - maximum daily flow, 675 1/s - hourly flow and about 415 1/s - daily flow. During the summer season, maximum hourly flow reaches values of 1.500 1/s. Thereby, managers concluded that the only viable solution is to reduce inflow and pumping of flow to the treatment plant located in Midia - Năvodari. Discharge of treated water is made by two pipelines in Black Sea in the Pescărie – Mamaia aria during the period of 1 October - 15 April and in the irrigation system during the summer season.



*Foto 1* Constanța Nord water treatment plant – 2010 project completion informative panel and current status of the station (personal source, 2013)

In the southern city has been built another water treatment plant -Constanta South, possessing a mechanically and biologically wastewater treatment system. This water is coming from the central and southern part of the settlement, from collected rainwater from the sewer system unit and waters discharged during the summer season by the treatment plant in the north. Analyzing the data provided by the statistical service of Hall of Constanta, it is found, that the flowing

Revista Română de Statistică - Supliment nr. 1/2014

wastewater in the station in a proportion of 60% are industrial wastewater, originating from economic agents, and the rest from domestic wastewater. Sewage treatment plant is sized for a capacity of 3.840 1/s - hourly flow and 3.200 1/s - maximum daily flow, since it was built with two identical production lines for a flow of 1.600 1/s each. Treated water is discharged into the Black Sea in the harbour area, in berth 86, by two metal pipes. At present, Constanta water treatment plant, is not working on design parameters, nor on the water line, or sludge line, mainly thanks to the underperforming machines, incomplete technological flux and the poor quality of execution of construction works.

In the vicinity of the industrial area, in the west of the city, was necessary to build another station, thereby, in 1993 Palas station was put into operation for treating the water captured at Galesu. The station is equipped with two laboratories for chemical and bacteriological analyzes. Following the treatment, products resulting from the settling and washing the filters, such as sludge, is discharged to Constanta South station.

National Institute of Research and Development for Biological Sciences Constanta, finalize in 2005 the new construction useful in water treatment, through the investment program of National Authority for Scientific Research. The management of the Institute found, that, the discharged substances do not present a hazardous organic load anymore for the city's sewer system and no source of environmental pollution.

In their turn people of *Administrația Porturilor Maritime S.A. Constanța* (A.P.M.) appealed to Siemens Industrial Solutions and Services Group (I&S) for the construction of two water treatment plants, one to treat leach ate discharges (7.300 m<sup>3</sup> of water annually) and one for wastewater treatment (capacity of 81.5000 m<sup>3</sup> annually). Stations were designed so that the chemical oxygen demand of the waste water to be reduced by 80%, thereby, treated wastewater to be within permitted emission to discharges into the sea.

To eliminate discomfort, the management team that deals with sustainable development of public water treatment in Constanta opted for rehabilitation of treatment plants. So, for the rehabilitation of Constanta North water treatment plant, the approved project target the demolition of the existing station and construction of a new station with a maximum capacity of 255.000 PE with extended aeration, with a system of removal of nitrogen and phosphorus, with aerobic stabilization program and sludge dewatering. The value of the work being estimated at approximately 28 million  $\in$  The same team continues to work like: rehabilitation of 35 pumping stations in areas as: Mamaia, Constanta North, Constanta South; capture wastewater discharged in Tăbăcăriei Lake and redirecting flows to Constanta North; rehabilitation of sewerage network in Peninsular Area; rehabilitation of spillways and discharge pipes from Constanta South. The value of the last projects being approximately 17.500.000  $\in$ 

Rehabilitation projects, of about 87 million  $\in$  started under normal conditions with the possibility of completing, were stopped by the European Commission (C.E.) after two years since their launch, due to complaints of

O.L.A.F. on suspicion of corruption, of false bills issued in the financing of I.S.P.A. programs from Constanta County. In this delicate situation the preaccession Romanian fund decided to take over funding and continuation of the project.

Due to the investment effort and loans that had to be returned in a certain time, it came to the occurrence of the technological gap between treatment – pumping systems and of water – sewage networks. For this reason are seeking, further, solutions and new funds for further rehabilitation projects, by contracting new loans by Constanta County Council thus being possible, the protection of the environment. Implementation of new technical assistance programs would support project management capacity on the assessment of flow of industrial and domestic wastewater and additional measures of their treatment would develop environmental management plans, a master plan for coastal waters of Constanta, mainly by eliminating of nutrients discharge into the Black Sea water.

#### References

- \*\*\* (1990-2010), *Planurile urbanistice generale 1990, 1995, 2000, 2002 2010*, Primăria Municipiului Constanța, Constanța.
- \*\*\* (2004), *Cartea Verde a județului Constanța*, Editura Ponto, Constanța, Constanța.
- \*\*\* Agenda locală 21, Planul de dezvoltare durabilă a municipiului Constanța, Constanța.
- \*\*\* (2012) *Caietul statistic al Municipiului Constanța 2000 2012*, Direcția județeană de Statistică Constanța.
- \*\*\* Anexa 1, proiectul I.S.P.A. 2000 / RO/16/P/PE/003, cu privire la Reabilitarea rețelei de canalizare și a facilităților de epurare a apelor uzate din Constanța

# The Regression Model used to Analyze the Correlation between Production and Labor

Prof. Constantin ANGHELACHE PhD.

Academy of Economic Studies, Bucharest "Artifex" University of Bucharest Lecturer Mădălina Gabriela ANGHEL PhD. "Artifex" University of Bucharest Assoc. prof. Alexandru MANOLE PhD. "Artifex" University of Bucharest Zoica DINCĂ (NICOLA) PhD. Student Academy of Economic Studies, Bucharest

#### Abstract

The regression model is used in order to obtain the parameters that correspond to the set of variable dependency analysis, formulated between variables, where the series of data are recorded in the statistical units of the population for a period or a moment, and for highlighting the dependence between the variables within a specified time-frame.

**Key words:** regression analysis, regression model, variables, prediction, process

In the theoretical analysis, dependency of variables is stochastic. Consideration of the residual variable within such a model is needed. Other factors that influence the score variable are grouped in the residual<sup>1</sup>.

Uni-factorial nonlinear models are linearized transformations that are applied to the variables, the regression model. So, for example, a model of the form turns into a linear model by logarithm the two terms of the above equality, resulting in linear function.

This model is recommended when the points are located, that the cloud of points around a line.

Linear regression model is based on the series of data for the two features. They are represented by vectors x (the variable factor) and y (variable score).

Simple regression aim is to highlight the relationship between a dependent variable explained (endogeneous, score) and an independent variable (explanatory note, exogenous factor predictors).

<sup>&</sup>lt;sup>1</sup> Anghelache, C. și alții (2012) – "*Elemente de econometrie teoretică și aplicată*", Editura Artifex, București

To be able to build a linear regression model we defined total production as the independent variable, while labor force in financial intermediation and insurance; real estate was considered to be a dependent variable.

To determine the parameters of the linear regression model we have considered a variety of data on the evolution of the macroeconomic indicators of outcomes in the period 1990-2012.

By using EViews we realized an analysis of correlation between labor force in the financial intermediation and insurance; real estate branch and TOTAL PRODUCTION.

-milions-

Year	Financial	Total production
	Intermediation and	
	insurance; real estate	
	branch	
	X	У
1990	6.1	79.1
1991	14.4	206.4
1992	58.3	606.9
1993	185.4	1906.5
1994	453.4	4700.1
1995	704.1	6746.9
1996	911.4	10197.1
1997	3015.9	23036.5
1998	4907.7	33711.2
1999	7905.7	48888.2
2000	11674.3	71990.9
2001	17956.0	106082.2
2002	25415.5	136922.3
2003	29217.3	166602.3
2004	36531.5	220931.3
2005	35172.2	244676.8
2006	40984.9	289695.6
2007	51455.6	350845.6
2008	43078.8	458535.5
2009	43949.1	450979.1
2010	57931.9	466397.0
2011	60899.5	487733.2
2012	62448.0	512112.2

Financial intermediation and insurance, real estate branch has an important role in influencing the total production. Between the two indicators there is a direct and linear in shape. As we can see from the table above, the evolution of financial intermediation and insurance; real estate is more considerable starting with 2010 until 2012. The financial intermediation and insurance; real estate field recorded values on rise during this period, who caused the increased of total production.

The validity of the regression model is confirmed by the F-test statistic values (353.9151-value far superior table what level is considered to be a landmark in tests of validity of econometric models) and the degree of risk is zero (reflected by the value of Significance).

- The correlation between the two indicators can be analyzed using computer software Eviews.

Multiple R is the coefficient of multiple correlation, in this case the simple correlation between x and y. It is noted that between the value of Branch 5 and that of total production registered in our country between 1990-2012 there is a direct and very strong conclusion expressed based on the value of Multiple R (0,943987).

The evolution of labor in the financial intermediation and insurance; real estate branch in Romania, during 1990-2012



Statistical tests regarding the value of BRANCH 5 in Romania, during 1990-2012 is represented:







Characteristics of the regression model

Dependent Variable: TOTAL\_PRODUCTIE Method: Least Squares Date: 02/17/14 Time: 16:03 Sample: 1990 2012 Included observations: 23 Variable Coefficient Std. Error t-Statistic Prob. RAMURA\_5 8.112656 0.431234 18.81263 0 0000 13844.70 C -10682.17 -0.771571 0.4490 0.943987 177981.9 R-squared Mean dependent var 188967.1 Adjusted R-squared 0.941320 S.D. dependent var S.E. of regression 45775 29 Akaike info criterion 24 38382 Sum squared resid 4 40F+10 Schwarz criterion 24 48256 Log likelihood -278 4139 Hannan-Quinn criter 24 40865 F-statistic 353,9151 Durbin-Watson stat 0.999373 Prob(F-statistic) 0.000000

We can conclude that as much the value of labor in the financial intermediation and insurance, real estate branch is growing, the value of the total production also is growing.

Also the validity of the regression model is confirmed by the F test value - statistically superior value table level that is considered to be the benchmark in the analysis of the validity of econometric models and by the value of the test Prob (F - statistic) that it is zero.

Based on observations made on the analysis of Romania's Branch 5, using simple regression model, we conclude that the value of this indicator is significantly influenced by the variation of Total Production.

#### References

- Andrei, T., Stancu, S.; Iacob, A.I. (2008) "Introduction to econometric pregnancies using Eviews", Economic Publishing House;
- Anghel M.G. (coautor). (2009) The hypotheses of the simple linear regression model, Metalurgia International, Vol. XIV, special issue no. 12
- Anghelache, C. (2008) "*Tratat de statistică teoretică și economică*", Editura Economică, București
- Anghelache, C. (2009) "Indicatori macroeconomici utilizați în comparabilitatea internațională", Conferința a 57-a "Statistica – trecut, prezent și viitor", ISBN 978-90-73592-29-2, Durban, articol cotat ISI
- Anghelache, C. (coord., 2012) "Modele statistico econometrice de analiză economică – utilizarea modelelor în studiul economiei României", Revista Română de Statistică, Supliment Noiembrie 2012
- Anghelache, C. și alții (2012) "*Elemente de econometrie teoretică și aplicată*", Editura Artifex, București
- Arnold, B.C., Balakrishnan, N., Nagaraja, B.N. (2008) "A First Course in Order Statistics", SIAM Philadelphia
- Dougherty, C. (2008) "Introduction to econometrics. Fourth edition", Oxford University Press

## A Set of Ten Relevant Statistical Indicators of Romania's External Debt Today

#### Lecturer Luiza APOSTOL, PhD candidate

University of Pitești, Faculty of Economic Sciences

#### Abstract

This paper contains an analysis of the evolution of Romania's trade balance and the relevant indicators of the external debt in the period 2000-2012. Trade balance deficits are the main cause of the negative current account balance, of the external imbalance and the need to resort to external borrowing in order to strike an equilibrium of the balance of foreign payments. Over the entire period analyzed, the trade balance closely follows the current account developments. The aim of the statistical analysis is, in this case, identifying imbalances, unbalanced developments or the combination of various trends and factors to generate serious imbalances.

**Key words**: foreign debt, balance of payments, trade balance, current account of the balance of payments, deficit of trade balance, trade balance indicators approach, the budget deficit

\*

Foreign trading activity can be succinctly defined as a nation's total imports and exports of economic goods. When the trade balance (TB) becomes strongly negative, it will generate the depreciation of the current account of the balance of foreign payments (BFE). As a nation's global BFE cannot remain unbalanced, any imbalance in the current account is offset or counteracted by a contrary imbalance of the capital and financial account.

Therefore, it is generally assumed that the current account deficit of BFE causes a surplus of the capital and financial account (by engaging credits or by attracting capital from abroad to pay the difference between revenues and payments arising from current operations), in much the same way as surplus account current is "compensated" by an export of capital (foreign loan or direct investment) to ensure overall annual balance of BFE. Bridging BPE deficit through external loan leads to an increase in the total volume of foreign debt, while reducing the possibility of payment of the existing debt (Giurgiu Adriana, 2011). Similarly, the state budget deficit can, and is, frequently covered by foreign loans.

Since foreign trade represents a significant part of GDP, it changes the material structure of GDP, its growth rate and, especially, its value volume, as seen

in the influence of net exports, but it also diminishes the chances of development, when its deficit balance is chronically high.

#### External debt indicators in today's Romania

Between the trade balance and the current account balance of foreign payments there exists a positive correlation, and in the case of today's Romania the graphical image of both balances, which both represent chronic deficits, is telling in this regard:





Source of data: UNECE Statistical Division Database accessible online at: <u>http://w3.unece.org/pxweb/database/STAT/</u>

The critical influence on the current account was represented by the trade deficit throughout the period considered; the increase in the negative balance of the current account of the years 2005-2008 was generated by the explosion of trade deficit, which marks the growing trend of economic imbalances.

In order to monitor the external debt – given the impact of the BFE indicators – their trends are analysed, as well as the structure of the current account of the balance of foreign payments, expressed in million euros, prior and subsequent to the global recession in Romania (2007-2008 and 2011-2012), in

Table no. 1. For each indicator are presented, in addition to the calculation relationship, the signals based on the statistical theory and information:

									_	- mill	lion e	uros -
	2007			2008			2011			2012		
	Credit	Debit	Balance	Credit	Debit	Balance	Credit	Debit	Balance	Credit	Debit	Balance
			(+/-)			(+/-)			(+/-)			(+/-)
Current	46051	62765	-16714	53582	69739	-16157	59534	65458	-5924	60660	66503	-
Account												5843
(I+II+III)												
I. Goods and	36434	53847	-17413	42479	60929	-18450	52545	59599	-7054	53472	59722	-
services												6250
Goods (X	29549	47371	-17822	33725	52834	-19109	45292	52686	-7394	45070	52449	-7379
FOB-M FOB)												
Services	6885	6476	409	8754	8095	659	7253	6913	340	8402	7273	1129
II. Revenue	2429	6556	-4127	2268	5951	-3683	1274	3481	-2207	1380	4405	-
												3025
III. Current	7188	2362	4826	8835	2859	5976	5715	2378	3337	5808	2376	3432
transfers												
Registered	68784	51317	17467	80025	62195	17830	75963	70466	5497	87653	82643	5010
capital/finance												
Errors and	-	753	-753	-	1673	-1673	427	-	427	833	-	833
omissions												
(net)												

Table no. 1: Pre- and post-recession information needed to assess the BFE indicators concerning foreign debt

Source: Payment balance (2007-2008 and 2011-2012), available on-line at http://www.bnr.ro/Publicatii-periodice

The level and dynamics of the current account balance are characterized by a first set of three statistical indicators, which make it possible to interpret the consequences of current account imbalances, the severity of the level of the negative balance and its dynamics; these indicators are made use of, either individually or as a whole, to monitor the deficits and, implicitly, the debt (the external debt, and even the foreign public debt):

I). The degree or coverage of payments (debit) by revenue (credit) is a indicator whose classical quality points to being an index of volume value, indicating the seriousness of the deficit:

Credit	2007	2008	2011	2012	
$G_A = \frac{1}{Debit} *100$	73.37%	76.83%	90.94%	91.21%	(1)

The coverage of payments by means of revenues (receipts) has recorded subunit values in both the pre-recession and the post-recession period, highlighting the current account deficit and the fact that Romania is spending more than it earns abroad from transactions with other economies and, therefore, is a net debtor in its relations with the world

Revista Română de Statistică - Supliment nr. 1/2014

Also, the indicator can be found for each chapter or post of the current account, detailing the area of maximum adverse impact.

$$G_{Ai} = \frac{Credit_i}{Debit_i} *100$$
(2)

II). The share of the current account balance calculated as to the GDP achieved (121.2 and 136.8 billion euros in 2007 and 2008, respectively 131.5 bn and 131.7 bn in 2011 and 2012) is an indicator of the signal type for triggering measures (actions) having an impact of the development of debit:

$$I_{1} = \frac{Credit - Debit}{PIB} * 100 \qquad \frac{2007}{-13.8\%} \quad \frac{2008}{-11.8\%} \quad \frac{2011}{-4.5\%} \quad \frac{2012}{-4.4\%}$$
(3)

An indicator value up to  $\pm 5\%$  is considered as being acceptable by economists, and does not involve immediate monetary or fiscal action; on the contrary, the levels of this indicator ranging from  $\pm 5\%$  to  $\pm 10\%$  are meant as alarm bells for the decision-makers, who are supposed to take steps to correct the imbalances. Values exceeding  $\pm 10\%$  indicate severe unbalanced, which can be corrected only by continued, coherent measures and policies.

III). The share of the current account balance within the total volume of transactions is an indicator whose level is acceptable to specialists if it falls within the interval (-10%; +10%). The values lying outside that range underline that the current account imbalance is serious, which requires the intervention of the monetary and fiscal authority and of the government; its correction is to be done within a long period of time.

$$I_{2} = \frac{Credit - Debit}{Credit + Debit} * 100 \qquad \frac{2007}{-15.4\%} \quad \frac{2008}{-13.1\%} \quad \frac{2011}{-4.7\%} \quad \frac{2012}{-4.6\%}$$
(4)

The indicator can also be determined for each chapter or post of the current account, according to the same relationship, where i represents each individual chapter or post:

$$I_{2i} = \frac{Credit_i - Debit_i}{Credit_i + Debit_i} *100$$

(5)

From the analysis of indicators I, II and III one can notice that the recession is practically the factor of favourable influence that reduced the imbalances and rebalanced, at less serious levels, the current account deficit of BFE in Romania. Unfortunately, it is the recession again that has become a random negative factor, which has worsened the external debt, so Romania had to resort to additional loans in order to cover its budget expenditure.

The structure of the imbalance of current account is shown by a second type of statistical indicators. In analysing the dynamics of imbalances, one can use either the current account balance index, or the index of coverage of the current account.

IV). The index of current account balance is an indicator that is determined only when and if the sign of the difference between <u>Credit and Debit does not change</u>:

$$I_{Sold} = \frac{S_1}{S_0} * 100 = \frac{Credit_1 - Debit_1}{Credit_0 - Debit_0} * 100 \qquad \begin{array}{c} 2008/2007 & 2012 \\ /2011 & /2011 \\ 96,7 < 100 & 98,64 < \\ 100 & \end{array}$$
(6)

An over-unit value of this index emphasizes and the positive balance show an increase in the surplus by an improved current account of the balance of current payments, and finally a decrease is seen in the negative debt dynamics caused by external trade, while sub-unit and negative balances translate the deficit increase by a deterioration of the current account of the balance of current payments, and new loans will ultimately be needed, as is the case in Romania, both prior to, and subsequent to the recession.

V). The index of coverage of payments (debit) by revenue (credit) shows an improvement, before and after the recession, of the deficit from one year to the next, maintaining the value of 100% as the limit of the interpretation:

$$I_{G_A} = \frac{G_{A1}}{G_{A0}} * 100 \qquad \qquad \boxed{\begin{array}{c} 2008/2007 & 2012/2011 \\ 104.7 > 100 & 100.3 > 100 \end{array}}$$
(7)

A more detailed analysis of the current account balance deficit confirms that it comes mainly from the negative balance of trade. Under normal circumstances, a trade deficit does not necessarily imply low efficiency in the economy, because it matters how this deficit is financed; it is generally maintained that there are countries which have a position of net exporters, and countries that are in the position of net importers, the difference being covered by foreign loans.

Since 2000, Romania has continued to be in the position of a net importer. Romanian exports were rather low in the EU pre-accession period, and in 2000 they scored only about 11.273 billion euros.

	Export	Basic	e rates	Import	Basic rates		Balance	Interval of
	$(Xy_t)$			(My <sub>t</sub> )			X-M	mobile
Year	Mill.	Fixed	Mobile	Mill.	Fixed	Mobile	Mill.euro	dynamics
	euros	XR <sub>t/0</sub>	XR <sub>t/t-1</sub>	euros	MR <sub>t/0</sub>	MR <sub>t/t-1</sub>		$XR_{t/t\text{-}1} - MR_{t/t\text{-}}$
								1
1999	7977	-	-	9927	-	-	-1950	-
2000	11273	41.31	41.31	14235	43.39	43.39	-2962	- 2.08
2001	12722	59.48	12.85	17383	75.10	22.11	-4661	- 9.26
2002	14675	83.96	15.35	18881	90.19	8.61	-4206	6.74
2003	15614	95.73	6.39	21201	113.56	12.28	-5587	-5.89
2004	18935	137.36	21.26	26281	164.74	23.96	-7346	-2.70
2005	22255	178.98	17.53	32569	228.08	23.92	-10314	-6.39
2006	25850	224.06	16.15	40746	310.50	25.11	-14896	-8.96
2007	29549	270.43	14.31	51322	416.99	25.96	-21773	-11.65
2008	33628	321.56	13.80	56337	467.51	9.77	-22709	4.03
2009	29084	264.60	-13.51	38953	292.39	-30.96	-9869	17.45
2010	37360	368.35	28.46	46869	372.14	20.32	-9509	8.14
2011	45274	467.56	21.18	54948	453.52	17.24	-9674	3.94
2012	45056	464.82	-0.48	54684	450.86	-0.48	-9628	0

Table no. 2: Evolution of export, and its percentage rates in Romania after2000

Sources: Anuarul statistic al României, 2001-2012 and Buletin statistic de comerț internațional 1/2013, Ed.INS, Bucharest

By analysing the data in Table 2, we see that over the last 13 years, we have witnessed an increase in the exports by nearly 4 times, and in the imports by 3.84 times.

The upward trend in the volume of foreign trade is obvious, no matter if we refer to exports, imports or trade balance, i.e. its deficit.

It appears that over the whole 2000-2013 period, export growth slightly exceeded import growth, but for most of the period analysed (2000-2007), the situation was reversed. Imports were higher than exports growth, and the fact that there was a low starting point explains, in fact, the existence of an export undercapacity of the Romanian economy in relation to imports.

The superiority of the growth rate of the imports compared to the growth rate of exports serves to show that the foreign trade liberalization policies have clearly favoured imports of goods, while exports remained at a low level. The reason for the widening trade deficit also lies in the fact that the increase in consumption and investment was higher than domestic production.

From 2008 export growth rate exceeded import growth rate, and from 2009, a year entirely affected by the global recession, the deficit declined sharply, representing in 2012 circa 40% of the trade deficit recorded in 2008. The imbalance of the two increases is revealed by the comparative chart no. 2, showing the mobile rhythms of the contrary flows (X and M).


Chart no. 2: Dynamics of percentage rates of mobile export flows (X) and import flows (M)

Source: Data from the calculations in Table. 2

VI-VII). Dynamics of trade balance ( $\Delta BC$ ) and the difference or gap of chained flow rates provides greater clarity, accuracy and information timeliness, signalling the economic times that are delicate from an evolutionary standpoint, in the years 2002 and 2008 (the first, belonging to a postponed global recession, and the second, to a confirmed recession). These arguments transform both the trade balance ( $\Delta BC$ ) into a related indicator of external debt:

 $\Delta BC = Export (X) - Import (M)$ 

(8)

and the absolute difference or the spread between rates linked export and import flows into a signal indicator of potential recessions, and implicitly disruptive for external debt:

 $\Delta R_{X \text{ and } M} = \text{Rate of export flow } (XR_{t/t-1}) - \text{Rate of import flow } (MR_{t/t-1})$ (9)

Therefore, for the balance of payments, if the current account has a negative balance (and, in the case of today's Romania, it has), the role of capital and financial account is very important: it has a gap adjustment function. Yet how this is achieved is important – through direct investments, which have the capacity to generate future benefits, or by borrowing, which, in addition to adjourning the

actual existing problem, make a difficult situation worse by the obligation of future repayment of interest at maturity.

After an exceptional upward trend of FDI in 2006-2007, which was maintained relatively in 2008 as well, their stock was halved due to a recession, as early as the end of the final year of recession in Romania, i.e. the end of 2010, while external debt continued upwards throughout the period analysed.

VIII). The value of trade index (IRSV), also known as an indicator of coverage of imports by exports, has the advantage of being a statistical indicator that simultaneously characterizes the two uncompensated streams of the export and import type. This indicator can be selected in the series of indicators that correlate with the level of external debt and determine it as a result of recording permanent and high deficits. The value of trade index (IRSV) or the index of coverage of imports by exports is calculated as :

IRSV or IGA = GA<sub>1</sub>/GA<sub>0</sub> = 
$$\frac{X_1}{M_1}$$
:  $\frac{X_0}{M_0} = \frac{X_1}{X_0}$ :  $\frac{M_1}{M_0} = \frac{I_X^{\nu}}{I_M^{\nu}}$  (10)

An over-unit value of this indicator highlights the fact that the value of exports grows faster than the value of imports, which results in an improvement in the trade balance (either a reduction in the deficit balance, or an increase in the surplus balance); a value of one corresponds to an equilibrium and shows that export and import evolve at the same rate; and a value smaller than one indicates that the export value grows more slowly than the value of imports, which leads to a worsening of the trade balance (either an increase in the balance deficit, which the prevalent case in the Romanian economy, excluding the impact of the recession, positive in this case, or a reduction in the surplus balance).

In order to give a factorial explanation of the evolution of the coverage, we use the index of gross and net trade, but they do not have the same impact in the interpretation of external debt as IRSV.

IX). The export purchasing power index (PPI "X ") is a signal having the ability to identify the limit where imports should be, if not terminated, at least discouraged lest the foreign debt be increased. IPP "X" results from the combination of the net trade index with the index of physical volume of exports, thus realistically estimating the evolution of imports, i.e. within the limits or restrictions of export, and taking into account the change in import prices during the base period elapsed from the base period to the current analysis period, and is determined according to the relationship:

$$IPC "X" = IRSN \times I_{X=}^{q} I_{M \text{ OBTAINABLE}}$$
(11)

The interpretation of this index, CPI "X", which became  $I^q_{M \text{ OBTAINABLE}}$  by comparing it with the actual index of imports  $(I^q_M)$  essentially explains the evolution of the trade balance.

When  $I_{M}^{q} < I_{M}^{q}$  obtained below the obtainable limit, in keeping with the purchasing power of exports, while  $I_{M}^{q} > I_{M}^{q}$  obtained below the obtainable limit, in keeping with the purchasing power of exports, while  $I_{M}^{q} > I_{M}^{q}$  obtained below the obtainable limit, in keeping with the purchasing power of exports, while  $I_{M}^{q} > I_{M}^{q}$  obtained below the obtainable limit, in keeping with the majority case to be found in the Romanian economy, except for the recession period) as a result of increased imports beyond the obtainable limit, in keeping with the purchasing power of exports, i.e. over the practicality generated by export revenues.

Based on the data of the Romanian economy between 2000 and 2012, processed by the IRS method as indexes and expressed in coefficients, the main statistical indicators of trade of foreign trade economy are quantified.

Table no. 3: The main statistica	al indicators ca	lculated in	keeping with	the
method of th	e trade indicat	tors (IRS)		

Method IRS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
I' Exports (I'x)	1.414	1.129	1.154	1.064	1.213	1.175	1.162	1.137	1.138	0.865	1.285	1.212	0.995
I <sup>v</sup> Imports (I <sup>v</sup> <sub>M</sub> )	1.434	1.221	1.087	1.123	1.240	1.238	1.251	1.252	1.098	0.690	1.203	1.172	0.995
I <sup>q</sup> Exporturi (X)	1.298	1.122	1.172	1.084	1.154	1.073	1.074	1.073	1.096	0.969	1.201	1.123	0.958
I <sup>q</sup> Imports (I <sup>q</sup> <sub>M</sub> )	1.384	1.225	1.101	1.161	1.231	1.176	1.208	1.275	1.062	0.773	1.155	1.103	0.987
I <sup>p</sup> Exports (X)	1.089	1.006	0.985	0.982	1.051	1.095	1.082	1.06	1.038	0.893	1.070	1.079	1.039
I <sup>p</sup> Imports (M)	1.036	0.997	0.987	0.967	1.007	1.053	1.036	0.982	1.034	0.893	1.042	1.062	1.008
IRSV	0.986	0.924	1.062	0.948	0.978	0.949	0.929	0.908	1.036	1.254	1.068	1.034	1.000
IRSB	0.938	0.916	1.064	0.934	0.937	0.912	0.889	0.842	1.032	1.254	1.039	1.018	0.971
IRSN	1.051	1.009	0.998	1.016	1.044	1.040	1.044	1.079	1.004	1.000	1.027	1.016	1.031
IPC"X"	1.364	1.132	1.170	1.101	1.204	1.116	1.122	1.158	1.100	0.969	1.233	1.141	0.988

Source: Gheorghe Săvoiu, (2013), Situații statistice financiar contabile și sisteme de indicatori statistici derivați, Editura Universitară, Bucharest, p. 136.

Except for the deep recession of 2009, Romania failed to take consistent action to reduce trade deficit influence on the accelerated dynamics of growing external debt. IRSV shows that same years 2002 and 2009 triggered positive processes. The global recession, initially triggered as a crisis in the fourth quarter of 2008, was felt through its regulating effects as early as that year, continuing its effects until 2012. Comparing CPI "X" with the quantity index of imports ( $\mathbf{I}^{q}_{M}$ ) shows that, except for 2002 and the years of recession and postrecession, Romania, though able to monitor the progress of indicators, did not take any significant impact step to discourage and limit imports to a signal level provided by ( $\mathbf{I}^{q}_{M}$ ), but rather permanently imported, far more than the purchasing power of exports would have allowed, and its trade balance deteriorated, increasing its deficit and generating clear trends of increased external debt.

The evolution of the trade balance and the current account of balance of payments and the association of their dynamics with the evolution of external debt in Romania, after 1990, are described in the chart below, highlighting two different trends, with the landmark 2008, when the financial crisis and and global recession are triggered in the national economy:

Chart no. 3: Developments in trade balance of BPE (coloured in blue), current account balance of BPE (red) and external debt of Romania (green) million dollars,



Source: UNECE Statistical Division Database accesibil on – line pe: http://w3.unece.org/pxweb/database/STAT/

The graphic arguments of the emergence of recession as a significant random factor in shaping debt are provided in Chart no. 3. The inverse relationship between external debt and current account deficits of BPE and deficit of BC is reported in statistical and econometric literature. The purely statistical arguments are generated by reducing the value of Rsquared ( $R^2$ ) or the coefficient characterizing the determination of the inverse link or association between 1990 and 2008 (without the influence of the recession) between the variable external debt and factors such balances (current account deficit of BPE and BC deficit, both becoming chronic) from -0.982 and -0.989 values, to significantly lower values, respectively -0.648 and -0.696 between 1990 and 2012 (including, this time, the years of recession, too). The balance is actually a deficit, so an increasingly negative value, which leads to a growing increase in the value of foreign debt, so the correlation or association, based on a reverse link, is logical economically and in a statistical and mathematical manner.

A third important deficit, having an impact on public debt developments, this time, is the budget deficit, calculated as the difference between revenues and actual payments, which represent the public sector borrowing requirements; one can note that revenues do not include internal and external loans, and payments do not include the rates of public debt repaid during the year. If one resorts to deficit indicators (as an exogenous variable) and public debt (as an endogenous variable), expressed as a percentage in relation to Romania's GDP, further including economic growth, the chart suggests a relatively high intensity of the link with the macroaggregate GDP ( $R^2$  or Rsquared between budget deficit and economic growth is equal to 0.679), which enshrines the much more visible influence of the factor recession after 2008.





## Source: Romania: Debt evolution Data accessible at http://countryeconomy.com/national-debt/romania

The relatively parallel dynamics of the budget deficit and foreign debt, and that of the public debt, highlights the association between these phenomena, and the indicator determined as a mere balance enters the set of causal indicators or explanatory factors selected.

X). The state budget deficit ( $\Delta$ BS) can be expressed either in million euro when calculated as the difference between revenues and expenditures

$\Delta BS = Revenue - Expenses$	(12)
or as a percentage of GDP	

 $(\Delta BS)/PIB = [(Revenue - Expenses):PIB] \times 100$ 

Some of the books and articles written on the topic of foreign debt in recent years have tried to present original solutions and new methods for revaluating, and especially for anticipating external debt, or they extend the analyzes related to the same area of problems to geographic behaviour areas (Josic, Hrvoje, 2013), considered similar in point of behaviour.

Source: Romania: Debt evolution data accessible on http://countryeconomy.com/national-debt/romania

### Conclusions

Contemporary theory continually redefines the essential role of public debt in the development of an economy, while delimiting the range of problems of external debt and public debt sustainability, which have become more and more acute, hence the tendency to expand the universe of financial research, enriching it with new instrumental or cross-disciplinary solutions, an area accepted today as the application of specific methods of some domains, which are at the same time methods devoted to them, to entirely different domains, with special effects and an increased relevance in understanding phenomena.

(13)

It is preferable for a country to increase its foreign debt volume as long as the marginal product of the capital borrowed is greater than, or equal to the cost of borrowing, because only in this case does the increase in the amount of foreign debt contribute to economic growth. The set of ten indicators we have succinctly and practically presented, are a system of explanatory or associated indicators, of the signal type, of the external debt and the public debt, resulting from the specific statistical methods of investigation and original cross-disciplinary application, namely from the BPE method and the IRS method, and also from the classical budget method.

#### References

- Giurgiu Adriana, (2011), *Is there any correlation between the chronic balance of trade deficit and the Romania's increasing external debt?* Analele Universității din Oradea. Științe economice, Vol. 20 Issue: 2, pag. 842 849.
- Hrvoje Josic, (2013), Comparative Analysis of External Debt Indicators in Croatia and Southeastern European Countries\*, Ekonomska Misao i Praksa, vol. 22 (1), pag. 197-220. <u>http://search.proquest.</u>

com.ux4ll8xu6v.useaccesscontrol.com/docview/1400678213?accountid=15533.

- Reinhart C., Rogoff K., (2010), Growth in a Time of Debt (No. w15639). National Bureau of Economic Research., pag. 1- 26. accesibil on- line pe: <u>http://www.nber.org/papers/</u>w15639.pdf?new\_window=1
- Reinhart C., Sbrancia B, (2011), *The Liquidation of Government Debt*, NBER Working Paper 16893, March, pag. 1-66, accesibil on –line pe : http://www.nber.org/papers/w16893.
- Săvoiu Gheorghe, Dinu Vasile, Tăchiciu Laurentiu, (2012), Romania Foreign Trade in Global Recession, Revealed by the Extended Method of Exchange Rate Indicators. Amfiteatru economic, Vol XIV (31), pag. 173-194.
- Săvoiu Gheorghe, (2013), Situații statistice financiar contabile și sisteme de indicatori statistici derivați, Editura Universitară, București.
- Tobias Knedlik, Gregor Von Schweinitz, (2012), *Macroeconomic Imbalances as Indicators for Debt Crises in Europe*, JCMS-Journal of Common Market Studies, Vol. 50 (5), pag. 726 – 745.
- \*\*\* Romania: Debt evolution (http://countryeconomy.com/national-debt/romania)
  \*\*\* UNECE Statistical Division Database
   (http://w3.unece.org/pxweb/database/STAT)

## Sun Tzu – The Art of War Interpretation for Business

### Assoc. prof. Sorin Gabriel GRESOI PhD.

"Artifex" University, Bucharest

### Abstract

This paper presents an interpretation of a business military strategy manual 2500 years old of a great Chinese General, successful interpretation of a British specialist who finds similarities between an economic and a military strategy.

### Key words: strategy, order, position, market

About 2.500 years ago (century VI î.e.n.) a great chinese philosopher and general wrote "The Art of War", work for 25 centuries has been a guideline, a manual for all the political and military leaders. In essence, Sun Tzu shows 13 concepts and tactics, military strategy, concepts of which should take into account any wise General:

- 1. Strategic assessment;
- 2. The Conflict;
- 3. Plan of attack;
- 4. Tactical considerations;
- 5. Efficiency;
- 6. Weaknesses and strengths;
- 7. The execution of manoeuvres;
- 8. Flexibility;
- 9. Stratagems;
- 10. The land;
- 11. The new situation;
- 12. Fire attack;
- 13. The collection of information.

Over the centuries, the Chinese General work had many translations in different languages and "entered" slowly in the western world. One of the most successful interpretations for The Art of War belongs to Dean Lundell\*\*. According to Lundell, the fundamental idea of the work of Sun Tzu is to win without having to fight, even though this concept is somewhat contradictory.

In synthesis, the interpretation given by Dean Lundell for each of the 13 listed concepts from Sun Tzu is as follows:

# • Tactical considerations or how to be stable in a changing environment

The wise warrior avoid defeat, does not engage in the final battle, procrastinating and save time -says Sun Tzu- then stand in queue until the enemy becomes vulnerable, because conditions change.

In business it suggests a strategy of waiting and an accumulation of financial resources to be ready at the right time, offered by the market, since the overall market conditions are in a permanent/fast-changing.

Also, Sun Tzu says that defending yourself when you have insufficient means to attack only when you have the necessary forces. This suggestion supports small investors or individual players which says Dean Lundell, should avoid accumulating "good money over bad money" is preferable to wait for "tomorrow".

No need skill, intelligence or strength, says Sun Tzu, to pick a leaf, to distinguish the Sun from the Moon or to predict victory when it's obvious.

In transactions or investments earn the one who has an action plan based on the approach "what if?", one who gives evidence of an iron discipline and respect a set of own rules.

### • Strategic evaluation and understanding of the big picture

Sun Tzu says that the war is of vital importance to the state/nation is a matter of survival, of life or death, so must be studied carefully and understood. The world is changing rapidly, we have no national economy but a global economic system where you have to know the policy of the Central Bank, what is liberal or conservative governance, economic performance, exchange rates, interest rates, and so on - says Lundell "Like soldiers on the battlefield"-says the same analyst-"the money will leave a bad market and will head to a good market: so you have to make a strategic assessment".

Sun Tzu says that a conflict is measured/is dependent on six factors:

- a) Way, the direction the market is going, current or trend can be observed, "sensed" (The market is never wrong, only uninformed policymakers can make wrong judgments).
- b) Weather or sky, that the cyclical evolution of the market and business (hope, greed, fear or desperation).
- c) The land or earth, the assessment of the situation/position held depending on the time, distance, accessibility and danger. On what market Act? That is the moment of its cyclic evolution?
- d) Management, which means or requires courage, loyalty and wisdom (which influences cause and foreseeable effects so on).
- e) Discipline, order and hierarchy that is resource allocation: requires a careful management of money and risk - simplified we can consider:



- f) The essence of the art of war lies in to mislead the opponent:
- If you're heavily looks like you're weak;
- Trying to stretch the enemy traps;
- If your enemy is superior on all levels, then avoid it.

"The General who thinks long at headquarters –says Sun Tzu- will win the fight, while the one who makes few calculations / analyzes will lose."

### • Weaknesses and strengths or when to attack and when to retreat

A skillful General, says Sun Tzu, first occupies the land and it cause the enemy to come and attack on a specific battlefield. In business it means "let the market come in support of its strategy" to oversee permanent "movements" of other competitors to keep secret the final plan of action to identify any breach in the market, being quick in decision and action. Either war or in business who have vision / strategic thinking developed a distinct plan to learn the strengths and weaknesses of the main opponents.

According to Sun Tzu, war is like water, so change as water adapts to the shape of the land that crosses it. Therefore business is needed to watch the daily market and tortuous route to act after this sinuous/cyclic evolution (but what worked last week or month you might no longer bear fruit today).

The most skilled military strategist Sun Tzu, says change their way of thinking and tactics according to the opponent specifically, its mentality and thinking of "pattern" or cultural, depth of thought/his education (witness genuine mental chess game between main competitors on the market).

### • Execution maneuvers or how to manage your position

Sun Tzu shows that ordering a large number of people equivalent to ordering a few subordinates (divided into teams and decentralization of hierarchical levels), which can act as a homogenous team quickly adaptable to new, unconventional and inventive in everything does; this team can exploit opportunities that the market offers, it becomes increasingly more efficient.

Sun Tzu's opinion is nothing harder than the art of maneuvering to confuse the opponent (it provides false information, it intoxicates the opponent's spies so

on). Sun Tzu also recommends the use of trusted allies, the local guides for the movement of troops in the field; therefore admissible any "tools" for correct assessment of the situation and attack at the right time of day (morning markets are more active, quiet lunch so on), "Patience is a quality difficult to achieve for many businessmen and investors", says Dean Lundell.

### • Flexibility or resorted to several types of transactions

There are no roads to be followed and armies, which may not be appealed, says Sun Tzu (an enemy found in position "from above", so on); so it is imperative for an investor to remain on the market he knows best.

A skillful General, says Sun Tzu, is flexible and carefully weighs the potential benefits and risks assumed. In business, being flexible involves accepting and miscalculations, unregistering temporarily, to allocate a sum of money on more options.

Sun Tzu shows that a general can have five dangerous flaws:

- carelessness;
- shyness;
- irritability:
- weakness;
- excessive concern over troops.

These five flaws are perfectly valid for managers and investors.

### • Stratagems or occupation of position

Simplifying various theoretical views found in textbooks, we consider as acceptable rigorously following separation (national):



Therefore we believe that actions stratagems are innovative, by novelty, "built" on the basis of information from areas/markets the related question.

Sun Tzu recommends that you do not carry the fight into a river, to camp on dry land, to avoid accidental land. In business this translates as not investing in markets calm, not a transaction midday avoid suspicious changes of price, do not underestimate the market possibilities and think constantly in view.

• The land and market knowledge from your possibilities

Sun Tzu says that there are six types of land:

- accessible;
- misleading;
- timer;
- narrow;

- bumpy;
- remote.

On the land available can easily accede both opponents the first to occupy a favorable position to win. For Business ground deceptively equates to a market where transactions are small and unpredictable price changes. On the land / market timers it is recommended waiting, the first opponent who 'moves' will lose operation.

When the markets evolves very tight between prolonged periods should remember Sun Tzu's advice about "narrow ground" (equivalent to a pass in that if you are caught, you will be destroyed forever).

There are, says Sun Tzu, six disasters that can lead to defeat a General:

- run;
- insubordination;
- collapsing;
- ruin;
- disorganization;
- confusion.

"When troops are strong and weak officers, the army is disobedient; when officers are strong, and the troops are weak, defeat is certain" – says Sun Tzu (we deduce that it is suggested a permanent balance between those who print the trend in a market, between managers and employees, between bosses and subordinates). An angry officer would throw into battle against a hasty plan devised, greed always darken clear judgment, so it is recommended to avoid desperate decisions, rigorous planning, knowing yourself and your opponent.

### • Situations or survival tactics

According to Sun Tzu, as it is offensive or defensive, there are nine countermeasures dependent nature/psychology of individuals. Decision-maker can use these steps, depending on the evolution of war / market if he can lead the army as such as the one man.

For this decision-maker must learn the tactics and stratagems possible, but especially need to understand market psychology; to use intuition, flair and to resort to flexibility for team work.

### • The collection of information

The wise General, says Sun Tzu, get exceptional results appealing to spies and any other source of information.

Therefore the real power lies in information and not a temporary position winner, reached on a market.

### References

Lionel Giles - The Art of War by Sun Tzu, 2009
Sun Tzu - The Art of War, Editura Nicol, 2013
Dean Lundell, Sun Tzu's Art of War for Traders and Investors, Published February 1997 by McGraw-Hill Companies

## The International Trade Evolution

Prof. Constantin ANGHELACHE PhD. Academy of Economic Studies, Bucharest "Artifex" University of Bucharest Prof. Gabriela Victoria ANGHELACHE PhD. Academy of Economic Studies, Bucharest Lecturer Mădălian ANGHEL PhD. "Artifex" University of Bucharest Georgeta BARDAŞU (LIXANDRU) PhD. Student Cristina SACALĂ PhD. Student Academy of Economic Studies, Bucharest

#### Abstract

This paper presents the main aspects regarding the international trade of Romania. From the point of view of the weight of the main groups of goods out of the combined Classified List, in the overall export operations for active processing, the main weights went to: clothes articles made out of knitted and crocheted, textile materials, mechanical equipments and machinery, electric apparatus for recording and reproducing sound and images, shoes and similar items, conveyance means and materials, metallurgical products.

Key words: trade, import, export, products, weight

From the point of view of the way the imports and the exports have been achieved by the three groups (defined, depending on the processing level, as after active processing, for passive processing), the structure has been as follows:

• As to export: final exports – 50.8%; exports after active processing – 48.8% and exports for passive processing – 0.4%;

• As to import: final imports – 75.2%; imports for active processing – 23% and imports after passive processing – 1.8%.

From the point of view of the weight of the main groups of goods out of the combined Classified List, in the overall export operations for active processing, the main weights went to: clothes articles made out of knitted and crocheted, textile materials, mechanical equipments and machinery, electric apparatus for recording and reproducing sound and images, shoes and similar items, conveyance means and materials, metallurgical products.

On an overall basis, we can appreciate that the foreign trade activity did develop negatively from the point of view of the volume but negatively as well as considering the two components, import and export. The decrease of the exports and imports has been stimulated also by the slight appreciation of the national currency. On this ground, the positive element of the appreciation (volatility)of leu implies a negative effect on the exports. Many of the exporters either tempered their activities, or recorded modest gains to the best, if not pure losses.

Along with the effects of the economic and financial crisis, another element which generated a slower rhythm of evolution of the exports and imports, consists of the fact that the process of privatization and restructuring involved the closing-up of a number of companies or autonomous State supervised administrations, as well as of the fact that the quality of the manufactured products was not in the position to meet the foreign customers requirements.

In the structure by countries, the biggest deficits have been recorded with Hungary, China, Kazakhstan, Austria, Germany, Russian Federation, contrary to 2008, when the hierarchy of the countries of the biggest deficits for Romania included Germany, Russian Federation, Kazakhstan, Austria and China.

However, to note the diminishing of the deficit with Germany, by about 37%, due to the increase of the cars export, which generated the transformation of the significant deficit in 2011.

Meantime, the deficit with the Russian Federation has been reduced as a result of the decrease recorded by the import of natural gas and crude oil from this country in 2009, 2010, 2011 and 2012.

The deficit recorded with China increased as a consequence of the imports increases for telephone devices for the mobile telephony and other kind of networks, this country holding presently the second place within the hierarchy of the countries of the highest deficits for Romania.

To note also the decrease of the surplus recorded with Bulgaria as a result of the diminishing of the exports of mineral oil products to this country.

*Positive sold* have been recorded mainly with: Serbia, Norway, Republic of Moldova, Egypt, United Arab Emirates, Lebanon, Georgia, Iraq, United Kingdom, Syrian Arab Republic.

The biggest weight in 2012 is held by the textiles, the exports of textiles after active processing representing 37.5% of the total exports and about 61% of the total exports of textiles. The exports of clothing articles and accessories, other than the knitted or crocheted one, processed in lohn system are holding the biggest weight in the frame of the textiles group.

As regards the exports and the imports achieved by the EU member states during the period 2007-2013, there are at least three common characteristics to be stated out.

The first characteristic consists of the fact that the evolution of exports and imports recorded during 2012 as comparatively with 2011, leave apart some small exceptions such as Ireland, Malta, Finland and United Kingdom for exports, respectively Estonia, Ireland, Latvia and Malta for imports, has marked positive trends although, of course, differing from country to country. The second characteristic is given by the fact that for both export and import, all the countries have recorded negative developments which, I'd say, evidenced a given particularity implied by an increased magnitude, close to 15 and almost 30%, even over this value in the import case, such as for instance, Romania, Bulgaria, Estonia, Latvia, Lithuania, respectively Finland.

At last, the third characteristic is marked by the fact that the outrun of the exports decrease by the imports diminishing led implicitly to the decrease of the trade deficit.

The evolution of the trade deficit of the EU member states is showing in a suggestive way a decrease of the deficit in 2012 for 16 countries including Romania as well, ordered at the left side of the demarcation line.

Thus, we are meeting two hypostasis: those countries which increased their trade deficit in 2012 as comparatively with the year 2009: Ireland, Belgium, Denmark, Czech Republic and Hungary and countries where the surplus recorded in 2009 is maintained in 2011 as well, although at a relatively lower level. This is the case of Germany, Holland, Sweden and Finland.

With a diminishing deficit of almost 14%, Romania is joining the countries having recorded the biggest deficit reductions.

Within the structure by countries, the largest deficits in 2012 have been recorded with Hungary, China, Kazakhstan, Germany, Austria, Russian Federation, contrary to the year 2010 when the hierarchy of the countries with which Romania recorded the biggest trade deficits included countries such as Germany, Russian Federation, Hungary, Kazakhstan, China and Austria.

The diminishing of the deficit with Germany is also noticeable, being due to the increase of the exports of cars and auto-vehicles for goods transportation.

Meantime, the deficit with the Russian Federation has been reduced, as a consequence of the diminished imports of gas and crude oil from this country in 2012 as against the year 2011. In fact, the total imports of gas and crude oil of Romania have been significantly reduced in 2011 and 2012.

The global economic crisis showed itself critically in the foreign trade field, each month in 2012 recording decreases of the Romanian export as comparatively with the corresponding months of the year 2009, which confirmed the tendencies occurring previously, starting with 2008.

As to the importers, out of about 68340 importers, 1110 importers (recording annual imports of over 5 million euro) are covering almost 70% of the imports volume of the year 2013.

To note that the weight of the exports and imports of agro-alimentary products (including beverage and tobacco) in the total exports, respectively imports, has decreased during the first six months of 2013 by about 0.9% in the exports case and by about 2.0% in the case of imports.

The main commercial partners from the European Union for the exports of agro-alimentary products, beverage and tobacco are the following: Italy (2% of the total export of agro-alimentary products, beverage and tobacco), Bulgaria (11%), Hungary (8%), Greece, Germany, Spain and Holland (with 5% each).

The exits of agro-alimentary products towards the European Union countries held a value weight of about 72% while the entries of agro-alimentary products from the European Union countries held a weight of over 25%.

In the case of the imports of agro-alimentary products imports, beverage and tobacco the main commercial partners from the European Union are the following: Hungary (18% of the total imports of agro-alimentary products, beverage and tobacco), Germany (12%), Bulgaria (8%), Holland (7%), Italy and Poland (with 6% each).

When analyzing the structure by partner countries for Romania exports and imports, according to the situation being available at the level of 2012, it can be easily stated out that the biggest weights as for the export are held by: Germany, holding a weight of about 18.6% (the top of the products being exported to this country comprising plug sets for sparking plugs, wires, cables, conductors, auto parts and accessories, cars, ships); Italy (over 12.8%, foot-ware, cigarettes, phones, clothing, cars); France (7.5%, cars, auto parts and accessories, plug sets for sparking plugs, phones, cables, conductors, tires, bearings, furniture); Turkey (6.2%, raw iron residues, iron and steel, rolled plates, oil products, phones, cars, tires, pumps, refined sun-flower oils, mobile phones devices, electronic components).

The biggest weight in the top of the partner countries to import is held, similar to the exports case, by: Germany with 17.1% (where from Romania is importing mainly cars, cars parts and accessories, drugs, wires, cables,) and Italy with 11.3% (leather, foot-ware parts, rolled plates, oil products, circuits), followed by Hungary, holding a weight of 8.7% of the total imports (drugs, wires, cables, mobile phone devices, electronic), France holding over 5.8% (auto-vehicles parts, drugs, turbojets, pumps, superchargers).

### References

- Anghelache, C-tin (2013). *România 2013. Starea economică sub povara efectelor crizei*, Editura Economică, București
- Anghelache, C-tin (2012). *România 2012. Starea economică în criză perpetuă,* Editura Economică, București
- Anghelache, C-tin (2011). *România 2011. Starea economică în malaxorul crizeii,* Editura Economică, București
- Anuarul statistic al României, edițiile 2002, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013
- \*\*\* Buletinul Statistic nr. 1-12/2002, 1-12/2003, 1-12/2004, 1-12/2005, 1-12/2006, 1-12/2007, 1-12/2008, 1-12/2009, 1-12/2010, 1-12/2011, 1-12/2012 şi 1-12/2013 editat de Institutul Național de Statistică

Revista Română de Statistică - Supliment nr. 1/2014

## Econometric Model Applied in the Analysis of the Correlation between Some of the Macroeconomic Variables

### Lecturer Mădălina Gabriela ANGHEL, Ph.D

"Artifex" University of Bucharest

### Abstract

This article aims to evaluate the existing relationship between the various macroeconomic variables in Romania, more precisely, between the exchange rate RON/EUR and the inflation rate as recorded for the year 2013. In order to hit this target, the macroeconomic model of regression has been utilized which revealed the fact that between the two variables subject of the analysis there is a linear and indirect connection.

**Key words**: exchange rate, inflation rate, index of the consumer goods, regression model, correlation.

### General aspects concerning the exchange rate and the inflation rate

The National Bank of Romania plays the role of creating and enforcing the exchange rate policy, the exchange rate regime of the national currency, leu, being presently one of controlled floating. The exchange rate setting up is achieved in connection with the inflation targets used as instrument of the monetary policy, thus having the possibility to regulate and adapt the strategies of this policy to the effects of the unforeseen factors which influence the national economy.

The inflation is meaning the generalized and longstanding increase of the prices for the goods within the economy, accompanied by a decrease of the purchasing power of the currency and it is measured by means of the consumer goods prices index.

The consumer goods prices index is expressing the overall evolution of the purchased goods prices and tariffs for the services used by the population during the current year as against the previous year or any other year chosen as reference year.

The annual inflation rate is representing the increase of the consumer goods prices of a month from the current year as against the same month from the previous year. It is calculated as ration in percentage expression between the index of the consumer goods prices from the corresponding month of the previous year, out of which it is deducted 100.

# The analysis of the correlation between the exchange rate RON/EUR and the inflation rate in the year 2013

In order to analyze the relation existing between the exchange rate RON/EUR and the inflation rate, we have generated a series of date with monthly frequencies as regards the values recorded by the two variables in the year 2013.

The monthly values of the consumer goods price index and inflation have been established by applying the following calculation relation:



Inflation rate = IPC – 100

The twelve terms of the series are submitted in the table below:

Table 1. Monthly values of the exchange rate RON/EUR and inflation rate recorded in the year 2013

recorded in the year 2015									
Month	Exchange rate L_EUR	IPC	Inflation rate						
January	4.3793	105.97	5.97						
February	4.3848	105.65	5.65						
March	4.3915	105.25	5.25						
April	4.3802	105.29	5.29						
May	4.3375	105.32	5.32						
June	4.4765	105.37	5.37						
July	4.4257	104.41	4.41						
August	4.4353	103.67	3.67						
September	4.4627	101.88	1.88						
October	4.4462	101.88	1.88						
November	4.4448	101.83	1.83						
December	4.4633	101.55	1.55						

In the frame of this analysis we used the average monthly exchange rate, calculated as simple arithmetical mean of the daily exchange rates.

In the first stage, for each of the two considered date series we applied statistical tests on the analyzed indicators and a separate graph has been achieved for their evolution, as follows:



▶ For the data series concerning the exchange rate evolution:

Graph 1.Evolution of the exchange rate RON/EUR in the year 2013

exchange rate	
Series: CURSL_EURM	
Sample: 1/01/2013 12/31/2013	
Observation: 12	
Mean	4.418983
Standard Error	0.012475
Median	4.4305
Mode	#N/A
Standard Deviation	0.043216
Sample Variance	0.001868
Kurtosis	-0.85838
Skewness	-0.43206
Range	0.139
Minimum	4.3375
Maximum	4.4765
Sum	53.0278
Count	12
Largest(1)	4.4765
Smallest(1)	4.3375
Confidence Level(95.0%)	0.027458

Table 2. Outcomes of the statistical tests applied on the series concerning the

> For the data series concerning the inflation rate evolution:



Graph 2. Evolution of the inflation rate in the year 2013

Series: Rata inflației	
Sample: 1/01/2013 12/31/2013	
Observation: 12	
Mean	4.005833
Standard Error	0.503218
Median	4.83
Mode	1.88
Standard Deviation	1.743197
Sample Variance	3.038736
Kurtosis	-1.75644
Skewness	-0.4824
Range	4.42
Minimum	1.55
Maximum	5.97
Sum	48.07
Count	12
Largest(1)	5.97
Smallest(1)	1.55
Confidence Level(95.0%)	1.107575

Table 3. Outcomes of the statistical tests applied of the series concerning the inflation rate

In order to identify the type of the regression model being used with the purpose to characterize the connection existing between the inflation rate evolution (as dependent variable) and the exchange rate RON/EUR evolution (as explicative variable), in the year 2013, we achieved the points formed graphic representation of the considered date series and, meantime, we traced the related regression line.



**Graph 3. Correlogram Inflation rate Exchange rate** 

The analysis of the correlation graph reveals an indirect connection, of linear type, between the inflation rate and the exchange rate RON/EUR, this one being expressed through the simple linear regression model, as follows:

Revista Română de Statistică - Supliment nr. 1/2014

### **R\_INF** = $\alpha + \beta * \text{CURSL}_\text{EURM} + \varepsilon$

where:

R\_INF = inflation rate (dependent variable);

CURSL\_EURM = exchange rate RON/EUR (explicative variable);

 $\alpha$ ,  $\beta$  = parameters of the linear regression model;

 $\varepsilon$  = residual value of the regression model.

The estimate of the econometric model of regression submitted to the analysis is achieved the least squares method.

Table 4.Estimation of	the	parameters of t	the regres	sion model
-----------------------	-----	-----------------	------------	------------

SUMMARY OUTPU	Г							
Regression Sta	itistics							
Multiple R	0.682206							
R Square	0.465405							
Adjusted R Square	0.411946							
Standard Error	1.336765							
Observations	12							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1	15.55668389	15.55668	8.705764	0.014520912			
Residual	10	17.86940777	1.786941					
Total	11	33.42609167						
(	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	.ower 95.0%	Upper 95.0%
Intercept	125.6067	41.2147169	3.047618	0.012302	33.77460137	217.4388	33.774601	217.438825
X Variable 1	-27.5178	9.326333054	-2.95055	0.014521	-48.2982059	-6.737476	-48.29821	-6.7374758

The values of the two parameters,  $\alpha$  and  $\beta$ , of the regression model are set up on the basis of the dates we obtained, as follows:

 $\alpha = 125.6067$ 

 $\beta = -27.5178$ 

The regression model characterizing the relation between the BET index and value of the stock exchange capitalization in the year 2013, is transcribed as follows:

### R\_INF = 125.6067 - 27.5178 CURSL\_EURM

The determination coefficient R-squared ( $R^2$ ) and the corrected determination coefficient Adjusted R-squared ( $R^2$  adjusted) show the weight in which the dependent variable is explained by the independent variable. Thus, in proportion of 46.54% of the inflation rate value is explained by the value of the exchange rate RON/EUR, the difference up to 1000% representing the influence of other factors not included in the present model.

The regression coefficient has a negative value (- 27.5178), which means that between the two variables there is an indirect connection.

The validity of the analyzed regression model is studied and confirmed by the values recorded by the F-statistic test (the value of 8,705 exceeds the tabled reference level) and Significance F test (almost zero), so that the model describing the relation between the inflation rate and the exchange rate RON/EUR is a correct one and the variable is a significant one from statistical point of view.

Observation	Predicted R_INF	Residuals	Standard Residuals
1	5.097832984	0.872167016	0.684291147
2	4.946484859	0.703515141	0.551969031
3	4.762115326	0.487884674	0.38278811
4	5.073066927	0.216933073	0.170202929
5	6.248078731	-0.928078731	-0.728158767
6	2.423098854	2.946901146	2.312101154
7	3.821005169	0.588994831	0.462117852
8	3.556833897	0.113166103	0.088788685
9	2.802845058	-0.922845058	-0.724052494
10	3.256889432	-1.376889432	-1.080289934
11	3.295414409	-1.465414409	-1.149745505
12	2.786334353	-1.236334353	-0.970012207

 Table 5. The forecasted values of the inflation rate for the year 2014

The table above is showing:

**RESIDUAL OUTPUT** 

• The predicted value of the inflation (Predicted R\_INF) achieved by replacing the values of the exchange rate in the estimated model;

### R INF<sub>CURSL EURM</sub> = 2135.6067 - 27.5178 · CURSL EURM;

- The value of the prediction error Residuals calculated as difference between the observed value and the predicted one;
- The standardized value of the Standard Residuals calculated through dividing the residual by the standard deviation of the residuals.

The quality of the selected model is analyzed also through the method of graphical representation:



Graph 4. Diagram independent variable - residual

Revista Română de Statistică - Supliment nr. 1/2014

When analysing the form of the points cloud we state out that there is no correlation between the independent variable CURSL\_EURM and residuals, so that we conclude that the model has been properly selected.



Graph 5. Diagram independent variable- predicted dependent variable

### Conclusions

Subsequent to the performed analysis, we can conclude that the evolution of the exchange rate RON/EUR in the year 2013 did not significantly influence the evolution of the inflation rate but, on the contrary, during the periods when an upward trend of this one (depreciation of the national currency) has been recorded, the inflation rate showed, to a large extent, a downward trend. Consequently, there is no clear correlation between the exchange rate and the inflation rate.

### References

- Anghel, M.G. (2013). *Modele de gestiune și analiză a portofoliilor*, Editura Economică, București;
- Anghel, M.G. (2010). *Utilizarea modelelor econometrice în analizele economice*, Simpozionul Științific Internațional "Necesitatea reformei economico – sociale a României în contextul crizei globale", Editura Artifex, București
- Anghel, M.G. (coautor) (2009). The hypotheses of the simple linear regression model, Metalurgia International, Vol. XIV, Special Issue no. 12
- Anghelache, C.; Gheorghe, M.; Voineagu, V. (2013). *Metode și modele de măsurare și analiză a inflației*, Editura Economică, București;
- Anghelache, C. (2013). *Elemente de econometrie teoretică*. Editura Artifex, București

<u>www.bnro.ro</u>

www.insse.ro

## Towards a Modern MENTORING

### Prof. Mircea UDRESCU PhD. Prof. Constantin CODERIE PhD

"Artifex" University of Bucharest

### Abstract

The promoters of mentoring in education try to strengthen the view of those who recognize and appreciate the role of the mentors in achieving performance. Phrases such as "I have had a good mentor" have become very frequent; mentor means a trustworthy adviser, a friend, a wise person, a guide, a teacher of reference, a close adviser etc.

The definitions of mentoring are many. Seen as a generalized process, in the sense that it can be found everywhere, in family, school, peer group and organization, we consider that mentoring is a form of manifestation of the organizational culture in which a person invests time, energy, knowledge and skills in stimulating the development of another person, due to professional obligations and mutual interests.

**Key words**: *student*, *disciple*, *teacher*, *mentor*, *mentoring*, *education*, *study*, *knowledge*, *information*.

The overall educational process is undergoing utmost turbulences, more than ever, and traditional educational methods are increasingly questioned by methods seen as modern and new; mentoring is one of them.

Traditional education is connected to the teacher, teaching goals, rigour and discipline, knowledge transferred mainly from the teacher to the student, assessment of the level of knowledge, hierarchy of students according to their marks, register, diploma, certificate etc.

The promoters of mentoring in education try to strengthen the general view of those who recognize and appreciate the role of the mentors in achieving performance. Phrases such as "I have had a good mentor", have become very frequent; mentor means a trustworthy adviser, a friend, a wise person, a guide, a teacher of reference, a close adviser etc.

The word originates from Homer's Odyssey, where we find that Odysseus, king of Ithaca, before going to the Trojan War, gave to Mentor, his best friend and a wise man, the task to manage his property and his assets, as well as the education of his son, Telemach. Consequently, Mentor started to play a major role in Telemach's education and evolution.

Great personalities of universal culture have admitted, ever since, that they had their own mentors. Socrates was Plato's mentor, Archimedes was Galileo Galilei's mentor, Hyden was Beethoven's mentor, Freud was Jung, Rodin was Brâncuşi's mentor, Peter Druker was Jim Colins's mentor, Douglas McGregor was Waren Bennis' mentor, Waren Bennis was Tom Peters' mentor. Many of today's scientists of global recognition proudly admit that they are continuators, in various fields, of what they started with their great mentors. Some entrepreneurs and famous managers explain their success in business through the role played in their lives by mentors whose advice became strong principles. This explains phrases such as " Behind a successful man, there is a wise woman, or behind a successful man, there is a successful man"; often, a person can play a major role in another person's life.

The roles of the mentor are as various as the cases where a person may enjoy another person's help. A mentor may acquire the role of best friend, adviser, supporter, objectivity-assessor, added value-assessor, umbrella, solution giver, trust inspiring person, life example, professional example, family example etc. Basically, the role of the mentor appears in educational processes – when the senior knows more than the disciple wants to accumulate, in consulting – when, under various contexts, the disciple needs clear criteria to choose, or for confirmation – when disciples needs an anchor to trust their own actions, or for models – when disciples wants to develop and they need competent and oriented training etc.

The Romanian dictionaries explain that mentor is "a spiritual leader, an educator"<sup>1</sup>.

In time, educational institutions, cultivated a certain type of personality of the mentor. Teachers were considered to be mentors of the generations they were teaching in schools. As social, economic and cultural life developed, heads of structures and managers, due to their educational mission, were also considered to be mentors. However, the teacher, the head of a structure and the manager are not considered to be mentors by definition. They are the official side of the educational action, while the capacity of a mentor suggests that the disciple confirms it. The teacher, the head of a structure and the manager became representatives of an official and collective side of a relation that aims at objectives, a harmonization of the educational behaviour, while the mentor became a synonym for individual success, as responsibility of both parties and as a competent response to the initiative of "treasure hunters". For them, the mentor has psychological and professional resources to preserve objectivity at all the three stages of the educational act: transfer of knowledge, assessment and designing of solutions for given situations. The mentor facilitates creative thinking, connects the disciples to the issues, suggests solutions according to the moment, cultivates the disciples' trust in their own forces, enjoys the others' success.

We can therefore identify two types of mentors: a formal mentor, within an institutional framework, with obligations, mission, a profession, planned, organized, coordinated and rigorously checked actions, and an informal mentor, evolving as such, with no planning, but with an extremely positive and productive emotional weight.

<sup>&</sup>lt;sup>1</sup>DEX, Dicționarul explicativ al limbii române, Academiei Publishing House, Bucharest, 1973, p.321

Following the implementation of the great scientific and technical discoveries, this new century finds mankind faced with a global economic challenge: to meet social needs in a customized manner. Customized marketing suggests that the production of consumer goods and services should take into account the expectations of each consumer, and the efforts to keep the customers are a major component of the vision of a successful entrepreneur. Similar processes take place in educational fields, where there is a increasing need to enforce individualized methods of knowledge acquisition and training of professional and life skills. Students have become demanding in their relations with their teachers, and with those entitled to consider themselves their mentor. Phrases such as: I know better how to do it, I like / I don't like the teacher's method, Don't tell me how to proceed, I 'll do it my way, I trust I am doing the right thing, Only him/her can be my professional and moral example, I want to be the master of my time etc. - cause trouble to the entire educational system. Teachers find themselves in the position to be assessed, to be accepted or rejected, and students become increasingly brave in naming the people who have a certain role in their personal becoming. In fact, students declare all that they want to learn but only what they need, through methods they agree upon and that motivate them. An increasing weight is therefore placed on the emotional side of the connection between the student and the teacher; the mentor becomes an adviser, a counselor, a wise person etc. who dedicates oneself to the disciple who has chosen him/her. Like in Homer's Odyssey, the modern mentor accepts the mission and serves the disciple, thus becoming a moral and professional example for his evolution.

Mentoring - to be chosen as a mentor and to act as a mentor - has imposed itself recently, as a sort of retro fashion, as a consequence of the recognition that a person can be some one else's mentor. The definitions of mentoring are many. It is a process that can be found everywhere, in family, school, peer group and organization. Mentoring is a manifestation of the organizational culture in which a person invests time, energy, knowledge, skills, in order to develop another person, due to professional obligations and mutual interests. If the traditional form of mentoring placed on one side a unique mentor, and on the other side, a group, a class, a team, a working group, etc., the current form of mentoring implies a disciple and several mentors, the role of the mentor can be played by anybody, successively or at the same time, by a friend, a parent, a teacher or several teachers, a colleague, a manager etc. Like in erecting a building, when the builders build the foundation, then floor by floor, the installations, then the roof, and the functionality of the building etc., the building of professional education and life education of the disciple is the outcome of a harmonious action of several mentors, who support when they are needed.

In mentoring, the mentor and the student (disciple) should have the following characteristics<sup>2</sup>:

<sup>&</sup>lt;sup>2</sup> According to Lucia Lazăr, Mentoringul, un concept vechi în haine noi, article, Manager Express, July-August 2013, p. 25-27

- **The ideal mentor**: good interpersonal abilities, objectivity, equal footing relations, flexibility, easy to prove competences, experience, non-aggressive attitude, propensity to develop initiative and independence, sincere, self-confident, objective assessment, mobilizing, trustworthy, motivated to succeed, open to accept power and risk, loyal, committed, able to develop relations, flexible and adjustable, aware of himself, well organized, able to accept challenges and to receive constructive feedback etc.
- **The ideal student**: wiling to learn and develop, intelligent, able to learn quickly, ambitious, motivated to succeed, willing to accept power and risk, loyal, committed, dutiful, able to develop relations, flexible and adjustable, self-aware, well organized, open to accept challenges and to receive a constructive feedback etc.

Consequently, the mentor, the disciple and the organization acquires new qualitative valences, in the sense that the disciple: develops his/her abilities to learn, to analyze and meditate, expands his/her professional and organizational knowledge, becomes more self- aware, more self-confident and more willing to take risks, acquires the ability to receive criticism, has the chance to learn in a more personalized manner, from recognized experience etc., the mentor: improves his/her level of awareness of his/her own gaps in learning, develops his/her ability to receive and give advice, updates his/her professional knowledge, improves his/her communicational abilities, has the chance to be appreciated and to be promoted etc., while the organization: increases the level of satisfaction and morality of its employees, expands its base of abilities and competences according to its own strategic objectives, improves services through developing everybody's competences, develops trust in competent support of the experienced ones, supports team work and efficient cooperation etc.

In the traditional educational system, the teacher transfers his/her knowledge to students; education is based on knowledge transfer, which generates motivation but also demobilizing attitude, lack of interest, rejection of the educational effort. Mentoring, without ignoring the teaching objectives, focuses on catalyzing the interest of the disciple, on supporting the disciple in achieving his/her vision of life. Mentoring implies a joint effort to shape a vision.

### References

- DEX, Dicționarul explicativ al limbii române, Academiei Publishing House, Bucharest, 1973
- Lucia Lazăr, Mentoringul un concept vechi în haine noi, article, Manager Express, Bucharest, July-August, 3013
- Maslow Abraham, Motivație și afaceri, Psihologia pentru Toți Publishing House, Bucharest, 2013
- Mircea Herivan, Educația la timpul viitor, Albatros Publishing House, Bucharest, 1976

## Aspects Regarding the Multiple Regression Used in Macro-economic Analysis

Prof. Constantin ANGHELACHE PhD.

Academy of Economic Studies, Bucharest "Artifex" University of Bucharest Assoc. prof. Alexandru MANOLE PhD. "Artifex" University of Bucharest Ligia PRODAN PhD. Student Andreea Gabriela BALTAC PhD. Student Zoica DINCĂ (NICOLA) PhD. Student Academy of Economic Studies, Bucharest

### Abstract

The regression function serves as a basis for carrying out the numerous analyzes micro or macroeconomic indicators. Information obtained by use of the model simple linear regression are not always sufficient to characterize changes in an economic phenomenon and, in particular, to identify possible future evolution of the latter. To remedy these shortcomings, in the literature had been entered into multiple regression models in which the dependent variable is defined on the basis of two or more variables factor incomes shall be described.

**Key words**: multiple linear regression, GDP, analysis, economics, macroeconomics.

The economic situation in which correlations involves only two variables are very rare. Rather we have a situation where a dependent variable, *Y*, can depend on a whole series of variables factorial or regressor. In practice, there are correlations of the form:

 $Y = \beta_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + ... + \beta_k X_k + \varepsilon$ where values  $X_j$  (j = 2, 3, ..., n) represents the variable factor or regressors, the values  $\beta_j$  (j = 1, 2, 3, ..., k) are the regression parameters, and  $\varepsilon$  is the residual factor. Residual factor reflects the random nature of human response and any other factors, others than  $X_j$ , which might influence the variable Y.

We adopted the usual notation, respectively assigned to the first factor notation  $X_2$ , the second notation  $X_3$  and so on. Sometimes it is convenient that the parameter  $\beta$  to be considered that coefficient of one variable  $X_1$  whose value is always equal to unity. Then the relationship is rewritten as:  $Y = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + ... + \beta_k X_k + \varepsilon$ 

Revista Română de Statistică - Supliment nr. 1/2014

In the case of regression with two variables (E( $\varepsilon$ ) = 0), then, substituting, for given values of the variables *X*, we get:  $E(X) = \beta + \beta X + \beta X + \beta X + \beta X$ 

 $E(Y) = \beta_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots + \beta_k X_k$ 

The relationship is multiple regression equation. For now, conventional, we consider that it is the linear form. Unlike the case of two-variable regression, we cannot represent this equation in a two-dimensional diagram.  $\beta_J$  are regression parameters. Sometimes, they are also called regression coefficients.  $\beta_I$  is a constant (intercept) and  $\beta_2$ ,  $\beta_3$  and so on, are the regression slope parameters.

 $\beta_4$  measuring the effects of E(*Y*) produced by changing one unit of  $X_4$ , considering that all other factor variables remain constant.  $\beta_2$  measures the effects on E(*Y*) produced by changing one unit of  $X_2$ , considering that all other variables remain constant factor. As the population regression equation is unknown, it has to be estimated based on data sample. Suppose that we have available a sample of *n* observations, each observation containing the dependent variable values for both *Y* and for each factorial variables *X*. We write the values for observation *i* as:

 $Y_i, X_{2i}, X_{3i}, X_{4i}, \dots, X_{ki}$ 

For example,  $X_{37}$  is the value of  $X_3$  in the 7th observation and  $X_{24}$  is the value  $X_2$  taken in the 4th observation. For a similar manner,  $Y_6$  is the variable Y in the observation of 6 and so on.

Given that it is assumed that the sample data were generated by the correlation of the population, each observation have to involve a set of values satisfy the multiple equation regression.

We can write the equation:

 $Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + \dots + \beta_k X_{ki} + \varepsilon_i$  for all the values,

where  $\varepsilon_i$  represents the residual value for the observation of the i.

We can rewrite the relationship in a simple matrix form, as follows:  $\mathbf{Y} = \mathbf{X}\mathbf{\beta} + \mathbf{\epsilon}$ , where

X is a matrix the form of  $n \times k$  with k column of values and then all sample values of the k - 1, X variables.

Thus, the fourth column of X, for example, contains the values of  $X_4$  of the sample n, the seventh column contains the values of  $X_7$  and so on.  $\beta$  is a vector of k x 1 column containing the parameters  $\beta_j$  and  $\varepsilon$  is an vector of n x 1 column containing the residual values.

The effective values of Y will not coincide with the expected values of Y and, in the case of two-variable regression, the differences between them are known as residual values.

Like  $Y_i = Y_i + e_i$  for all values of *i* 

where  $e_i$  is the residual corresponding to the observations of *i*.

The relationship can be written as:

 $Y_i = \hat{\beta}_1 + \hat{\beta}_2 X_{2i} + \hat{\beta}_3 X_{3i} + \ldots + \hat{\beta}_{ki} X_{ki} + e_i$ , for all values of *i* or on matrix form:

 $Y = X \beta + e$ , where **X** and **Y** are already defined

There are two issues to be retained on the residual values.

First, regardless of the method used to estimate the regression equation, we get such residual values - one for each of the sample observations. Second, as  $\hat{\rho}$ 

expected  $\beta_{j}$  when it becomes known and can be used to calculate them. Now, we

need to calculate the differential with the vector  $\beta$  and equalizer to zero the result. Such of this matrix lead to the following relation:

$$\frac{\partial S}{\hat{\beta}} = -2X'Y + 2X'X\hat{\beta} = 0$$

The above equation is a set of k equations that can be written as:

 $X'X \beta = X'Y$ 

### The average number of employees, on the activities of the national economy

Year	Agriculture, forestry and fishing	Industry, including energy	Constructions	Trade, repair of motor vehicles and motorcycles; transport and storage; Hotels and restaurants; Information and communications	Financial intermediation and insurance; Real estate transactions	Other service activities <sup>1</sup>	Total labour force
1000	7(2)	2046	704	1407	120	000	0154
1990	762	3846	/04	1427	429	988	8150
1991	/08	3043	486	1344	338	1055	7574
1992	654	3245	459	1200	308	1022	6888
1993	648	3017	536	1152	294	1025	6672
1994	575	2856	515	1160	289	1043	6438
1995	503	2615	443	1291	262	1046	6160
1996	442	2586	431	1191	254	1035	5939
1997	357	2443	387	1193	218	999	5597
1998	316	2272	378	1188	240	975	5369
1999	244	1991	309	1044	236	937	4761
2000	199	1873	316	1022	248	965	4623
2001	191	1901	309	1010	249	959	4619
2002	162	1891	300	986	277	952	4568
2003	155	1848	325	1013	288	962	4591
2004	145	1741	323	1006	297	957	4469
2005	147	1672	348	1086	317	989	4559
2006	136	1632	352	1159	371	1017	4667
2007	127	1615	406	1241	422	1074	4885
2008	105	1606	458	1373	139	1365	5046
2009	110	1371	404	1330	136	1423	4774
2010	95	1237	337	1224	128	1355	4376
2011	98	1259	334	1227	126	1305	4349
2012	104	1296	356	1246	121	1320	4443

Source: Statistical Yearbook, the AVERAGE NUMBER of employees, on the ACTIVITIES of the NATIONAL ECONOMY

Agriculture, forestry and fisheries in the period 1990-1999, a reduction in the number of employees. So if in 1990 were in this branch employees, 762 in

1996 were 442 employees, and in 1999 it was at 244 employees. The period between the years 2000-2012 is characterized by a significant drop in the number of employees, especially in 2010 when there were 95 employees in 2011 and their number was 98. In 2012 we notice a slight increase in the number of employees, 104.

In the field of industry and energy, we are also to a reduction in the number of employees, which in 1990 were 3846, and in 2012 the number fell to 1296. We find, as in the previous fall in veriginoasă branch of the number of employees since 2000.

Constructions, constitutes another branch of national economy which has been confronted also with the reduction from one year to another in the number of employees, with major discrepancies between 1990 and 2002, whereas the number of employees was reduced to more than half, from 704 to a total of 300. After an increase in the number of employees in 2007-2009, starting in 2010 their number starts again to fall, and in 2012 begins to increase timidly.

Trade, repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants; information and communication constitutes a series of activities of the national economy which have recorded a large number of employees in the period 1990-1999, and after 2000 we are witnessing a decline in them. In 2002 shall be inregistraza the smallest number of employees of the analysis period, concerned 986 employees.

Financial Intermediation and insurance; real estate constitutes a branch of national economy who knows fluctuations increasing and decreasing, and at the level of 2007 total number of employees was 422, very close to the total number of employees at the level of 1990, concerned 429.

Other service activities (professional activities, Scientific and technical knowledge; service activities and administrative support services activities; public administration and defense; social security from the public system; education; health and social work; activities of performances, Cultural and recreational; repair of household products and other services) represents a branch with dramatic changes to the number of employees. Thus, in the period 1991 to 1995 shall number of employees is increasing, and during the period 1996-2005, we are witnessing a reduction in their number. Starting with 2006, the number of employees begins to increase, the year with the highest number of employees in 2009.

In the case of total employment in the period 1990-2012 we are witnessing permanent fluctuations from one year to another marked by up and down movements in the number of employees. The largest dicrepanta we can observe between 1990, when the total number of employees in 8156 and 2011, the total number of employees has reached 4349, thus reducing by about half their number. An extremely important factor of drastically reducing the number of employees highlighted in the year 2011 is the impact economic-financial crisis on employment.

The equation model for multiple linear regression will show in the following way:  $Y=a_0+a_1X_1+a_2X_2+a_3X_3+a_4X_4+a_5X_5+a_6X_6+\mathcal{E}$ 

where :

### Y – Total labour force;

 $a_0,a_1,a_2, a_3,a_4,a_5,a_6$  – the regression model parameters;

 $\varepsilon$  - variable, interpreted as error (disturbance, measurement error).

Thus, the regression model can be cited under this equation maths: **Total labour force** =  $a_0+a_1BRANCH_1+a_2BRANCH_2+a_3BRANCH_3+$  $+a_4BRACNH_4+a_5BRANCH_5+a_6BRANCH_6+ \varepsilon$ 

The regression model features Dependent Variable: TOTAL\_FORTA\_MUNCA Method: Least Squares Date: 02/17/14 Time: 21:15 Sample: 1990 2012 Included observations: 23

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RAMURA 1	1.000000	1.11E-13	9.01E+12	0.0000
RAMURA 2	1.000000	3.79E-14	2.64E+13	0.0000
RAMURA_3	1.000000	1.16E-13	8.60E+12	0.0000
RAMURA_4	1.000000	8.16E-14	1.22E+13	0.0000
RAMURA_5	1.000000	9.12E-14	1.10E+13	0.0000
RAMURA_6	1.000000	9.02E-14	1.11E+13	0.0000
с —	3.14E-10	8.72E-11	3.604705	0.0024
R-squared	1.000000	Mean depend	lent var	5370.565
Adjusted R-squared	1.000000	S.D. depende	nt var	1108.866
S.E. of regression	1.88E-11	Akaike info cri	iterion	-46.31476
Sum squared resid	5.63E-21	Schwarz crite	rion	-45.96918
Log likelihood	539.6198	Hannan-Quin	n criter.	-46.22785
F-statistic	1.28E+28	Durbin-Watso	on stat	1.044600
Prob(F-statistic)	0.000000			

For an pertinent analyze of the correlation between the three macroeconomic indicators presented in the table above, it is necessary in a first step of this research to identify a number of features aiming the evolution of each indicator considered in the period under review. To prove this, using the software Eviews 7.2, we studied in the first stage, the evolution of the three indicators. As can be seen from analyzing the data series under investigation, especially as in the figure shown above, in the period considered, the three of our country's macroeconomic indicators have registered a steady growth from year to year,

Revista Română de Statistică - Supliment nr. 1/2014

except to this rule making 2000 and 2009 when there was a decrease of the three indicators.

The purpose of multiple regression (term used by Pearson, 1908) is to highlight the relationship between a dependent variable (explained endogenous effect) and a lot of independent variables (explanatory factors, exogenous predictors).

Multiple linear regression model equation will look like this:

 $Y = b_0 + b_1 X_1 + b_2 X_2 + \varepsilon$ 

in which:

Y - Gross Domestic Product- GDP;

X<sub>1</sub> - Final Consumption- CF;

X<sub>2</sub> -Net investments- INV;

 $b_0, b_1, b_2$  - parameters of the regression model;

 $\varepsilon$  is a variable, interpreted as error (disturbance, measurement error).

The regression model may be rewrite under the following mathematical equation:  $PIB = b_0 + b_1 CF + b_2 INV + \varepsilon$ 



Evolution of GDP, final consumption and net investment in Romania in the period 1998 - 2011

To estimate the regression model parameters we used the software Eiews 7.2 in which we defined an equation that has as outcome variables GDP, and factor variables the final consumption and net investments. We also thought that this

regression model will also include free term c, which is expected to influence dimming terms that were not taken into account when we building this model. Estimation method defined in the program is the method of *least square*.

Based on the above, using Eiews 7.2 we obtained the following results:

<b>=</b> E	😑 Equation: UNTITLED Workfile: REGRESIE MULTI::Untitled\ 🛛 💶 🗙										
View	Proc	Object	Print	Name	Freeze	Estimat	te	Forecast	Stats	Reside	;]
Dep Meth Date Sam Inclu	Dependent Variable: PIB Method: Least Squares Date: 04/15/13 Time: 21:35 Sample: 1998 2011 Included observations: 14										
	Va	riable		Coef	ficient	Std. E	Erro	or t-s	Statisti	ic	Prob.
		CF INV C		1.16 0.28 -892	35488 34958 7.569	0.099731 11.68637 0.478308 0.595763 12641.63 -0.706204		0.099731 11.68637 0.478308 0.595763 12641.63 -0.706204		7 ( 3 ( 4 (	0.0000 0.5634 0.4947
R-so Adju S.E. Sum Log F-st Prot	quared isted F of reg n squa likelih atistic p(F-sta	d R-squar ression red res ood atistic)	red 1 id	0.98 0.98 193 4.10 -156 490 0.00	88909 36892 10.85 0E+09 .3349 .3848 00000	Mean dependent var S.D. dependent var Akaike info criterion Schwarz criterion Hannan-Quinn criter. Durbin-Watson stat			34 16 22 22 22 0.4	7095.7 8668.9 76213 89907 74945 98544	

Characteristics of the regression model

From the above, multiple regression model describing the relationship between the three macroeconomic indicators that are are the subject of previously determined may be given in the form of equation as follows: PIB = -8.927,569 + 1,165488 CF + 0,284958 INV

Thus, we can say that an increasing with a monetary unit of final consumption (with its two component - private consumption and public consumption) will lead to an increase of 1.165488 units monetary of gross domestic product value. In case of the net investment, the difference is more significant, we can see that every leu invested brings an increase of only 0.284958 lei of the level of gross domestic product. This situation corresponds with the reality economics of Romania because in the last twenty years the Romanian economy was based almost exclusively on stimulating consumption and less on promotion of an investment policy correctly.

The influence of the free term as a picture of the factors that were not included in the analysis model is one significant. In fact, it can be said, that the factors that were not included in the econometric model of analysis, they have an significant decrease in the value of gross domestic product.

The probability for this model to be correct is very high - about 98.89%, this conclusion can be formulated on the basis of statistical tests R-squared (0.988909) and Adjusted R-squared (0.986892).

Also the validity of the regression model is confirmed by the F test value statistically superior value table level that is considered to be the benchmark in the analysis of the validity of econometric models and by the value of the test Prob (F - statistic) that it is zero.

Based on observations made on the analysis of Romania's GDP, using multiple regression model, we conclude that the value of this indicator is significantly influenced by the variation of final consumption and net investment less variation.

Using a multifactorial regression model allows to obtain more edifying results in macroeconomic analysis and conducting relevant research on the evolution of the national economy.

### References

Anghelache, C. și alții (2012) – "Elements of theoretical and applied econometrics", by Artifex Publishing House, București;

Bardsen, G., Nymagen, R., Jansen, E. (2005) – "The econometrics of Macroeconomic Modelling", Oxford University Press;

Benjamin, C., Herrard A., Hanee-Bigot, M., Tavere, C. (2010) – "Forecasting with an Econometric Model", Springer;

Gourieoux, C., Jasiak, J. (2001) – "Financial econometrics: problems, models and methods", Princeton University Press, Princeton

## A Study on the Relationship between Fiscal Pressure and the Business Confidence Index

Prof. Georgeta VINTILĂ PhD. Bucharest University of Economic Studies Ioana Laura ȚIBULCĂ PhD. Bucharest University of Economic Studies

### Abstract

In the current economic context, taxation impacts all aspects of the business environment. Using the business confidence index as an estimation of the expected evolution of the manufacturing sector and fiscal pressure as the result of taxation of companies, this study analyses the relationship between the two variables. Our conclusions are based on data collected from the OECD member states, analysed using regression estimation. The results of our research reveal the influence of taxation on business confidence.

**Key words:** *business confidence, fiscal pressure, taxation* **JEL codes:** *H20, H32, G38, F30* 

### **Introduction and Literature Review**

Taxation had an undeniable impact on our day to day life. If this statement holds true for people, it is equally true for companies. However it is much more difficult to pinpoint the influence taxation has on the business environment. The current study is our attempt to analyse the relationship between the business confidence index and fiscal pressure.

The business confidence index is calculated by the OECD based on the answers managers of companies give to questions that are part of business confidence surveys. The goal is to see what the managers believe is the current state of their company and what their expectations are for the future. The fiscal pressure we analyzed is only related to the companies. Thus we have considered corporate tax revenues, taxes on production and sales, social contributions paid by the employer and customs and import duties.

Business confidence has also been an issue of great interest amongst researchers. Jacobs (1988) and Quinn (1989) both studied business confidence models and class power. And recently, Darling (1955) published a study on measuring business confidence using the relationship between corporate dividends and earnings as a surrogate. The mentioned author also did a statistical analysis of the covariation between business confidence and stock market prices. The idea was further developed recently. Collins (2001) used the Granger Causality to analyse the relationship between business confidence surveys and stock market performance. His conclusion was that business confidence surveys are not a predictor of stock market performance, but that stock market performance is a predictor of business confidence surveys. Other authors have focused on business confidence indexes in a specific country (Ece, Turknur & Ece, 2005; Carnazza & Parigi, 2003; Kershoff, 2000), while other authors have reserched business confidence in a broader context. Ng, Y.K. (1992) tried to answer the question of whether a collpse in business confidence could lead to economic depression, using nonperfect competition as a background. More recently, business confidence has been linked with the impact of possible political, economic and legislation changes on the foreign direct investment intentions of major companies around the world (Kearney, 2005).

Our study aims to analyse the relationship between taxation and business confidence indexes. We will first analyse data from the OECD as an aggregate zone and estimate regression models with the business confidence index as a dependent variable. The current study is also a continuation adn expansion of previous research published by the authors regarding this issue (Vintilă & Țibulcă, 2013).

### **Research Methodology**

One of the main variables used in our study is the Business Confidence Index (BCI). It is one of the indicators calculated by the OECD and included in its Main Economic Indicators publication. The BCI is a standardised set of business tendency time series, calculated according to a standardised methodology published by the OECD. One of the benefits of this standardised confidence indicator is that it makes data comparable across countries and also facilitates the calculation of geographical zone aggregate confidence indicators which was not previously possible.

The standardised method of calculating BCI is based on business survey data, collected by each country and then converted to a specific number of points, according to each answer given by the members of the target group. The number of points attributed to the BCI as a result of this procedure is usually compared to a value of 100 points. The business tendency surveys on which the BCI is based on, are also called business opinion or business climate surveys, and their main purpose is to ask company managers questions about the current situation of their business and about their plans and expectations for the near future<sup>1</sup>.

The standardised BCI represents only the manufacturing sector. Other sectors (construction, retail trade and services) were not included since data availability is scarce among Non European Union OECD member countries. In order of preference the following types of business survey data have been used to calculate the standardised indicators by country: the harmonized industrial confidence indicator, business confidence indicators (national definition), business situation or business sentiment indicators.<sup>2</sup>

<sup>&</sup>lt;sup>1</sup> According to the OECD's *Business Tendency Surveys: A Handbook*, published by the Statistics Directorate, Paris, 2003

<sup>&</sup>lt;sup>2</sup> According to Introducing OECD Standardised Business and Consumer Confidence Indicators and Zone Aggregates, Main Economic Indicators, OECD, December 2006
The BCI is calculated on a monthly basis for a few of the individual member states of the OECD, such as Germany, Japan, the United States and the United Kingdom, but also for the European Union and for the OECD member states (as aggregate zones). In our research we have used the BCI calculated for the entire OECD and we have converted the monthly data to annual data using a simple average

The other main variable used is our study is the fiscal pressure, which we have considered to be the revenues obtained form a certain type of tax, measured as percentage of the GDP. Consequently, we have considered more than one kind of fiscal pressure: the corporate fiscal pressure (CT) is the corporate tax revenue as percentage of GDP, the employer's fiscal pressure (SC) is the revenue collected from social contributions paid by employers as percentage of GDP, the sales and production fiscal pressure (PST) is the revenue obtained from taxes on production, sales, transfers as percentage of GDP, the custom duties fiscal pressure (CID) is the revenue collected from customs and import duties as percentage of GDP. All of these variables were used as annual data calculated for the OECD as an aggregate zone.

Our study focuses on the OECD as an aggregate zone. We have tried to estimate regressions using Eviews in order to establish if there is a direct relationship between the fiscal pressure and the business confidence index. The first regression estimated is a simple regression, with one independent variable (CT) and one dependent variable (BCI). The second regression is a multiple one, with the same explained variable (BCI) and four explanatory variables (CT, SC, PST and CID).

#### **Research Results**

As previously mentioned, the results refer to the OECD member states as an aggregate zone. Our aim was to see if there is a direct relationship between the business confidence index and the fiscal pressure that a company faces as a result of the corporate taxes it pays. Therefore, the first regression we estimated was a simple regression:

$$BCI = \alpha_1 + \alpha_2^* CT + \varepsilon$$

In the results presented in Table no.1, both the  $R^2$  coefficient with a value of 0.162612 and the adjusted  $R^2$  coefficient with a value of 0.126204, reach relatively low values which are not quite adequate to say that the regression model is an acceptable one. Approximately 16% of the variation of the business confidence index is explained through the model.

Table no.1 – Eviews output for simple regression

Dependent Variable: BCI Method: Least Squares Date: 02/08/13 Time: 21:08 Sample (adjusted): 1985 2009

Revista Română de Statistică - Supliment nr. 1/2014

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C CT	-0.002403 0.102759	0.003278 0.048623	-0.733200 2.113378	0.4708 0.0456
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood Durbin-Watson stat	0.162612 0.126204 0.016280 0.006096 68.51361 2.576257	Mean depende S.D. depende Akaike info ci Schwarz crite F-statistic Prob(F-statist	dent var ent var riterion erion tic)	-0.001608 0.017416 -5.321089 -5.223579 4.466365 0.045627

Included observations: 25 after adjustments

The t-statistic test for coefficient  $\alpha_1$  shows the fact that this coefficient is not different from 0, as the null hypothesis of the test cannot be rejected. The result suggests that the model does not need a free coefficient. The same t-statistic test for the other coefficient shows that it is statistically significant. The null hypothesis for the test which says that all the coefficients are equal to 0 is rejected. The f-statistic has a value of F=4.466365, reveals as true the H<sub>1</sub> hypothesis ( $\alpha_2$ <>0). The p-value, of 0.045627, shows the very low risk that the rejection of the null hypothesis (H<sub>0</sub>:  $\alpha_2$ =0) could be a wrong decision.

However, we cannot overlook the fact that the regression model is not adequate. This could be corrected by the introduction of further explanatory variables. The results for the second regression we estimated are presented below. This is a multiple regression:

 $BCI = \alpha_1 + \alpha_2^* CT + \alpha_3^* SC + \alpha_4^* PST + \alpha_5^* CID + \varepsilon$ 

The value of  $R^2$  has improved, which means that up to 41% of the variation of the business confidence index is explained by the evolution of the independent variables. Strictly statistically speaking, it is still not a high enough value to consider the model adequate. But form a economist's point of view, taking into account the staggering number of variables that influence the business confidence index, to say that almost 40% can be explained by the changes in the different types of taxes, is a very high number. The conclusion is that the influence of taxation on the business confidence index in the OECD member states is strong.

Table no.2 – Eviews output for multiple regression

Dependent Variable: BCI Method: Least Squares Date: 02/08/13 Time: 21:10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000624	0.003628	-0.172093	0.8651
CT	0.083366	0.044780	1.861682	0.0774
SC	-0.292932	0.111347	-2.630794	0.0160
PST	0.356042	0.216579	1.643933	0.1158
CID	0.000398	0.029507	0.013495	0.9894
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood Durbin-Watson stat	0.410102 0.292123 0.014653 0.004294 72.89284 2.597283	Mean depende S.D. depende Akaike info cr Schwarz crite F-statistic Prob(F-statisti	dent var ent var riterion erion tic)	-0.001608 0.017416 -5.431427 -5.187652 3.476048 0.026027

Sample (adjusted): 1985 2009 Included observations: 25 after adjustments

The free coefficient  $\alpha_1$  should still be removed from the model, as it is not statistically significant. The other coefficients are statistically different from 0, as shown by the F-statistic value and the associated probability. The only exception is the last coefficient, which according to the t-statistic test is not significant statistically, which also means that the last variable could be excluded from the model.

Given the value of the estimated coefficients, we may conclude that the influence of the taxes on sales and production is greater than that of the corporate taxes as far as the business confidence index is concerned. One surprising result is the positive value of the coefficients preceding the corporate fiscal pressure and the pressure due to taxes on production and sales. These results suggest that an increase in corporate taxes or in taxes on sales and production, would lead to an increase in business confidence. Economically speaking, such a result is difficult to justify.

Given the value of  $R^2$ , the positive values of some of the estimated coefficients and the low number of observations used, it is difficult to say with certainty what the impact of taxation is on the business confidence index. Therefore, further development of our research methods is necessary if we want to establish whether the relationship between the two variables is one of causality.

#### Conclusions

The current study confirms the findings of other studies in the available literature, as well as our own expectations in regard to the business confidence

index and the possible use of corporate fiscal pressure to predict or anticipate the evolution of business confidence.

Our study has leaded us to conclude that there is a definite relationship between the business confidence index and fiscal pressure, in its many forms. The level of corporate taxes, the amount paid by the employer as social contributions, as well as the taxes on production and services, all influence the business confidence index for the OECD member states. The same conclusion is not accurate for the customs and import duties, as their influence on the business confidence index has proven to be negligible. Therefore, any change in the taxation of companies will be reflected in the expectations of the managers regarding the business environment and the evolution of their own company.

#### References

- Carnazza, P. and Parigi, G. (2003). Tentative business confidence indicators for the Italian economy. *Journal of Forecasting*, 22(8), 587-602.
- Collins, D. (2001). The Relationship between Business Confidence Surveys and Stock Market Performance. *Investment Analysts Journal*, 54, 9-17.
- Darling, P.G. (1955). A Surrogative Measure of Business Confidence and Its Relation to Stock Prices. *The Journal of Finance*, 10, 442–458.
- Ece, D., Turknur H., and Ece O. (2005) Building up a Real Sector Business Confidence Index for Turkey. *Central Bank of the Republic of Turkey, Research and Monetary Policy Department.*
- Heye, C. (1993). Labour Market Tightness and Business Confidence: An International Comparison. *Politics & Society*, 21, 169-193.
- Jacobs, D. (1988). Corporate Economic Power and the State: A Longitudinal Assessment of Two Explanations, *American Journal of Sociology*, 93(4), 852-881.
- Kearney, A.T. (2005). FDI Confidence Index 2005. Global Business Policy Council, Brussels.
- Kershoff, G. (2000). Measuring Business and Consumer Confidence in South Africa. *BER, Stellenbosh*.
- Ng, Y.K. (1992). Business confidence and depression prevention: A mesoeconomic perspective. *American Economic Review*, 82(2), 365-71.
- OECD (2003). Business Tendency Surveys: A Handbook. Statistics Directorate, Paris
- OECD (2006). Introducing OECD Standardised Business and Consumer Confidence Indicators and Zone Aggregates. Main Economic Indicators
- Quinn, D.P. (1989). Corporate Taxation and Corporate Economic Power: Testing Class-Power and Business-Confidence Models. *American Journal of Sociology*, 94 (6), 1419-1426.
- Vintilă, G. and Țibulcă, I.L. (2013). The Impact of Tax Pressure on Companies' Performance Case Study: OECD Europe Zone. *Romanian Statistical Review*.

## Development Issues on the EU Internal Market

#### Assoc. prof. Ioana Nely MILITARU PhD.

Academy of Economic Studies

#### Abstract

The internal market should be seen as a process, evolution, starting from the common market established by the Treaty establishing the European Coal and Steel Community (1952, which established the coal and steel market) respectively Treaty establishing the European Economic Community and the Treaty establishing European Atomic Energy Community (1958, which established a European common market generalized to the entire economy and atomic energy). Each subsequent treaty founding treaties of the European Communities helped to eliminate trade barriers between Member States in order to increase economic prosperity and contribute to, ever closer union among the peoples of Europe.

**Keywords**: internal market, common market freedoms, charges having equivalent effect, customs union, common customs tariff, quantitative restrictions.

### 1. Treaty establishing the European Coal and Steel Community

 $\Phi$  Concept , common market , was noted by Robert Schuman declaration of 9 May 1950 which led to the creation of the ECSC in 1952<sup>3</sup> .

ECSC Treaty<sup>4</sup> establishing the first international organization - based on supranational principles - the common market for coal and steel and expansions to develop the economy, increase employment and raise living standards in the Community (ECSC). The market was designed in order to streamline the distribution of high-level production to ensure stability and employment.

Common market for coal and steel opened on February 10, 1953 and May 1, 1953 steel.

 $\Phi$ The meeting in Messina the 6 foreign ministers from 20 May 1955, in a memorandum Benelux proposes the creation of a common market with a range of economic activity more broadly than coal and steel covering nuclear energy transport, finance etc<sup>5</sup>.

In 1956 (April) shall meet in Brussels a preparatory committee, chaired by PH Spaak, the Belgian Minister of Foreign Affairs at the time, which has two

<sup>4</sup> In art. 100.

<sup>&</sup>lt;sup>3</sup> TCECO was signed on 18 April 1951 and entered into force in 1952.

<sup>&</sup>lt;sup>5</sup> See Brânduşa Stefanescu, the Court of Justice of the European Communities, Scientific and Encyclopedic Publishing House, Bucharest, 1979, Bucharest, p 23.

main projects, one on a general common market and the other on an atomic  $\operatorname{energy}^6$  community .

#### 2. Treaty establishing the European Economic Community

The two projects are materializing as the treaties that were established in 1957 - the signature - with effect from January 1, 1958 the European Economic Community and the Economic Community of Atomic Energy<sup>7</sup> (also known as the Treaties of Rome, after the place of signature).

Article 2 CEECs, provide both the Community mission and the means by which this can be achieved as follows:

- Mission is to promote throughout the Community a harmonious development of economic activities, sustainable and balanced growth, increased stability, an accelerated increase the standard of living and closer relations between the countries to which they meet;

- The means of achieving these objectives: establishing a common market and proximity gradually turning the economic policies of the Member States.

Article 3 of the CEECs further states that Community action to achieve the objectives set out in art. 2 on mainly two means.

 $\Phi$  way for the establishment of a common market Community action is geared towards :

- abolition, as between Member States of customs duties and quantitative restrictions on entry and exit of goods and of all other measures having equivalent effect (Art. 3 lit. A);

-Establishment of a common customs tariff and a common commercial policy in relation to third countries ( Art. 3 lit. B )  $\,$ 

- abolition, as between Member States, of obstacles to the free movement of persons, services and capital (art .3 c) - establishment of a system to prevent distortion of competition within the common market (art. 3 lit. f);

- Approximation of the laws to the extent required for the functioning of the common market (Art. 3 lit. H).

**Common Market** is designed according TCEE geographical space that is based on:

**1.** free movement of goods, persons ( employees and self-employed persons exercising a legal entity), services, capital; Common Market was set to establish (according to art . 8 CEECs ) over a transitional period of 12 years<sup>8</sup>, divided into three stages of four years each. For each stage, the Treaty has established a set of actions to be undertaken and carried out simultaneously. Each stage have been awarded a number of actions to be taken and followed. Subject to

<sup>&</sup>lt;sup>6</sup> These projects have been approved by the Intergovernmental Conference in Venice in May 1959.

<sup>&</sup>lt;sup>7</sup> See Dragos Marian Radulescu European Union - from tradition to fundamental rights. The affirmation of the fundamental human right to a healthy environment, ProUniversitaria Publishing House, Bucharest, 2012, page 39 et seq.

<sup>&</sup>lt;sup>8</sup> The transitional period of 12 years, from 1958 -1970.

the exceptions and exemptions provided for CEECs transition period is the deadline for entry into force of all the rules laid down for implementation of all achievements involved the establishment of the common market (Article 8 paragraph 7 CEECs).

**2. customs union**. Customs Union covers all trade in goods and which shall involve the prohibition between Member States of customs duties on imports and exports and of all charges having equivalent effect, and the adoption of a common customs tariff in their relations with third countries (Art. 9 CEECs).

Term objective of establishing the common market has not been reached, while the objective concerning the **customs union** was achieved on 1 July 1968 (18 months before the end of the transition period proposed by TCE) as follows :

- customs duties were eliminated within the Community ;
- was established a common customs tariff applicable to goods from countries outside the EEC ;
- were removed quantitative restrictions ( quotas ) on trade between Member States of the Community .

Overseas countries and territories associated with the common market and customs union , in order to increase trade and to continue joint efforts of economic and social development .

**3. Free competition**. Common Market was founded on the principle of free competition CEECs provides that are incompatible with the common market and prohibited all agreements between undertakings, decisions by associations of undertakings and concerted practices which may affect trade between Member States and which have as their object or effect the prevention, restriction or distortion of competition within the internal market (art. 85 CEECs).

To close gradually turning the economic policies of the Member States of the Community action is also directed towards the **development of common policies**:

- Establishing a common commercial policy in relation to third countries (Art. 3 lit. B);

- Adoption of a common agricultural policy (Article 3 lit. D);

- Adoption of a common transport policy (Article 3 lit. 's);

- Implementation of procedures to coordinate the economic policies of the Member States and to prevent imbalances in their balances of payments ( art. 3 letter . G);

3. White Paper, Internal Market, 1985 Single European Act (A.U.E.)

The concept of the internal market, was first mentioned by the European Commission which published in 1985, "White Paper on the Internal Market<sup>9</sup>". Document has stated that the objective of the contents of the internal market to

<sup>&</sup>lt;sup>9</sup> At the initiative of the incumbent President Jacques Delors. For details on the period 1970 - 1985 (year of publication of the White Paper to achieve the Internal Market) View: Design, Fit for the Internal Market - preparing entrepreneurs for accession to the EU, EU Internal Market http://www.piatainterna.ccina.ro / Docs / PiataInterna / GhidPiataInterna.pdf, 7.

meet until December 31, 1992 , by bringing together national markets into - a single market without borders $^{10}$ .

**The Single European Act** signed in 1986, entered into force on July 1, 1987 was adopted on the basis of the White Paper on completing the internal market . According to the White Paper, SEA in art . 13 provides that the internal market to be introduced gradually over a period (7 years) ending 31 December 1992<sup>11</sup>.

SEA objective was to finalize the internal market, by means of directives adopted 310 to approximate the laws of Member States<sup>12</sup>, this market comprising an area without internal frontiers in which the free movement of goods, persons, services and capital is ensured in under the Treaty (art. EUA).

The SEA is found three categories of measures, on the frontiers, physical, technical and fiscal outlined in the "White Paper on completing the internal market "<sup>13</sup>

#### 4. Treaty of Maastricht

On 1 January 1993 White Paper set out the program of completing the internal market of the European Commission appreciated that was met Communities activity focusing on development<sup>14</sup>.

In this regard, the Treaty of Maastricht ( entered into force on November 1, 1993 ) the provisions on the **free movement of goods, persons , services and capital**, which were the subject of Part Two of CEECs entitled, Community Foundations, **were included in Part** III - **policies on Community**, TEC ( named after TMs ), namely: agricultural policy (Title II ), visa policy , asylum , immigration and other policies related to free movement of persons (Title IV ) transport policy (Title V), competition policy (Title VI), economic and monetary policy (Title VII), the common commercial policy (Title IX) , social policy, education , vocational training and youth (Title XI ) policy on culture ( Title XII ) health policy (Title XIII) , consumer policy (Title XIII) , industry policy (Title XVI) , economic and social cohesion (Title XVII ) policy on research and development (Title XVIII) , policy environment (Title XIX) , development cooperation (Title XX).

Community objectives referred to in art . 2 TEC is done so by **establishing** a common market and an economic and monetary<sup>15</sup> union and the common policies and activities.

 $<sup>^{10}</sup>$  White Paper identified 300 obstacles to the single market and for each one legislative measure to / remove it, Ibid, p 9.

<sup>&</sup>lt;sup>11</sup> During 1986 - 1992, numbered 12 Member States of the European Communities.

<sup>&</sup>lt;sup>12</sup> See, infra, p 23.

<sup>&</sup>lt;sup>13</sup> Idem.

<sup>&</sup>lt;sup>14</sup> See Manual of European Affairs, European Institute of Romania, 2005, p 65.

<sup>&</sup>lt;sup>15</sup> Community mission is to promote throughout the Community a harmonious , balanced and sustainable development of economic activities, a high level of employment and of social protection , equality between men and women, sustainable non-inflationary growth , a high degree of convergence of performance economical, a high level of protection and improvement of the

**Common Market is not defined**<sup>16</sup>, but the economy of the EC Treaty, namely the art . 3 specifying the means of achieving these objectives, it follows that the common market is achieved by the Community by including in its area of **activity both domestic market and common policies**<sup>17</sup>.

**Common market** is therefore broader than **domestic**, the latter being only the next stage of integration into a **single market**, designed to operate as a **national market**. In this regard, the Community's work<sup>18</sup> is geared to ensure :

- The prohibition between Member States of customs duties and quantitative restrictions on imports and exports of goods and of all other measures having equivalent effect (Art. 3 lit. ECT);

- Establishment of the internal market characterized by the abolition , as between Member States, of obstacles to the free movement of goods, persons , services and capital (Article 3 lit. C TCE ) ;

- Measures concerning the entry and movement of persons in accordance with the provisions of Title IV TEC on , Visas , asylum , immigration and other policies related to free movement of persons (Art. 3 lit. D TCE );

- A system that provides non-distortion of competition in the internal market ( Art. 3 lit. G TCE ) ;

- Approximation of national laws to the extent required for the functioning of a common market ( Art. 3 lit. H TCE ) .

Domestic market, according to TMS, TCE is characterized as geographic area without internal frontiers comprising the Member States in which the free movement of goods, persons, services and capital, eliminating any border controls between Member States. Market must operate under the same conditions as a national market.

- Europe without borders , however, was not born on 1 January 1993, but is the result of a long process<sup>19</sup> that began with the founding Treaties of the Communities , a process that , in the context of development of the internal market concerns continue .
- In this respect the priority task for the institutions EC, later EU to adopt legislation on the internal market already established.

<sup>18</sup> Article 3 TEC

environment , the raising of living standards and quality of life , economic and social cohesion and solidarity among Member States (Article 2 TEC) . <sup>16</sup> Common market concept has been defined in the literature as a single geographical area ,

<sup>&</sup>lt;sup>10</sup> Common market concept has been defined in the literature as a single geographical area , substituted diversity of national geographical areas that merging and applying rules econiei market (see , J. Boulouis , Droit des Communautés institutionnel auropeeennes 4 ed , avec references L Union européenne sur lived , Paris, Montchrestien , 1993, p 56 , quoted by Roxana Munteanu , op. cit. p. 44 ) . Cruceru Popescu Anca Sorina , " Economic and legal competitive economy " , Economic Publishing House , 2006, pp. 10 ff.

<sup>&</sup>lt;sup>17</sup> The policies set out in art . 3 TCE are common commercial policy , the common agricultural and fisheries, a common transport policy , a social policy that includes a European Social Fund , an environmental policy , etc. .

<sup>&</sup>lt;sup>19</sup> See Jose Echkenazi Guide EU Niculescu Publishing House, 2008, Bucharest, p 80 ff.

- The Decision no. 93/72 Commission was constituted an advisory committee for the coordination of the internal market. It can be found on all the practical issues relating to the internal market<sup>20</sup>.
- The Council also adopted Regulation no. 2679/98 on the internal market which have established rules relating to the free movement of goods between Member States<sup>21</sup>.
- According to the Regulation, the internal market comprises an area without internal frontiers in which the free movement of goods guaranteed . Within that Member States must refrain from any action or behavior that may constitute a barrier to trade and, on the other hand, to take all necessary and proportionate measures to facilitate the free movement of goods in their territory<sup>22</sup>.

Article 1 section 1 of the Regulation expressly states that obstacle, the free movement of goods between Member States and which is attributable to a Member State, whether or not involving action or inaction on its part, which could be a violation Articles 30-36 of the EC Treaty, now 36-42 TFEU and

(a) leads to serious disruption of the free movement of goods preventing, delaying or diverting or otherwise physically import them into a Member State, the export of a Member State or transport in a Member State:

(b) causes serious losses to persons harmed;

(c) requires immediate action to prevent the continuation, expansion or intensification of the disruption or loss in question ; term " inaction " includes where the competent authorities of a Member State, in the presence of an obstacle caused by actions by private individuals, not taking all necessary and proportionate measures within their power to eliminate the obstacle and ensuring the free movement of goods within their territory (Article 1 section 2 Regulation).

### 5. Treaty on the Functioning of the EU (Lisbon Treaty)

The domestic market is regulated by the TFEU in Title I of Part III - a, , internal policies and action of the Union, Article 26, which states, internal market comprises an area without internal frontiers in which the free movement of goods, persons, services and capital is ensured in accordance with the Treaties,

In order to achieve the objectives set out in art . 26 TFEU, the Commission may propose appropriate provisions since the establishment of the internal market between Member States' economies are differences in their development. Provisions of the Commission may take the form of derogations, they must however be temporary and disturb as little functioning of the common market (Art. 27 para. 2TFUE).

<sup>&</sup>lt;sup>20</sup> See Official Journal of the European Communities, no. 26/93 of 03. 02. 1993.

<sup>&</sup>lt;sup>21</sup> Regulation (EC) NO. 26/79/98 of 7 December 1998 on the functioning of the internal market in relation to the free movement of goods between Member States, OJEC L 337/8 13 December 1998. <sup>22</sup> See Cruceru Popescu Anca Sorina, "competitive economy in the European Union" Artifex Publishing House, Bucharest, 2008, pp. 5 ff.

Components of the internal market, according Treaties are the free movement of goods, services, persons and capital.

#### Conclusions

The internal market is an area without internal frontiers in which the free movement of goods, persons, services and capital. Currently the internal market issue was resumed by the EU institutions with the communication strategy, Europe 2020, the Commission report, a new strategy for the single market - the economy and of European society, the Communication, Act single Market. One area of progress of the internal market is currently the Digital Single Market . This creates conditions to stimulate the economy through commerce. Digital Single Market highlights new opportunities for current business practices to be consistent with the opportunities created by information and communication technologies .

#### References

- Brânduşa Stefanescu, the Court of Justice of the European Communities, Scientific and Encyclopedic Publishing House, Bucharest, 1979, Bucharest, p 23.
- Dragos Marian Radulescu European Union from tradition to fundamental rights . The affirmation of the fundamental human right to a healthy environment, ProUniversitaria Publishing House, Bucharest, 2012.
- Handbook of European Affairs, European Institute of Romania, Bcuresti, 2005. April . J. Boulouis, Droit des Communautés institutionnel auropeeennes 4 ed, avec references L Union européenne sur lived, Paris, Montchrestien, 1993.

Jose Echkenazi Guide EU Niculescu Publishing House, Bucharest, 2008.

Roxana Munteanu, European Law, Oscar Print, Bucharest, 1996.

- Cruceru Popescu Anca Sorina, " competitive economy in the European Union " Artifex Publishing, 2008.
- Cruceru Popescu Anca Sorina, " Economic and legal competitive economy ", Economic Publishing House, 2006.

http://www.piatainterna.ccina.ro/Docs/PiataInterna/GhidPiataInterna.pdf

## Model based on Linear Regression Function

**Prof. Constantin ANGHELACHE PhD.** 

Academy of Economic Studies, Bucharest "Artifex" University of Bucharest Prof. Radu Titus MARINESCU PhD. Assoc. prof. Emanuela IONESCU PhD. "Artifex" University of Bucharest Ligia PRODAN PhD. Student Alexandru URSACHE PhD. Student Academy of Economic Studies, Bucharest

#### Abstract

Linear regression model involves the identification of variables for defining specification for variable and model residuals; the context in which the regression model is used. Analysis of chronological (time) using a temporal function which, in essence, is also a regression, with a variable time (t). The purpose of using the regression model is to obtain the parameters that correspond to the set of variable dependency analysis, formulated between variables, where the series of data are recorded in the statistical units of the population for a period or a moment, and for highlighting the dependence between the variables within a specified time-frame.

Key words: regression, dependency, estimation, method, variable

In the theoretical analysis, dependency of variables is stochastic. Consideration of the residual variable within such a model is needed. Other factors that influence the score variable are grouped in the residual.

Uni-factorial nonlinear models are linearized transformations that are applied to the variables, the regression model. So, for example, a model of the form turns into a linear model by logarithm of the two terms of the above equality, resulting in linear function.

This model is recommended when the points are located, that the cloud of points around a line.

Sometimes, for estimating parameters using other techniques of estimation, which cannot be incremental transformations, linear estimation of parameters is made by numerical methods. Linear regression model is based on the series of data for the two features. They are represented by vectors x (the variable factor) and y (variable score).

This requires completion of the methods used for the estimation of the two parameters; specify the methods to be used for testing the properties of the estimators of regression model and setting the framework for the use of the regression model in making predictions.

In defining the function of linear regression are considered, most commonly, four hypotheses:

- data series are not affected by the errors.
- for each fixed value of the characteristic factorial, residual variable is zero, i.e. on average:

 $E\left[\varepsilon_{i}|X=x_{i}\right]=0$ 

for all i,

- the lack of correlation between residues expressed that the terms do not exhibit the phenomenon of covariance, which means the variable correlation hypothesis
- residuals with the independent, which means that

 $\operatorname{cov}(X, \varepsilon_j) = 0$ 

for any j, showing an increase in the value of the variable factorial does not automatically lead to an increase of the values of the variable.

On the basis of the four assumptions define the linear regression model through the function:  $y_i = b + a \cdot x_i + \varepsilon_i$ , i = 1,...,n

Linear regression model involves the identification of variables for defining specification for variable and model residuals; the context in which the regression model is used. Analysis of chronological (time) using a temporal function which, in essence, is also a regression, with a variable time (t).

The purpose of using the regression model is to obtain the parameters that correspond to the set of variable dependency analysis, formulated between variables, where the series of data are recorded in the statistical units of the population for a period or a moment, and for highlighting the dependence between the variables within a specified time-frame. In the theoretical analysis, dependency of variables is stochastic. Consideration of the residual variable within such a model is needed. Other factors that influence the score variable are grouped in the residual.

Uni-factorial nonlinear models are linearized transformations that are applied to the variables, the regression model. So, for example, a model of the form turns into a linear model by logarithm the two terms of the above equality, resulting in linear function.

This model is recommended when the points are located, that the cloud of points around a line.

Sometimes, for estimating parameters using other techniques of estimation, which cannot be incremental transformations, linear estimation of parameters is made by numerical methods.

Linear regression model is based on the series of data for the two features. They are represented by vectors x (the variable factor) and y (variable score).

# • The regression model used in the analysis of the correlation between GDP and labor resorces

Simple regression aim is to highlight the relationship between a dependent variable explained (endogeneous, score) and an independent variable (explanatory note, exogenous factor predictors).

To be able to build a linear regression model we defined labor resorces as the independent variable, while the gross domestic product was considered to be a dependent variable.

To determine the parameters of the linear regression model we have considered a variety of data on the evolution of the macroeconomic indicators of outcomes in the period 1990-2012.

		-milio
Year	Agriculture,	Total
	forestry and	production
	fisheries	
	BRANCH 1	
	Х	У
1990	18.7	79.1
1991	41.6	206.4
1992	114.8	606.9
1993	420.6	1906.5
1994	989.8	4700.1
1995	1426.9	6746.9
1996	2094.9	10197.1
1997	4553.3	23036.5
1998	5377.3	33711.2
1999	7280.5	48888.2
2000	8901.5	71990.9
2001	15617.9	106082.2
2002	17289.3	136922.3
2003	22847.5	166602.3
2004	31055.0	220931.3
2005	24291.8	244676.8
2006	26861.9	289695.6
2007	23992.2	350845.6
2008	34126.4	458535.5
2009	32297.8	450979.1
2010	29874.2	466397.0
2011	36341.6	487733.2
2012	28638.1	512112.2

**Correlation analysis of TOTAL PRODUCTION and BRANCH 1** 

Revista Română de Statistică - Supliment nr. 1/2014

From the analysis of correlation between total production and the first branch, namely agriculture, forestry and fisheries, have cost and then unearthed graphic that during the analysis period from 1990 to 2012 as the value of agriculture, forestry and fisheries is stronger. For this, from 2001 onwards and until the year 2012 the correlation between the two factors is significant, and the relationship of interdependence between those two factors.

Developments in the field of agriculture, forestry and fisheries in Romania in the period 1990 to 2012



Graphical representation of the total production in Romania during 1990-2012 is as follows:



Statistic tests regarding BRANCH 1 of Romania during 1990-2012



Statistics tests upon the value of total\_production of Romania between 1990-2012 are plotted:



Corelation BRANCH 1 – TOTAL PRODUCTION is represented:



Characteristics of regression model are:

Dependent Variable: TOTAL\_PRODUCTIE Method: Least Squares Date: 02/17/14 Time: 14:05 Sample: 1990 2012 Included observations: 23

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RAMURA 1	13.28463	1.107328	11,99701	0.0000
c _	-26747.84	22322.92	-1.198223	0.2442
R-squared	0.872672	Mean dependent var		177981.9
Adjusted R-squared	0.866609	S.D. depende	ent var	188967.1
S.E. of regression	69016.07	Akaike info cr	iterion	25.20501
Sum squared resid	1.00E+11	Schwarz crite	rion	25.30375
Log likelihood	-287.8576	Hannan-Quin	in criter.	25.22984
F-statistic	143.9282	Durbin-Watso	on stat	0.549909
Prob(F-statistic)	0.000000			

#### References

- Benjamin, C.; Herrard, N.; Houée-Bigot, M.,; Tavéra, C. (2012) "Forecasting with an Econometric Model", Springer Press
- Anghelache, C. (2008) ,, *Treaty of theoretical and economic statistics*", Publishing House Economics, Bucharest
- Anghelache, C.; Anghelache, G. (2009) Utilization of the chronological series within the Stochastic processes, Metalurgia International Vol. XIV, nr. 4, Science Publishing House F.M.R.
- Anghelache, G.V.; Anghelache, C.; Mitruţ, C.; Bădulescu, M.C.; Mariţescu, M. (2009) – "Decomposition of time series dynamic aspects", National Scientific Symposium "Octav Onicescu", Romanian Statistical Review-March Supplement
- Codirlaşu, A.; Chidesciuc, N.Al. (2008) " Banking finance. Applied econometrics with Eviews 5.1. -Lecture notes", www.dofin.ase.ro
- Dougherty, Ch. (2007) "Introduction to Econometrics", Oxford University Press
- Sima, I.A. (2007) "Stochastic valuation models and financial time-series features", International Conference "Financial and monetary policies in the European Union, Academy of Economic Studies of Bucharest, Department of Finance

Andrei, T.Bourbonnais, R. (2003) - "Econometrics", Economic Publishing House

# GDP and Foreign Investments Evolution

Prof. Constantin MITRUȚ PhD. Adina Mihaela DINU PhD. Student Ligia PRODAN PhD. Student Bogdan DRAGOMIR PhD. Student

Academy of Economic Studies, Bucharest

#### Abstract

In this paper, we analyze the main results regarding evolution of the national economy in recent years. This period is characterized by sinuous development of economy under the impact of several events with major influence on social-economic development.

The results of most synthetic development of the national economy is the gross domestic product. GDP and GDP/capita it shall be indicators that give substance in relation to the country's economic development in a given period. Gross domestic product is an indicator that describes the results achieved by the economic activity at the level of a country. The conclusions arising from this article have important significance both to the general evolution of GDP and FDI as well as economic factors, political or social, both external and internal.

Key words: GDP, evolution, analysis, investments, economics.

As from the III quarter 2008, the seasonally adjusted Gross Domestic Product recorded a constant decrease from one to another quarter. The biggest decrease has been recorded during the I quarter 2009 as against the IV quarter 2008 (-4.1%).then, the GDP evolution, seasonally adjusted on the number of working days, constantly until 4<sup>th</sup> quarter, 2010.

It can be stated out that the biggest decrease has been recorded during the II quarter of 2010 while the smallest one occurred during the fourth quarter. The same positive rhythm was also observed in 2011. During Quarter IV, 2011 and Quarter I, 2012, GDP decreases were recorded again. During the third and fourth quarters of 2012, and also during the first and second trimesters of 2012, GDP increased in a slow rhythm.

In connection with the other European Union member countries, Romania recorded for the IV quarter 2010 as against the previous quarter, an economic decrease while a significant number of countries have recorded increases (Belgium, Denmark, France, Lithuania, Austria, Poland, Slovenia, Great Britain), or recorded decreases bellow 0.5%. Meantime, the overall GDP of the EU increased by 0.1%.

Comparatively with the IV quarter 2008, in 2009, 2010, 2011 and 2012, the EU member countries have recorded reduced volumes of the GDP, the biggest ones being recorded Latvia (-17.9%) and Lithuania (-13.2%), followed by Romania (-6.9%), Slovenia (-5.8%) and Hungary (-5.3%). The overall decrease at the EU level counted

for -2.3%. In 2009, it has maintained an accelerated decrease rhythm. In 2010, fourth quarter and 2011, some recovery, but uncertain, due to the crisis within the Euro union. In 2012, the unconvincing evolution of GDP continues, and in 2013 the first signs that show the beginning of a growth have occurred, a growth that is to manifest in the following period too.

Significant contributions to the negative evolution of the GDP during 2010, 2011 and 2012 comparatively with 2009 are given by the constructions, which recorded a decrease as well as by the section trade, cars and households appliances repair, hotels and restaurants, transports and telecommunications recording a decrease. The other branches have recorded small decreases of activity volumes.

The previously mentioned branches had the highest negative impact on the GDP volume decrease during the period 2009- 2012 comparatively to 2008, as they have recorded decreases.

As far as the utilization is concerned, the highest impact on the GDP decrease during the period 2009- 2012 comparatively with 2008, went to the gross forming of fix capital, the individual consumption of the population households, the collective consumption of the public administrations.

The increase of the exports of goods and services had a positive impact.

According to the seasonally adjusted data, the gross forming of fix capital had the biggest negative contribution. These reductions have been partially compensated by the increase of the volume of the exports of goods and services, and the collective consumption of the public administration.

Based of a comparison between the GDP structure by categories of utilizations in Romania as against the EU, there is a superior weight of the gross forming of fix capital and a lower weight of the exports of goods and services in Romania comparatively with the European Union.

#### • GDP by ownership forms

Out of the performed analysis, it results that for the period 2009-2012, for which there are provisional data, the private sector contributed with 72.4%-75.4% to the GDP forming. The weight of the private sector, still low, has been generated mainly by the gross added value in the agriculture. Such an influence is a normal one if to consider that the agriculture has to face negative natural conditions.

If comparing the weight of the private sector in the GDP achievement with the figures recorded for the previous periods, we find out that this weight is superior to all the periods being analyzed as from the year 2000, even as from the year 1990, up to date.

In 2010-2012, for which we are actually performing a complete analysis, we find that the weight of the private sector in the gross added value increased as for the constructions field.

What is really important is the fact that the weight of the private sector in the achievement of the gross added value by branches of the national economy and, eventually, to the GDP forming, kept on maintaining at a high level.

It is obvious that the privatization of other administrations or extending the privatization at the level of branches already privatized will have the targeted effect.

Here we have to underline the fact that such an analysis is not always pertinent since there will be and remain sectors of activity absolutely important for the national economy for which the state must keep its attributes of sole owner.

#### • Direct foreign investments

Under the circumstances, according to the data provided by the NBR, it is resulting that in 2010 the total value of the direct foreign investment in Romania reached the level of 3,914 and for 2011<sup>1</sup>, it had the value of 3,329,432.4 thousand euro, in 2012 it was 2,856,416.6 thousand euro and recorded a value of 1,066,398.4 thousand euro for the first seven months of 2013.

						- 1111110
Indicator	2008	2009	2010	2011	2012	2013*)
Total	9496	3488	2220	1920	1204	2315
Capital share	4873	1729	1824	1817	916	1805
Intra-group			396	594	288	510
credits	4623	1759				

The value of the foreign direct investment flows

<u>- millio</u>n euro-

**Data source**: National Bank of Romania

<sup>\*)</sup> Provisional data, on six months

In the year 2010, 1,824 million euro of the direct foreign investment has been placed in the sector of "participations to capital" and 396 million euro represented intra-group credits.





<sup>\*)</sup> semi-definitive data, <sup>\*\*)</sup> revised data, <sup>\*\*\*)</sup> provisional data, 30.06.2013 **Data source**: National Bank of Romania.

<sup>&</sup>lt;sup>1</sup> Anghelache, C-tin, Manole, Al., Prodan, L., Dincă, Z., Baltac, A. The decline of Capital Investments in Romania, Romanian Statistical Review, 2013/Trim.III.

Meantime, by the end of 2010, the direct investment of the Romanian residents abroad counted for 1,675 million euro, this being the contribution evaluated by the documentary system available in the country. The year 2012 reveals a situation hard to figure. The foreign direct investment counted for 1,240 million euro only. Out of this amount, 69.3% have represented capital shares and 30.7% intra-group credits.

#### References

- Anghelache, C-tin, Manole, Al., Prodan, L., Dincă, Z., Baltac, A. The decline of Capital Investments in Romania, Romanian Statistical Review, 2013/Trim.III.
- Anghelache, C-tin (2012). "România 2012. Economic Status in perpetual crisis", Economic Publishing House, Bucharest, Romania.
- Anghelache, C-tin, Manole, A. (2012). "Correlation between GDP direct investments–An econometric approach", Metalurgia Internațional, Nr. 8/2012, pp. 96-98, categorie ISI.
- Anghelache, C-tin, Anghelache, G.V. (2012). "GDP and the final consumption of Romania. Evolution and correlation in the last decades", Metalurgia Internațional, Nr. 8/2012, pp. 158-160, categorie ISI.
- Benjamin, C., Herrard A., Hanee-Bigot, M., Tavere, C. (2010) "Forecasting with an Econometric Model", Springer
- Anghelache, C-tin, Cucu, V. (2012). "Model for the analysis of GDP", Metalurgia International, Nr. 5/2012, pp. 182-185, categorie ISI
- \*\*\* The Romanian statistical yearbook, editions 2002, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012

# Logistics, Management and Efficiency

Prof. Mircea UDRESCU PhD. "Artifex" University of Bucharest Sandu CUTURELA, PhD. Student National Defense University

#### Abstract

The problem related to the efficiency of the management for organization is general being the concern off all managers. In the present essay we consider that the efficacy of the organization begins from the structural systemization of the organizational management into general management, management of logistics and management of production which demands a new managerial process, more competitive based on economic efficiency.

**Key words:** *logistics, management, efficiency, manager, marketing, integration.* 

#### I. Logistics, management and efficiency: correlative definitions

This is out of question that the concepts of management, logistics and efficiency are more and more utilized both in the current speaking and in the works which content is treating such problems.

If considering the most general approach, the management of any organization is perceived as an integrated assemble of activities of forecasting, organizing, drawing the personnel and the financial and material resources, as well as of controlling-adjusting, typical to the leading sub-system, activities through which the targets are set up and achieved under competitively conditions. Therefore, the management is responsible for the company profitableness and for the general quality of the social life since the crucial moment of the managerial processes is given by the managerial decision [1], which is to be found out within all the consecrated functions of the management. Thus, the prediction is closing up with the decision concerning the targets and the action directions, the organizing process is closing up with the decisions consecrating the structural and procedural of the company, the coordination is closing up with decisions regarding the harmonization of the personnel and the labour, the drawing process is closing up with decisions concerning the personnel motivation while the control-adjustment process is closing up with correcting decisions, meant to lead to the targets achievement. All the management functions, mainly the managerial decisions substantiation, are based on the managerial information and communication, the information quality influencing the quality of the decisions and, implicitly, the professionalism of the managerial process.

Along with the management, the daily mass-media are applying, more and more frequently, to expressions such as: company logistics, public administration logistics, hospitals logistics, didactic logistics, order forces logistics, delinquent's logistics, military logistics highways logistics, airports logistics etc. All these syntagma are entitling us to accept an already accomplished fact, namely: logistics is a notion of a more and more larger utilisation suggesting something common to many social activities with a certain meaning. Although we are not aiming to submit the evolution of the concept of logistics in time, in order to try an explanation of its present meaning, we shall point out only a few of its definitions, which will help us to sustain those methodological approaches which are correlating the management, logistics and economic efficiency as an unitary whole. Thus, about four decades ago, the Romanian university environment considered by logistics, a complex of activities, including the products handling, transportation, selection, and storage, the establishment of the commercial assortment, the preparation and execution of the orders, having as goal the physical displacement of the product from the producer to the end user with the lowest costs involved by the distribution process"[2]

Starting from the very essence content of the logistics in the marketing field, respectively securing the physical displacement of the product from the producer to the end user, with the lowest costs involved by the distribution process, some of the theoreticians try to impose the concept of industrial logistics, which suggests the optimum sizing of the material flows and the connected operations, taking into account both the decisional, of command, optimum and the physical instrumentation optimum – storage, sorting, handling, transportation etc.

Consequently, logistics is more and more perceived as a since of future, which will have as object of study the optimum sizing and correlation of the information and goods flows in order to secure the permanent accommodation of the organization to the frame conditions of the market economy. Subsequently, logistics is concerning more and more the decisional aspects of the de management, while the scientific set up of the very moment when a product must be in every point of the productive and distribution chain is substantiating the image of the modern logistics. For many of us, the forthcoming period will ....benchmark the ascension to a large extent of the logistics, as it is considered by the specialists an essential condition of the competitiveness under the present economic relations ... an instrument of managerial nature, a technology of synthesis, coordinating the tasks of the supplying, fabrication, industrial administration, post-sale conscription stages. The basic rule of logistics implies the principle according which the local optimums sum is not equal with the global optimum. From this point of view, the logistics specialist appears as the orchestraman or as the chief of a general staff ...."[3].

John Gattorna, considered as a world authority in the logistics domain, believes that it is a mistake to associate logistics with the finite products distribution, namely with the last stage of the production, only. This point of view is ignoring the role played by the logistics in respect of the management of the internal flows of raw materials, sub-ensembles, licenses, parts and packing. This flow is accompanied by the flow of information in both directions, which is representing the operating frame of the logistics function and this is why the logistics manager is considered as being the only one person of the company charged with the management of all the information and materials flows, starting from the product design up to its consumption, taking into account the interactions between these flows, which gives the logistics specialist to possibility to estimate the company capacity to meet the expectations [4].

Nowadays, many of the above submitted theories are already representing a reality. Some organizations have already scheduled in their organogram logistics functions or compartments and more and more of them are considering logistics as a managerial function in charge with the synchronization product, place, time, with the aim to reach an overall optimization of the activities which maintain the company in the competition environment. Similar to the terms management and logistics, the notion of efficiency has also the tendency of being daily much utilized. It is suggesting the wish that the ratio between the useful effect, the labour outcome, and the connected expenses, namely the effort paid in order to get it, is most favourable. To the extent the effect achieved per the expense unit is bigger or, vice versa, to the extent the expense involved by getting a certain useful effect is smaller, the efficiency is higher, which makes the organization lining up with high efficiency parameters. The efficiency is representing a universal form of valuating the funds expense by any organization, their outcomes being indissolubly connected to certain particular efforts, in this context being placed also the organization management on which the level of the efficiency indicators depends.

### II. Logistics- between the management and the company functions

About one hundred years ago, the French Henry Fayol showed that any enterprises is carrying on production, commercial, financial, accounting, security and administrative activities, the last ones having the role to forecast, organize, command, coordinate and control[5], and here we have the first theoretical ordination of the company (organization) functions and of its management functions.

Nowadays, it is considered that the management is putting in movement a series of homogenous activities which get materialized in the functions of the modern company [6], namely: the research-development function, the production function, the commercial function, financial-accounting function and human resources function. Considering the organization management as a structured process, the fact that all the management functions are found again in each of the organization functions is thus sustained. Thus, in the production function we find out: the managerial function of prediction which is projecting the quantitative and qualitative targets concerning the production and the allocation of the required human, material and financial resources; the organizing function through the production and labour algorithmically process; the coordination function through the efforts concentration and expressing the co-motivational elements aiming the

achievement of the production targets; the control function through surveying the correlative aspects between the planned targets and the achieved ones; the regulation function through setting up steps meant to lead to the production achievement by preventing any of contradictions etc. As a result, the management process is conceived in a vertical vision, from the bottom to the top, in the sense that the management functions: predicting, organizing, coordinating, drawing, controlling-accommodating, give a contour to the management process so that this one is generating the organization (research-development, production, commercial, financial-accounting and human resources), on which basis the goals of the organization are set up.

An adequate understanding of the logistics philosophy, respectively the optimization of the information and materials flows both upstream of the production process, during its execution, as well as downstream, during the distribution and the maintenance of the products in consummation, gives us the possibility to sustain the necessity to revise the functions of the company, organization, by taking into consideration two functions, namely: logistics function and production function. The logistics function of any organization secures the technical and material basis for supporting the production and maintaining the viability of the organization, as socio-professional entity, the logistics manager being directly subordinated to the general manager and responsible for the optimization of the information and materials flows which bring to the production achievement, in the condition of the competition environment. At its turn, the production function has as final goal the very reason of existing of the organization, respectively, to produce goods and services according to the quality requirements as set up by the consumers. Under these circumstances, the management process has a vertical expression, from the bottom to the top, out of which we clearly observe the responsibilities as to setting up the general targets as well as to defining the organization functions, as showed by the Figure no. 1.



Figure no.1-The managerial process in the conditions the organization is structured by two components: logistics and production

Revista Română de Statistică - Supliment nr. 1/2014

Certainly, the logistics function of the company covers the contribution of more compartments, among which we can enumerate: the financial-accounting compartments, the marketing compartments with commercial, supplying, distribution, storage, marketing research etc., entities, human resources compartments, administrative compartments with entities for environment, labour protection, prevention and extinction of fires etc., while the production function can include compartments for research-development, production sections etc.

The to-day practice demonstrated the fact that the companies which have accepted a structural and procedural organizing, taking into consideration the logistics commandments, have faced a clearer display of the managerial functions as well as better economic effects in comparison with those ignoring the logistics requirements.

#### III: The logistics management and the organization efficiency

The attempt to underline some of the interdependences between the logistics management and the economic efficiency is circumscribed to the present efforts meant to identify the directions contributing to the increase of the general social efficiency.

The influence of the logistics management on the organization efficiency has both theoretical and practical connotations.

From the theoretical perspective, it is natural to agree with the ideas that the logistics management is responsible for the increase of the efficiency in the logistics compartments and, thus, it is part to the general efficiency increase of the organization. On the second hand, the efficiency is the ultimate goal of any managerial structure, consequently of the logistics management as well, responsible for the optimization of the organizing frame meant to support the processes individualizing the activity object of every organization.

Basically, the general management contributes to the systemic approach of the efficiency by making operational a system of indicators for evaluating its own activity, which are found out, with particularities given by the activity nature, in the economic practice. It is obvious that the applicative management operated and keeps on operating with a multitude of indicators, differentiated by the forecasted goals and targets, which get materialized in strategies and policies as to expressing the organizations functions. Since the organization is conceived as unitary action of two basic structural components: logistics and production, we consider that the efficiency indicators system of the organization should be structured by efficiency indicators of the logistics, efficiency indicators of the production (of the basic activity), based on which the general efficiency indicators of the organization are to be defined. As the current regulations are not providing a unitary approach of the efficiency indicators, we consider that the following presentation of these ones is quite suggestive, as submitted by the Figure no. 2:



Figure no. 2- Suggestion concerning the efficiency indicators of the organization

At the organization level, the managerial approach for the efficiency and the structuring of the main indicators of efficiency allow the possibility of the analysis for the organization competitiveness. Meantime, the general management of the company, through the logistics management and the production management (basic activity) have as meaning the projection (making it aware of) of the level of the efficiency indicators having to be achieved on the overall level of the organization but also on the level of the led subsystems, the unitary setting up of the modalities to achieve of the forecasted levels of efficiency as well as of the clarification of the criteria or modalities to evaluate the outcomes of the compartments and the organization as against the forecasted levels of efficiency.

In order to meet these requirements, the general management but also the logistics management, must enforce the management functions so that the principles concerning the supremacy of the targets, the decisional unity, the harmonization of the functions and positions and the responsible spending of the human, material, financial and time resources become an organisational generalized culture of the company. There are a lot of theoretical steps which are consecrating the need to project and implement management methods and techniques having as purpose an as high as possible efficiency, as goal of every

Revista Română de Statistică - Supliment nr. 1/2014

managerial component. The pragmatic contribution of the management on the efficiency in the logistic fields is grounded on the management of the cycle information-decision-action-evaluation of results, which reason is connected to securing the general optimum, being aware of the fact that , most of the times, the sum of the partial optimums, compartmental, does not equal the total optimum of the organization.

To diminishing of this cycle in the logistical compartments, a significant contribution is given by improving each of the logistics management subsystems: organizing, informatics and decisional.

Thus, the correlation between the logistics management and the economic efficiency implies the adoption of two approaches: the first one is aiming to consider the logistics management as against the efforts involved by the functioning and improvement of its own management system, emphasize put on the aspects regarding rationalizing and forms to introduce the new and, the second one modality is referring to the logistics management efficiency in a large sense, by establishing the efforts and the outcomes generated by the functioning of the component subsystems.

All the above aspects are evidencing the fact that the evaluation of the logistics management efficiency seems to be an extremely complex issue due to the specific nature of the logistics which is found out in both the productive and non-productive sphere, involving more methodological and structural approaches to be expected.

#### References

Cibela Neagu, Mircea Udrescu, Managementul Organizației, Editura Tritonic, București, 2008, p. 192-216, see also T.Zorlențan, E. Burduş, G. Căprărescu, Managementul organizației, Editura Economică, București, 1998, p. 20-34,

Colectiv, Dicționar de marketing, Editura Junimea, Iași, 1979, p. 186.

- Rodica Chiriță, Logistica- factor de stimulare a întreprinderii, articol, Tribuna Economicănr. 2, 1994.
- John Gattorna, Managementul logisticii și distribuției, Editura Teora, București, 1999, p. 17-26.
- Cf.P.Vagu, Conducerea, organizarea și planificarea unităților industriale, Editura Didactică și Pedagogică, București, 1975p. 25, după, H. Fayol, Administration industrielle et generale, Dunod, Paris, 1966, p.10
- T. Zorlențan, F. Burduş, G. Căprărescu, op. Cit., p. 20-22.
- Mircea Udrescu, Gheorghe Minculete, Benoni Andronic, Elemente de logistică economică, Editura Universității de Apărare Naîionale, București, 2010
- Anca Popesu Cruceru, Mircea Udrescu, Gestiunea sistemelor logistice de marketing, Editura Artifex, București, 2012

# Using Linear and Non-linear Models in Macroeconomic Analyses

### Prof. Constantin ANGHELACHE PhD.

Academy of Economic Studies, Bucharest "Artifex" University of Bucharest Ligia PRODAN PhD. Student Daniel DUMITRESCU PhD. Student Diana Valentina SOARE PhD. Student Georgeta BARDAŞU (LIXANDRU) PhD. Student Academy of Economic Studies, Bucharest

#### Abstract

The analysis of the correlations between the economic variables can be performed depending on non-linear functions also, which are linearized by transformations. We proceed likewise in order to submit the non-linear model in a simple equivalent form, allowing an easy interpretation of the parameters values or their estimation.

**Key words:** *linear regression, analysis, correlation, economic variables, models* 

The semi-logarithmic<sup>1</sup> and the double logarithmic models are the two models which can be linearized:

- The logarithmic model can be either without free term or with free term.
- The free term model (log-log) is of the dependence form, respectively:

 $y_i = a x_i^b \varepsilon_i$ 

In this model  $a \in R^*_+$  and  $b \in R$ . Depending of the sign of the parameter b the properties of the resulting characteristic are set up.

If this parameter is positive, the resulting characteristic has an up warding trajectory. The down warding trajectory of the resulting characteristic is emphasized, in the case of the regression non-linear model, by the negative value of the resulting characteristic exponent.

Applying the logarithms the double logarithmic model results log  $y_i = \log a + b \log x_i + \log \epsilon_i$ 

Using the substitutions

<sup>&</sup>lt;sup>1</sup> Romanian Statistical Review – supliment – December 2013

 $y_i^* = k = \log y_i, x_i^* = \log x_i a^* = \log \varepsilon_i$ , the regression linear model becomes:

 $y_i^* = a^* + bx_i^* + \varepsilon_i^*$ 

We estimate the two parameters of the regression linear model and establish the parameter a which appears in the regression linear model:

 $\hat{a} = 10^{\hat{a}^*}$ 

• The free term model (log-log) holds, in addition, a free term and shows under the following form:

 $y_i = a_0 + a x_i^b \varepsilon_i$ 

In the case of this model applying the previous procedure of linearization is no more possible. In order to estimate the parameters, one of the following two methods applies:

- when a value of the free term of the model is specified, then, using the notations  $v_i = y_i - a_0$  and  $u_i = x_i$ , we get the regression model  $y_i = ax_i^b \varepsilon_i$ . In this respect, parameters are estimated according to the case of the double logarithmic model;
- then we estimate the three parameters of the model through numerical models. It is possible to transform the model into a linear one using the development of the Taylor series.

We submit a number of properties of the parameters which are needed for interpreting the model parameters and the characteristics of the factorial variable in connection with the parameters values. The interpretations are achieved in the context of using the model  $y_i = ax_i^b \varepsilon_i$ . For this model we underline that:

- if b < 0, the function log-log is down warding as against the factorial characteristic. In this case,  $\lim_{x \to \infty} y_i(x_i) = 0$ . In the situation of the free term model r,  $\lim_{x \to \infty} y_i(x_i) = a_0$ ;
- if b > 0, the non-linear function is up warding and  $\lim_{x\to\infty} y_i(x_i) = \infty$ ;
- irrespectively of the sign of the parameter b, this is equal with the elasticity of the resulting variable, calculated in connection with the factorial variable, namely:

$$b = \frac{\partial y_i}{\partial x_i} : \frac{y_i}{x_i};$$

- when the differential of second order is  $\frac{\partial^2 y_i}{\partial x_i^2} = ab(b-1)x_i^{b-2}$ , is

results that:  $b \in (0,1)$ , the analytic function is up warding and concave ;

b = 1, the regression model gets reduced to the simple linear model, without free term ; b > 1, the function is up warding and convex .

• The exponential model is used in the case when the points cloud resulting from the graphical representation of the series of values  $(x_i, y_i)_{i=\overline{1,n}}$  is directed along the curve of an exponential function.

The exponential model, with the parameters a and b, is defined through the relation

 $y_i = a \cdot b^{x_i} \varepsilon_i, a, b \in R^*_{+}$ 

The estimation of the parameters of the exponential model is made through data transformations by logarithms, following the stages:

- by logarithms applied to the equality terms we get the regression linear model:

 $\ln y_i = \ln a + \ln b \cdot x_i + \ln \varepsilon_i$ 

The model <sup>2</sup> becomes a linear by the substitution of  $u_i = \ln y_i, \eta_i = \ln x_i, a^* = \ln a$  and  $b^* = b$ ;

- we estimate the parameters of the regression linear model ,  $u_i = a^* + b^* x_i + \eta_i$  using the smallest squares method; we get the estimators  $\hat{a}^*$  and  $\hat{b}^*$ ;
- the estimators of the parameters of the regression non-linear model are established:

 $\hat{a} = e^{\hat{a}^*}$  and  $\hat{b} = e^{\hat{b}^*}$ 

Finally, we calculate the values adjusted on the basis of the estimates regression non-linear model:

 $\hat{y}_i = \hat{a}(\hat{b})^{x_i}, i = \overline{1, n}$ 

The exponential model is used when the values of the resulting variable increase in an arithmetic progression while the values of the factorial variable increase in a geometrical progression.

In order to interpret the meaning of the parameter b we take into account that

 $b = \frac{1}{y} \cdot \frac{\partial y}{\partial x}$ 

It is to notice that the parameter b defines the increase rate of the resulting characteristic depending on the factorial variable X.

In the case of the exponential model we distinguish the following situations:

- b is the rate of increasing or decreasing of the characteristic Y as against X;
- if b > 1, he evolution of the characteristic Y is up warding

<sup>2</sup> Romanian Statistical Review – supliment – December 2013

Revista Română de Statistică - Supliment nr. 1/2014

- if  $b \in (0,1)$ , the characteristic Y records a decrease as against the variable X;
- the values of the characteristic Y are positive only and the parameter a satisfies the positivity property.

We have realized an analysis of the correlation between total production and other activities and services branch using EViews

		-milion
Year	Other activities and services <sup>3</sup>	Total production
	Х	У
1990	4.6	79.1
1991	12.9	206.4
1992	36.3	606.9
1993	111.2	1906.5
1994	287.1	4700.1
1995	454.6	6746.9
1996	613.2	10197.1
1997	1191.6	23036.5
1998	3109.0	33711.2
1999	4541.1	48888.2
2000	7362.5	71990.9
2001	9165.8	106082.2
2002	14344.7	136922.3
2003	14344.7	166602.3
2004	26088.1	220931.3
2005	32049.6	244676.8
2006	35312.4	289695.6
2007	41950.2	350845.6
2008	87318.2	458535.5
2009	87405.3	450979.1
2010	94723.3	466397.0
2011	102884.4	487733.2
2012	115407.1	512112.2

<sup>&</sup>lt;sup>3</sup> Professional activities, scientific and technical knowledge; administrative and service activities activities of support services; Public administration and defence; the social security public system; tertiary education; health and social work; Performances, cultural activities and recreations; repair of household products and other services.

The correlation between other activities and services – and the total production highlights that the evolution of two indicators can be related. And from the analysis using software Eviews we can establish that the correlation is significant for the period 2008-2012 when as other activities and services register values increasing to establish and increase the total production.

The evolution of the labor in other activities and services branch in Romania during 1990-2012



For an pertinent analyze of the evolution of labor in other activities and services it is necessary in a first step of this research to establish the growth of other activities and services in the period under review. To prove this, using the software Eviews 7.2, we studied in the first stage, the evolution of this indicator.

As can be seen from analyzing the data series under investigation, especially as in the figure shown above, in the period considered, the labor in other activities and services branch has registered a steady growth from year to year, except to this rule making the period between 2008 and 2012, when the growth kept getting bigger from an year to another.

Statistical tests performed on the value of labor in other activities and services branch in Romania in the period 1990-2012 are graphically represented:



Revista Română de Statistică - Supliment nr. 1/2014

Correlation labor force in the other activities and services – total production:



### Characteristics of the regression model

Dependent Variable: TOTAL_PRODUCTIE Method: Least Squares Date: 02/17/14 Time: 16:20 Sample: 1990 2012 Included observations: 23						
Variable	Coefficient	Std. Error	t-Statistic	Prob.		
RAMURA_6	4.696137	0.263743	17.80575	0.0000		
С	39401.35	12712.74	3.099360	0.0054		
R-squared	0.937878	Mean depend	ent var	177981.9		
Adjusted R-squared	0.934920	S.D. dependent var		188967.1		
S.E. of regression	48207.06	Akaike info criterion		24.48734		
Sum squared resid	4.88E+10	Schwarz criterion		24.58608		
Log likelihood	-279.6044	Hannan-Quinn criter.		24.51217		
F-statistic	317.0446	Durbin-Watson stat		0.341478		
Prob(F-statistic)	0.000000					

#### References

- Andrei, T., Stancu, S.; Iacob, A.I. (2008) "Introduction to econometric pregnancies using Eviews", Economic Publishing House;
- Anghelache, C.; Bugudui, E.; Anghelache, C. S.; Deatcu, C. (2009) "Elements of theoretical and statistical economic - Theory and case studies", Artifex Publishing House;
- Anghelache, C-tin, Capanu, I. (2003). *Indicatori macroeconomici. Calcul și analiză* economică, Editura Economică, București
- Arnold, B.C., Balakrishnan, N., Nagaraja, B.N. (2008) "A First Course in Order Statistics", SIAM Philadelphia
- Jesus Fernandez-Villaverde & Juan Rubio-Ramirez (2009) "Two Books on the New Macroeconometrics", Taylor and Francis Journals, Econometric Reviews
- Voineagu, V., Țițan, E. și colectiv (2007) "Teorie și practică econometrică", Editura Meteor Press

www.business24.ro

www.bvb.ro

www.finantistii.ro

# Can the Corporate Tax Burden be used to predict the Evolution of Business Confidence?

#### Professor PhD. GEORGETA VINTILĂ

Bucharest University of Economic Studies PhD. IOANA LAURA TIBULCĂ

Bucharest University of Economic Studies

#### Abstract

One of the main factors that companies take into account in making estimations regarding the future of their activity is taxation. The tax burden impacts the business environment overall and each company individually. Therefore, we have decided to establish if the evolution of the corporate tax burden can be used to predict changes in business confidence and if business confidence is a reliable predictor for the evolution of the corporate fiscal pressure. To answer these questions, we have used quarterly data collected for the US and Granger causality tests.

Key words: business confidence, tax burden, Granger causality, taxation JEL codes: H20, H32

#### Introduction

The tax burden and its impact on the business environment have been an interesting research topic for authors during the last fifty years. Having witnessed the effects of the global economic crisis on businesses around the world, researchers have recently focused again on taxation and the way it influences the business environment. Therefore, the number of published studies on business confidence indices has increased lately. However, none of these studies have linked the business confidence index with fiscal pressure.

The business confidence index is based on anticipations made by managers regarding the future of their companies. Therefore, we believe that it is reasonable to expect that changes in taxation, which are reflected in the tax burden, will influence the business confidence index. In this article, our goal is to establish if the tax burden can be used to anticipate the evolution of business confidence, using Granger causality tests.

The following study is structured into three sections. The first section deals with the literature review and it contains an overview of other research previously done on our topic of interest. The second section deals with the research methodology we used throughout the entire research process. The third section is a presentation of the results we obtained as a result of our analysis and it also contains the interpretation of our results. This last section is followed by the conclusions of our research and by the references we used.

#### 1. Literature Review

Granger causality is widely used as an analysis tool in economy in general and in the field of taxation, in particular. Chen and Hsiao (2010) point out the fact that though it is a popular concept in time series analysis, the Granger causality test is often misused as a means of determining causality, when the results of the Granger test does not necessarily imply real causality and should be used more accurately as a forecasting tool. Rault and Afonso (2009) used bootstrap panel analysis to study the causality between government revenue and spending for the EU with data from 1960 to 2006. Their conclusion was that spend-and-tax causality exists for Italy, France, Spain, Greece, and Portugal, while tax-and-spend evidence is present for Germany, Belgium, Austria, Finland and the UK.

Several studies done on taxation in emerging economies have used the Granger causality as an analysis tool. Keho (2010) studied the causal relationship between government revenues and spending in Côte d'Ivoire using annual data for the period of between 1960 and 2005. The conclusion was the existence of a positive long-run unidirectional causality running from revenues to expenditures. Maynard and Guy (2009) investigate the relationship between total government expenditure and total tax revenue in Barbados, using technique of Granger Causality to determine the causality relationship in a multivariate model. Their results suggest that government expenditure unidirectional Granger-causes changes in revenue.

Taylor and McNabb (2007) studied whether indicators of consumer and business confidence can predict movements in GDP over the business cycle. They also analysed the predictive power of business confidence and reached the conclusion that business confidence indicators play a significant role in predicting downturns. Hohnischa, Pittnauerc, Solomond and Stauffere (2005) proposed a stochastic model of interactive formation of individual expectations regarding the business climate in an industry, based on data from business climate surveys conducted in Gemany since 1960.

In this research study, we will use the Granger causality test to see if business confidence can pe predicted by tax pressure or if fiscal pressure can be a predictor for business confidence.

#### 2. Research Methodology

The business confidence indicator (BCI) is calculated based answers given by managers to questions included in business tendency surveys. The purpose of these surveys is to provide an image of what the managers believe the future evolution of their company will be. The OECD has published a methodology both for the construction of the business tendency surveys and also for the transformation of the results obtained into confidence indicators.
The questions included in business tendency surveys have qualitative answers and the respondents are asked to give opinions on the evolution of the company they run and not actual numbers. Therefore, these qualitative answers have to be converted to quantitative information. This quantitative information is then presented in the form of business confidence indicators. These indicators can be constructed for a certain sector of the economy (the construction sector, the retail sector, the services sector or the industrial sector) or it can be related to an overall view of the economy of a certain country or a specific area (more than one country, for example the Euro zone).

The BCI is a standardized indicator, but it only includes information regarding the manufacturing sector. Some of the member states of the OECD calculate individual BCI on a monthly basis. We have used the BCI calculated for the US as one of the main variables in our research and we have converted the monthly data to quarterly data by using a simple mathematical average.

The second main variable used is our study is the tax burden, which we have calculated to be the revenues obtained form a certain type of tax, considered as percentage of the GDP. In order to achieve the goal of our research, we have collected data regarding the corporate fiscal pressure (CT), the corporate tax revenue as percentage of GDP. The corporate fiscal pressure which we used in our study is calculated as quarterly data collected for the US.

We have used only two variables, the business confidence index (BCI) for the US and the corporate fiscal pressure calculated as revenue obtained from corporate taxes as percentage of GDP in the US. Our goal is to establish if the relationship between fiscal pressure and the business confidence index is one of causality. In other words, what we wish to see is whether one variable can be used in order to predict the other one. We have used quarterly data and the Granger Causality Test in order to answer our question. The results of the causality tests are preceded by results to Unit Root Tests because we wanted to make sure the time series we were working with are stationary.

## 3. Research Results

In order to establish if the business confidence index is in a causality relationship with the corporate fiscal pressure, we have used quarterly data collected in the US and analysed the results of the Granger Causality tests.

Before using the Granger Causality Test, both variables are tested using the Augmented Dickey-Fuller test in order to see if they are stationary or not. Estimating time series that are not stationary would lead to spurious results in the next stages of our research. Consequently, we include below the results of the ADF tests for our variables.

Table no.1 - ADF test results for BCI

Null Hypothesis: BCI has a unit root Exogenous: Constant Lag Length: 3 (Automatic based on SIC, MAXLAG=12)

Revista Română de Statistică - Supliment nr. 1/2014

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.920445	0.0026
Test critical values:	1% level	-3.484198	
	5% level	-2.885051	
	10% level	-2.579386	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation Dependent Variable: D(BC) Method: Least Squares Date: 02/08/13 Time: 19:58 Sample (adjusted): 1979Q2 2009Q4 Included observations: 123 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BC(-1) D(BC(-1)) D(BC(-2)) D(BC(-3)) C	-0.718470 -0.308184 -0.341390 -0.372031 -0.001274	0.183262 0.154817 0.123357 0.085389 0.007088	-3.920445 -1.990637 -2.767495 -4.356915 -0.179687	0.0001 0.0488 0.0066 0.0000 0.8577
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood Durbin-Watson stat	0.591569 0.577724 0.078592 0.728854 140.8712 2.001476	Mean depend S.D. depende Akaike info cr Schwarz crite F-statistic Prob(F-statistic	dent var ent var riterion erion tic)	-0.000815 0.120943 -2.209288 -2.094971 42.72767 0.000000

The value associated with the ADF test for the business confidence index is -3.920445, with an associated probability of 0.0026. As a result, the probability of making a mistake in rejecting the null hypothesis is almost 0%. We reject  $H_0$ : BCI has a unit root, which leads to the conclusion that the series does not have a unit root, and therefore it is stationary. Since the series represents the relative variation of the business confidence index from one year to the next, this conclusion is the expected one.

Table no.2 – ADF test results for fiscal pressure
Null Hypothesis: FP has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic based on SIC, MAXLAG=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.867008	0.0000
Test critical values:	1% level	-3.484198	
	5% level	-2.885051	
	10% level	-2.579386	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation Dependent Variable: D(FP) Method: Least Squares Date: 02/08/13 Time: 20:00 Sample (adjusted): 1979Q2 2009Q4 Included observations: 123 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FP(-1) D(FP(-1)) D(FP(-2)) D(FP(-3))	-1.148903 0.503839 0.252396 0.408311	0.146041 0.129393 0.106068 0.087097 0.001330	-7.867008 3.893868 2.379566 4.688001	0.0000 0.0002 0.0189 0.0000 0.8914
	0.000102			0.0014
R-squared Adjusted R-squared	0.470535 0.452587	S.D. depende	ent var ent var	0.000195 0.019898
S.E. of regression Sum squared resid	0.014722 0.025575	Akaike info c	riterion erion	-5.559150 -5.444834
Log likelihood Durbin-Watson stat	346.8877 2.024396	F-statistic Prob(F-statis	tic)	26.21664 0.000000
		-	-	

The table above shows the results for the ADF test for our second variable, the corporate fiscal pressure, which is measured as the revenue collected from corporate taxes as percentage of the GDP. This variable is also used as a relative variation of the corporate fiscal pressure from one year to the next and, therefore

Revista Română de Statistică - Supliment nr. 1/2014

we expected this series to be a stationery one as well. Our expectations were confirmed by the value of the ADF test -7.867008 and its associated probability of 0.0000. We rejected the null hypothesis and concluded that the time series is stationary.

The results of the Granger Causality tests are presented in Table no.3.

Table no.3 – Eviews output for Granger Causality tests

Pairwise Granger Causality Tests

Date: 02/08/13 Time: 17:15

Sample: 1978Q1 2009Q4

Lags: 1

Obs	F-Statistic	Drobobility
		FIODADIIILY
126	1.23683	0.26825
	1.40083	0.23887
Obs	F-Statistic	Probability
125	0.44646	0 64095
125	0.44040	0.04055
	0.07433	0.41351
Obs	F-Statistic	Probability
124	1.02481	0.38434
	0.82124	0.48467
Obs	F-Statistic	Probability
	126 Obs 125 Obs 124 Obs	126 1.23683   1.40083   Obs F-Statistic   125 0.44646   0.87499   Obs F-Statistic   124 1.02481   0.82124   Obs F-Statistic

Revista Română de Statistică - Supliment nr. 1/2014

FP does not Granger Cause BCI	123	2.50832	0.04581
BCI does not Granger Cause FP		3.40393	0.01141

For the first three tests, we cannot reject the null hypothesis for either of the two causality relationships. Therefore, the corporate fiscal pressure does not Granger cause the business confidence index and the business confidence index does not Granger cause the corporate fiscal pressure. Neither variable can be used to predict the other one.

The results change, however, for the last Granger test, where we used 4 lags. In this case we can reject the null hypothesis for both causality relationships because the probability associated with the F-value of the test is less than 0.05. We can conclude that for 4 lags, corporate fiscal pressure granger causes the business confidence index and the causality relationship is valid both ways. The findings are synthesised in Table no.4.

Direction of causality	Number of lags	F-value	Decision
$FP \rightarrow BCI$	1	1.23683	Do not reject
$BCI \rightarrow FP$	1	1.40083	Do not reject
$FP \rightarrow BCI$	2	0.44646	Do not reject
$BCI \rightarrow FP$	2	0.87499	Do not reject
$FP \rightarrow BCI$	3	1.02481	Do not reject
$BCI \rightarrow FP$	3	0.82124	Do not reject
$FP \rightarrow BCI$	4	2.50832	Reject
$BCI \rightarrow FP$	4	3.40393	Reject

Table no.4 – Granger Causality conclusions

### Conclusions

We have established the existence of a granger causality relationship between the business confidence index and the corporate fiscal pressure, based on data collected in the US, using 4 lags. The granger causality goes both ways between our variables. Since fiscal pressure is an indicator which is usually measured annually and not quarterly, we can consider the use of 4 lags a realistic solution if we want to use corporate fiscal pressure in order to predict the business confidence index.

In conclusion, for the US, business confidence can be used to anticipate the evolution of corporate fiscal pressure and corporate fiscal pressure can be used to

Revista Română de Statistică - Supliment nr. 1/2014

anticipate the variations of the business confidence index. Though our conclusion is true for the US, further research is necessary before it can be extended to other states and before it can be accurately generalised for all the states.

#### References

- Chen, P. & Hsiao, C.Y. (2010). Looking behind Granger causality. MPRA Paper No. 24859 posted 10. September, http://mpra.ub.uni-muenchen.de/24859/
- Dickey, D.A. & Fuller, W.A. (1979). Distribution of the estimators for autoregressive time series with a unit root. Journal of the American Statistical Association, 74, 427-431.
- Foresti, P. (2007). Testing for Granger causality between stock prices and economic growth. MPRA Paper No. 2962 posted 07. November, http://mpra.ub.uni-muenchen.de/2962/
- Freeman, J.R. (1983). Granger Causality and the Time Series Analysis of Political Relationships. *American Journal of Political Science*, 27(2), 327-358.
- Granger, C.W.J. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica*, 37, 424-438.
- Heye, C. (1993). Labour Market Tightness and Business Confidence: An International Comparison. *Politics & Society*, 21, 169-193.
- Hohnischa, M., Pittnauerc, S., Solomond, S. & Stauffere, D. (2005). Socioeconomic interaction and swings in business confidence indicators. *Physica A: Statistical Mechanics and its Applications*, 345 (3–4), 646–656.
- Keho, Y. (2010). Budget balance through revenue or spending adjustments? An econometric analysis of the Ivorian budgetary process, 1960 – 2005. *Journal of Economics and International Finance*, 2(1), 001-011.
- Lin, J.L. (2008). Notes on Testing Causality. Institute of Economics, Academia Sinica, National Chengchi University
- Maynard, T. & Guy, K. (2009). The Causal Relationship between Government Expenditure and Tax Revenue in Barbados. Annual Review Seminar Research Department Central Bank of Barbados
- Rault, C. & Afonso, A. (2009). Bootstrap Panel Granger-Causality between Government Spending and Revenue in the EU. William Davidson Institute Working Paper No. 944 published 13. October, http://ssrn.com/abstract=1488334
- OECD (2003). Business Tendency Surveys: A Handbook. Statistics Directorate, Paris
- OECD (2006). Introducing OECD Standardised Business and Consumer Confidence Indicators and Zone Aggregates. Main Economic Indicators
- Taylor, K. & McNabb, R. (2007). Business Cycles and the Role of Confidence: Evidence for Europe. Oxford Bulletin of Economics and Statistics, 69, 185–208.

# Production of Services in Romania

**Prof. Constantin ANGHELACHE PhD.** 

Academy of Economic Studies, Bucharest "Artifex" University of Bucharest Assoc. prof. Alexandru MANOLE PhD. Assoc. prof. Aurelian DIACONU PhD. "Artifex" University of Bucharest Andreea Gabriela BALTAC PhD. Student Academy of Economic Studies, Bucharest Cristina SACALĂ PhD. Student Academy of Economic Studies, Bucharest

## Abstract

Comparatively to the previous year (2008), during the period 2009-2013, the indices of the market services supplied to the population, as well as the indices of the retail trade have recorded a decrease. This decrease is generated by the domestic demand (an element of the GDP utilization), which recorded an underlined decrease generated by the income reduction. Meantime, the services reached a weight of over 53,1% in the GDP, out of which the retail trade only recorded a substantial increase.

**Key words:** *GDP*, gross added value, correlation, evolution, tourism, analysis

The services contribution to the GDP achievement by the gross added value achieved in the frame of this sector means a positive development which, at this stage of the integration, means a lot for Romania.

Out of the analysis of the structure of the carried out services activities, we note the fact that the retail trade recorded diminished rhythm of increase.

Although the activity of sales by correspondence and virtual shops get developed and permanent, this type of trade recorded a decrease of 2.9% as against the year 2009.

The decrease continued in 2011 and 2012.

The dynamics of the services carried out to the population has been supported mainly by the activity of hotels and restaurants, which recorded no increase.

Briefly, 2011 is a significant year as far as the production of services is concerned, by the following major guide marks:

• The increase of the weight services hold as for the GDP achievement;

- The structural balancing of the services carried out to the population;
- Differentiated decreases, for certain fields as already mentioned, quite significant, of the production of services spread on various zones, reflecting in fact the cynical effects of the economic crisis;
- The employment of a large number of persons in activities of carried out services, which tendency should mark a similar evolution during the forthcoming period;
- Maintaining the quality of the services carried out to the population;
- Diminishing of the hotel activity;
- Exceeding a weight of 51% of the contribution which the production of services brings to the GDP achievement (for a number of developed countries such as Sweden, Switzerland etc., the carried out services contribute with over 70% to the GDP achievement);
- There has been a development of the financial and banking services as well as of capital market service, including thus a series of employees.

Another aspect concerning the analysis in the field of the production of services in our country is given by the volume of the turnover figure achieved by the wholesale and retail trade of auto-vehicles, the retail trade with fuel etc. As comparatively the year 2010 in 2011 this field of activity recorded a significant decrease, continued in 2012.

Here we have another element which denotes a negative evolution of the activity run in the field of the production of services in our country.

Generally speaking, the turnover figure decreased for all sectors of activity, as a consequence of the alarming cut off of the population income.

As for the international tourism, in 2010, 2011 and 2012 the number of foreign visitors coming in Romania decreased as comparatively to the previous year. Basically, the persons having friendship or kinship connections in Romania kept on visiting them. In this respect, the most numerous visits have been paid by citizen from Germany, United States, Israel, France, Republic of Moldova as well as from other countries where there is a significant number of Romanian natives.

During the year we are analyzing, the departures of the Romanian visitors abroad decreased as comparatively with 2009. The negative rhythm of departures has accentuated in 2011, 2012 and the first half of 2013.

As it was to anticipate, we find out a decrease of the possibilities which the persons from Romania are disposing of as to travel abroad, although the provisions regarding the free circulation of persons within the territory of other states of the community entered into force.

In 2010-2013, over 81.7% of the trips abroad have been achieved by personal auto conveyance means, as tourism visits and trips abroad.

The volume indices of the trade turnover decreased, following the general economic tendency.

The dynamics recorded over the year as far as retail is concerned shows a down warding trend with a significant decrease as since November 2009.

However, the vehicles sales, with a constant trend up to the July month, changes the trajectory marking decreases over the entire period since 2009, up to the end of the year 2012.

### References

Anghelache, C-tin (2013). *România 2013. Starea economică sub povara efectelor crizei*, Editura Economică, București

Anghelache, C-tin (2012). *România 2012. Starea economică în criză perpetuă,* Editura Economică, București

Anuarul statistic al României, edițiile 2002, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013

\*\*\* Buletinul Statistic nr. 1-12/2002, 1-12/2003, 1-12/2004, 1-12/2005, 1-12/2006, 1-12/2007, 1-12/2008, 1-12/2009, 1-12/2010, 1-12/2011, 1-12/2012 şi 1-12/2013 editat de Institutul Național de Statistică