

The crisis of winning

"I hope that one of the sacrifices of this crisis will not be financial self-regulation, as the main mechanism of equilibrium in the world of finance."

Alan Greenspan

The increasingly manifest inadequacies between the solutions of economic theory and the results of reality's evolutions point to a significant fact: the economic theory is in crisis! More and more people seem to accept this truth.

Somewhat distressed, the recognition of the crisis affects the prestige of economic theory twice: once through self-blaming, and secondly through silence over the fundamental causes of the crisis.

Any lucid analysis reveals a sufficiency of the theory when things seem to go well in reality. The theorists draw praise for having explained the functioning of the horn of abundance. When prosperity no longer flows in waves from the eternal spring, the theories are called to the stand to answer for it. This is what's been happening since coherent visions exist on what Economics might be.

Beyond the story though are the causes of it. With the risk of stirring heresy, the error in which economic theory is found presently must be named: its power of description convinces amphitheaters yet leaves the markets indifferent. The explaining is completely separated from the rule-making.

The shift in behavior has accentuated in the last century. This is how the theory has dissolved in analyses of opportunity for profit. The meaning of what has emerged was the empire of speculation built on instruments yet to be licensed by the theory.

In focus, the situation looks like this: on one side the world of theory with its rational-type characters and, on the other side, the world of profit, with soldiers armed with the weapons of speculation and of winning at any cost.

Economic theory, in its classis guise as a theory of the rationalization of human behavior, has become useless to the interests of absolute gain. Any hedge fund CEO believes in deregulation. Therefore he has no need for economic theory. Actually, profit is conquered with legions of speculative mercenaries and not with laureates of the Nobel Prize in Economics. When the latter got involved in speculation, the result was bankruptcy. So, the demonstration has been made. In an age of empiricism there is no fit for theoretical debate. A CEO is qualified to win and offers the substance for empirical case-studies. The end.

The fault line between the explicative model specific to economic theory and the active model of self-sufficient profit amplifies. The theory becomes somewhat timorous when the disaster in the economy happens. For instance, it uses shy concepts, as in the case of the present global economical crisis, which it initially called – and still keeps branding it – a simple disturbance of the financial markets.

It is not that important, in the end, that a theory does not have a solution to what is happening in the global economy. What is fatal is the abdication in front of speculative irrationalism as a practice of the financial markets and the incapacity of limiting the disaster through invoking the urgency of resorting to the rational instruments forged by theory over time. The "mea culpa" done in the 12th hour by some of the sacred monsters of profit would deserve to be exploited because it is – essentially – a recognition of the merits of theory.

The regulation of global financial markets throughout all their innovative compartments means the adoption by everyone of the straightjacket of the rationale and rationality; the steering of the economy toward the defining values of economic theory; the re-instatement of the essential tension which insures the unity between theory and reality.

The preeminence of determinant solutions in the fight for profit is not just a contradiction of the intellectual experience of a rational type but also an attempt to test the post-modern project in its last dissolute consequences over human nature.

Lucrative excesses calling upon the autonomy of human condition open a deviant path in hominization as an on-going process of human nature. On this path, the specific meanings of the goal-means relation which structure humanity are suspended. That which belongs to the human condition undergoes a perverse metamorphosis of consistencies, from the ones as means toward the ones as a goal in themselves.

In this reversed universe, human nature collapses under the impact of the process of making the values of human condition profitable. Man is just workforce, imperfect part of the a-human mechanism of profit.

Hoc est cadaver, sepulchrum extra non habens...

Marin Dinu

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Assets. Biological Assets. The Seasonal Model in Agriculture

■

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***Abstract.** In order to support the agricultural exploitation we tried in this paper to develop a model that involves a seasonal component at entity’s level. Consequently, we made a study to an exploitation acting in the vegetal field by collecting accounting informations from the data base entity and by informations that were processed using different statistical functions. So, through the proposed model we try to make certain previsions taking into account the economic situation in which the agricultural exploitation works.*

Key words: asset; biological asset; agricultural exploitation; seasonality.

■

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1. The agricultural exploitation

In the dedicated literature there are used different names and definitions which refer to the concept of an economic unit, such as: enterprise, organization, economic agent, commercial society, entity (the concept of entity is used more often by the Order no. 1752/2005 in order to approve the accounting regulations according with the European orders, Monitorul Oficial no. 1080 bis/2005), firm, associated enterprises, enterprises combinations and others. Further on, we will present some definitions from the literature of the concept of enterprise.

An enterprise is an economical unit which is characterized by a specific kind of activity, by a technological functioning and organization, by the capacity to produce certain goods, to lead and manage in a rational way, and also by its financial autonomy (Dobrotă, 1997, p. 120).

In another vision, the enterprise represents the entity that manages the economical values with the purpose to realize some productive activities, some commodities circulation and bonds (shares, bonds, bills of exchange), the entity that performs services and other social useful operations (Călin, Ristea, 2000, p. 17).

According to the Council Regulations no. 686/1993 regarding the statistic observation units, the enterprise represents a group of legal units which are established as organizational entity of goods production, commercial services which benefits by a certain decisional autonomy, especially for the assurance of its current resources.

Another point of view considers the enterprise as a group of persons, organized

according to certain legal, economical, technological requirements which concept and develop a complex of work processes using certain working methods, materialized in products and services with the purpose to obtain a net income or profit as big as possible (Marian et al., 1994, p. 14).

From the above definitions arise the following characteristics of the enterprises:

- have their own⁽¹⁾ patrimony and a licit purpose;
- the labour is paid;
- have decisional autonomy;
- organize own accounting;
- the purpose in the competitive economy of a certain enterprise we consider to be the one to consolidate a market position and to increase the entity value comparing to the other competitive entities.

In general, the enterprises can be classified by many criteria. A classification can be done depending on the big fields in which it activates, the enterprises belonging to:

- the primary sector – agriculture, extractive industry;
- the secondary sector – enterprises that belong to the industry and civil engineering;
- tertiary sector – enterprises that have as activity object the trade, the transport, the tourism, banking commercial societies.

Under the primary sector a special attention is given in present to the agricultural exploitations.

The concept of exploitation has its origin in the French word „exploitation” and it refers to an economic enterprise which exploits the lands, forests, mines (Romanian Academy Linguistic Institute “Iorgu Iordan”, 1998, p. 359).

For the first time after 1989 in the Romanian legislation the concept of agricultural exploitation was defined as representing a complex form of property organization, through which the land, animals and the other way of production are put into value, interconnected into an unitary system with the purpose to perform works, provide services and efficient agricultural products (Ordonanța de Urgență no. 108/2001 regarding the agricultural exploitations, Monitorul Oficial no. 352/2001).

According to the Order no. 152/2004 regarding establishment of organizational and functioning terms of reference of the Integrated System of Management and Control published in the Monitorul Oficial no. 186/2004 the exploitation represents a production unit administrated by a farmer⁽²⁾ and situated on the country territory.

In another normative document (The Order of the Ministry of Agriculture, Forests and Rural Development no. 302/2005 regarding the realization of the Farms Register, published in the Monitorul Oficial no. 401/2005) the agricultural exploitation is presented as a technical-economic unit that develops its activity under a single management and has as activity object the land exploitation. In the same normative act is told that the agricultural exploitation has one or more farms⁽³⁾. And the farm has the total organization of production factors with the purpose to obtain agriculture products, managed by a single manager. A farm is generally composed by: a yard with buildings and the corresponding agricultural lands.

According to the annual statistic of Romania, edition 2005, the agricultural exploitation represents an economic entity

of production which has its activity under a current unique management and has all the animals and lands used all or partial for the realization of an agriculture production no matter of the property type, legal form or size.

A weak point in the Romanian legislation is the lack of the agricultural exploitation definition till the Urgent law no. 108/2001. Also we notice that in present are more than one definitions of the agricultural exploitation presented by the Romanian norms. We consider that presenting some clear and easily understood normative documents we can eliminate this negative aspect.

In the specialty literature it is used the word of agricultural enterprise as an economic and production unit, an alive and independent organism which has its own patrimony. It is also an economic agent of which main activity is the production of agriculture products and agricultural aliments and also services destined to be sell. The agricultural enterprise is a centre of decisions with its own accounting and bank account and which has relations with the outlets and supply market from where it achieves a part of its production factors that she combines in different proportions with the own resources. The agricultural enterprise manages its resources and production in order to obtain a maximum profit and observing the durable development requirements (Zahiu, 1999, p. 77).

We mention the fact that the expression of exploitation does not identify with the concept of property because a private land can be deliberately divided to more than one subjects of exploitation completing their unit of production under the name of agricultural exploitation.

If we refer to the International Standards of Accounting elaborated by the International Accounting Standards Board⁽⁴⁾ we do not find the concept of “agricultural exploitation” but the one of “agriculture activity” which represents “the management biological assets transformation by an certain enterprise in order to sell to the agriculture production or in additional biological assets” (IAS 41 Agriculture, paragraph 5).

2. The concepts of asset and biological asset

According to the Financial Accounting Standards Board (FASB) the definition of the asset is given as representing the future economic advantages that come from transactions or past events. At the level of the Financial Accounting Standards Board (IASB) we find a similar definition.

In the specialty literature there are opinions according to which the definition of the asset must be revised in the way of that the future economic benefit should be replaced by the right of property as main criteria of recognition. On contrary, other opinions specify that just the vague character of the definition make her applicable to a bigger number of situations, thus assuring its longevity.

Compared to the American vision, the international concept explicitly sets the asset as economic resource that must have certain strictness.

The definition of the asset is based on the next elements: resource, control, past event, economic benefits; cost; credibility.

The resource represents a reserve or resources susceptible to be capitalized in a

certain situation. If we extend the concept to natural resource then we will deal with the totally of the mineral and mining resources, of lands, waters and forests that a country owns (Romanian Academy Linguistic Institute “Iorgu Iordan”, 1998, p. 920).

The economic resources are composed from the totality of elements, direct and indirect premises – of the social practical actions, which are useable, can be attracted and are real used to produce and obtain goods (Dobrotă, 1997, p. 20).

The economical goods are composed from those scarce elements that exist in nature or are created by man – identified and measurable – goods directly related with the human needs (Dobrotă, 1997, p. 78).

The concept of control originates from the expression “contra rolus”, which means the verification by a specific person of the original document by its duplicate. The control represents the permanent or periodical analysis of an activity, situation in order to follow its course and in order to take improvement measures (Romanian Academy Linguistic Institute “Iorgu Iordan”, 1998, p. 221). In the vision of the International Accounting Board the control can be defined as “the power to lead the financial and operational politics of an enterprise in order to obtain benefits on its activity”.

We consider that introducing the expression of control in order to define the asset concept and the prevalence of economic over the legal principle has disturbed the accounting practitioner and especially the theoretician because the collocation of property right was given up. The Civil Code defines the property right as

being a right to exclusively and absolutely enjoin and hold a good but under some limits determined by law.

The past event represents an important matter, a fact of a great importance for the entity that already took place.

The economical benefits represent the entity potential to contribute to the development of the treasury flows. As a rule, the majority of the economists consider that the purpose of an affair is to register a profit as big as possible. This idea is met very often in the specialty literature as in the optic of many entities also. We consider that this objective must not be generalized because the entities must aim the financial position consolidation on the market, by maintaining stable relations with its partners, harmony between the employees, a symbiosis on hierarchical scale between the employees and the employers' representatives.

The cost reflect the consume of raw materials and consumable being composed from direct expenses related to the use of the labour force and also from the quotas from the indirect production expenses allocated in a rational manner to goods production process. The cost concept is used in relation to entering in patrimony of elements such as: procurement. The cost concept is used very often when we refer to the management accounting. No matter the circumstances of cost using we consider that to the notion of cost it should be given the proper importance because the information spread by it is crucial for the decisions taken by the investors, clients and suppliers.

Credibility refers to the notion that expresses the truth. The cost of the asset must express the reality, must respect the

principles that governs the whole scaffold accounting. For an asset to have a credible cost there must be a credible market.

The credible market is a market where are cumulatively accomplished the following conditions:

- the commercialized elements are unitary;
- permanently can be found interested buyers and sellers;
- the prices are known by the interested ones.

We present below a scheme through which we present the content of the asset concept:

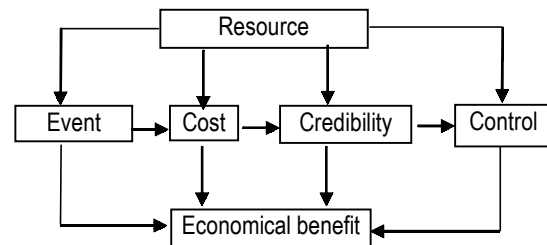
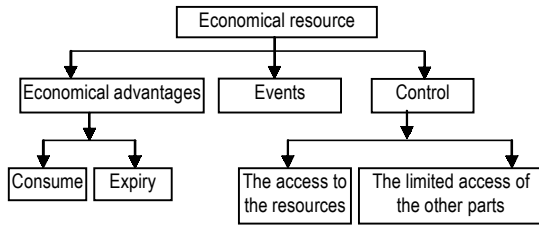


Figure 1. *The content of the asset concept*

We observe from the above figure that an asset, in general, is considered a resource once it enters in the entity patrimony and the result is represented by the economic benefit. Shortly, we can introduce the idea that the concept asset is similar to the notion of economic benefit. But if we will consider the economic benefit similar to the profit then we will get to the paradox to confuse the notion of asset with the one of the capital. We consider that this is a risk of the internationalized accounting: the accounting profession in Romania may misinterpret certain concepts, fact that can lead to the professional rationale affecting.

Going in-depth our analysis, certain assets have their own features which we present below:



Source: Stere, 2001, p. 18.

Figure 2. The asset put to the microscope

The consume from the figure above refers to the delimitation and separation of the economic benefits over the resources that they come from. The expiry refers to the fact that the potential of the resource decreases in time. Thus, the fact that the resources are limited is demonstrated.

Because of the control the entity has access to the resources from its own patrimony, but in the same time the access of the other entities to the resources is restricted.

In this paragraph we want to analyze also the biological asset concept, which is represented by a living animal or plant, and a group of biological assets represent a group of similar animals or plants (IAS 41 Agriculture, article 5). Results that in the structure of a biological asset we have: animals and plants that we will refer further on.

The animal is an organized creature, single or multi-cellular having the capacity to move and feel (Romanian Academy Linguistic Institute “Iorgu Iordan”, 1998, p. 42).

The plant is a generic name given to the vegetal organisms with an organization more simple than of the animals and which extract their substances from the roots. The plant is characterized by the presence of chlorophyll and by the fact that the member of the cellule is made out of cellulose and in the case of the superior species from the body made out of root, trunk and leaves (Romanian Academy Linguistic Institute “Iorgu Iordan”, 1998, p. 802).

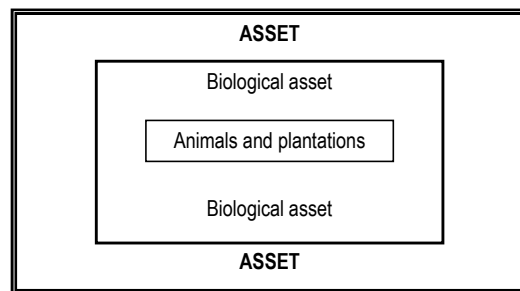


Figure 3. Asset versus biological asset

The notion of asset in general has the meaning of biological asset. Also from the crops are resulting the agricultural products which represent the assets. In the legal optic the biological assets are the elements that have a positive economic value for the agricultural exploitations, which generate benefits bigger or smaller depending on the risks that can appear.

Below we presented some biological assets examples agricultural products and products obtained from the crop process:

Biological assets, agricultural products and processed products

Table 1

Biological assets	Agricultural product	Products resulted after the crop
Sheep	Wool	Stalk, carpet
Trees from the plantation	Log of tree	Timber
Plants	Cotton plant	Clothes
Milk cows	Milk	Cheese
Pigs	Carcass	Sausage, prefabricated ham
Bushes	Leaves	Tea, treated cigarette

Source: IAS 41 Agriculture, paragraph 4.

The biological assets for which is applied IAS 41 are only those assets destined for selling through which transformation are obtained the agricultural products or the additional biological assets.

The IAS 41 does not cover:

- the biological assets owned for creative purposes (for example the ones from the fun parks, zoo, botanical gardens – the ones that do not have commercial activities, including the sportive hunting and fishing);
- the investment made in a forest with the purpose to reduce the carbon dioxide from the atmosphere;
- animals and birds owned for the fights (dogs, roosters);
- animals owned for protection (e.g. dogs)⁽⁵⁾;
- forests for the mountains protection;
- living animals and plants owned for expositions and competitions;
- living animals and plants owned for decorative purposes;
- animals owned only for work (e.g. the horses, mule, donkey, duffers).

The biological assets of an entity no matter their vegetal or animal origin can be classified in the following categories according to the IAS 41, paragraph 43 as follows:

- consumable biological assets – the ones that will be cropped as agriculture products or sold as biological assets;
- productive biological assets – the ones that are not consumed being self regenerating rather than agricultural products;

- mature biological assets – the ones that have accomplished the conditions to be cropped (are mature from a morphological or productive point of view);
- immature biological assets – the ones that didn't rich the full development phase and are not ready for cropping.

According to the IAS 41 the biological assets are delimited from the agriculture products. This delimitation has accounting implications. So the agricultural products are considered stocks and they do not have to be depreciated while part of the biological assets are put under the process of wear and so they must be depreciated.

The agriculture product represents the product cropped from the biological asset of the agriculture entity. The agriculture products are classified by many criteria but we consider that he most important is depending on the purpose from the agriculture activity:

- the main products are the ones for who's production presumes organizing the production process and programming;
- secondary products the ones obtained in the same time with the main products as a biological characteristic of the agriculture production. The secondary products do not make the base activity object, but is resulted as a biological consequence of this activity.

Below we will present the sphere of the asset in the agriculture exploitations from the point of view of the IAS 41 Agriculture.

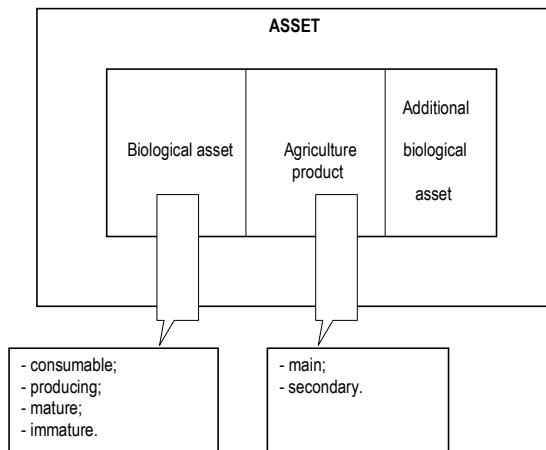


Figure 4. *The sphere of the asset in the agriculture exploitations*

If we exemplify the notions exposed above, in an agricultural exploitation we have:

- The consumable biological asset: rice.
- The main agriculture product: grains.
- The secondary agriculture product: stems.
- The additional biological asset: seeds.

- The consumable biological asset: walnut.
- The main agriculture product: walnuts.
- The secondary agriculture product: leaves.
- The additional biological asset: stocks.

In the vegetal field there can be situations in which we have only biological assets and main and secondary products, the additional assets are missing. For example:

- The consumable biological asset: grain.
- The main agriculture product: grain.
- The secondary agriculture product: maize stalk.
- The additional biological asset: -.
- Also in the vegetal field there can exist only biological assets and the main product:

- The consumable biological asset: carrot.
- The main agriculture product: root.
- The secondary agriculture product:-.
- The additional biological asset:-.

We present also an example from the zoo technical field specifying that the affirmation made above are applying in this sector too:

- The consumable biological asset: cattle.
- The main agriculture product: carcass.
- The second agriculture product: hoofs, hair, intestine, cow hide;
- The additional biological asset: -.

Referring to the classification of products as main and secondary if we make appeal to the management accounting we can identify the specific way, which can be applied in the agriculture exploitations, namely the method of equalizing the quantity of the secondary product with the main product. This is how the unitary cost is calculated.

3. Season and seasonality model in agricultural exploitations

The agriculture sector occupies an important role in the field of national economy and it faces new challenges related to the complex process of the economy reorganization, of adapting at the competition environment and integration in the agriculture structures of the common market.

It is an illusion that we can imagine that people which are not specialists can manage the agriculture exploitation. In our opinion the organization and the bookkeeping of the accounting, providing information's

regarding the efficient management and others can not be done by other people than the qualified accountants, because even a single entry bookkeeping can not be reduced to the simple bookkeeping because it involves also third parties (state, banks, clients, suppliers), in what regards the presentation and the elaboration of the financial informations and in what regards the professional arguments related to the planning in agriculture. The work of the qualified accountants has to be integrated with the one of the agriculture specialists.

In the context of the agriculture integration at European level the agriculture exploitations considered to be base forms of organization and working of the agriculture are making the object of a complex and careful analysis. The successful implementation of some essential modifications necessary at the level of the exploitations structures, productions and merchandising and also at the level of the management and administration of own resources will attract the increasing of the decisional capacity and the adaptation of the agriculture units to the requests imposed by the new mechanisms of the economy market. Although the agriculture exploitations presents particularities given by the specific of agriculture they must be approached in a systematic vision, framed in the fundamental structures of the Romanian economy and adapted to the general trends of the national economic politics and in external plan at the common market agriculture politics.

In our opinion, the strategy of rethinking and development of the agriculture sector and of the agriculture exploitations in particular must address to:

- The implementation and the observing of the acquis related to the mandatory operational costs (necessary for the institutions created to work) and costs generated by the need of reorganization and modernization in order to respect the standards and for increasing of sector competitiveness.

- The obligations of Romania as a member of UE which involves the contribution to the common market budget and a negative impact on the national budget.

- For the producers the costs take into account the necessity of exploitations modernization and re-dimension in order to face the direct competition with the producers from the other countries members of the European Union, also with the producers that are outside the European area. In this moment the Romanian agriculture is full of farms of sustenance, which in fact represents maybe the most important problem with which Romania is dealing in the field. We consider that those farms should be rethought from organizational point of view and there should also exist a simulation transforming them into micro-farms (almost every farm has from one to two milk cows in this case the “little farmer” does not receive the state aid because the forms of help are given only if you have more than three cows; consequently, we propose that is necessary more subsistence farms to associate themselves in order to establish an associative form of at least 10-15 cows).

- For the consumers the costs will be generated by the increasing of the prices at the majority of the agro-alimentary products.

- The press in the agricultural field is less read by the farmers. Only 20-30% of

the farmers read the specialized reviews (Ferma, Profitul agricol etc.) and in the rural area we can say that the press and the specialty materials are almost absent. We consider that the potential readers can be attracted through a funny story related to agriculture.

- The state aid matter is a very difficult one because there are registered payment delays that endanger the production process. For example, if the autumn state aids for grain are not given in time for the lands preparatory works this will have as a consequence a poor quality of works.

The opportunity, necessity and the role the efficient management cannot be denied in order to a proper running of an agricultural exploitation. That's why the role of the economic expert including the accountant in the context of the agricultural exploitation activities cannot be neglected. To be more specific, when we study the organization and management of the agricultural exploitation accounting we cannot remark certain particularities that have repercussions on the efficiency of the agricultural entity.

The production activity is highly influenced by the natural causes. If in industry the goods obtained have a small dependence on the pedo-climatic factors not the same thing happened in agriculture where one can be obtained superior crops in favourable climates conditions or reduced crops in climates conditions less favourable. The decreasing of the unfavourable influence of the natural factors on the crops from the agriculture can be realized by introducing the elements of the technical progress (mechanization, chemistry, irrigation, etc.).

Now, after EU accession more than ever we have to get used not to treat simply, conventional or with prejudices the agriculture. As it is natural in a modern economy when we refer to the agriculture we must take into account a whole complex articulated circuit and of preparing, obtaining, depositing, processing and selling the agriculture production. There should also be taken into consideration the entire products of the industry and services that are present in the circuit in question.

Even if the Accounting law no. 82/1991 republished does not specify the agricultural exploitation particularities, the illustration of the existent and the patrimonial agricultural movements through the accounting has a special way related to the activity object of those and the characteristic factors of production.

In general the concept of season represents the time period of the year corresponding much or less to a season; period of time that is characterized by the appearance of some phenomena or by an intense activity in some fields; time of the year that is benefit to make certain actions that are conditioned by the characteristics of the season.

A characteristic of agriculture is the cyclic nature of the production, determined by natural factors and biological ones that are revealed by the production instability and temporary and also by the farmers' incomes.

The variations that are produced in the agriculture sector sometimes can have a regularity character and can result from certain objective causes related to the changes of season.

In order to quantify the influence of the season it is necessary to be known the periodicity of the variation based on which statistical data will be registered monthly, quarterly, etc.

In theory and also in practice frequently arises the problem to find out, based on analyzing some series of data, the condition of that phenomenon and its future evolution or involution. The analysis of the chronological series leads to a planning by extrapolating the past and present data over the future.

Generally, we can define the statistic series as a construction based on the observation results, reflecting either the structure of some populations in account with one or more variables, or the variation of a statistic indicator comparing with those variables.

The statistics series can be classified using different criteria like: the number of variables, the nature of the indicator from the base of the series, the way to express the variable's realization, the variable's nature, etc. According to the last mentioned criterion, the statistics series can be:

- Attributive series (based on attributive variable);
- Space series (based on space variable);
- Chronological series (of time).

Next we will refer to the chronological series.

The chronological series reflect the evolution in time of a statistic population studied in report with a variable. If we put down the references periods with 1, 2, ..., t, ..., n, and the numeric values of the size y

suitable to those references periods with $y(1)$, $y(2)$, ..., $y(n)$, then the chronological series will have the following form:

$$y: \begin{pmatrix} 0 & 1 & 2 & 3 & \dots t & \dots n \\ y(0) & y(1) & y(2) & y(3) & y(t) & y(n) \end{pmatrix} (1)$$

Indicators $y(t)$, where $t = \overline{1, n}$ is the result of many factors interaction: essential factors, seasonally factors, cyclic factors, unessential factors, etc.

The essential factors have a continuous and constant action deciding the main part from $y(t)$ called level of trend or trend.

The seasonally factors are also essential factors but their action changes periodically determining some variations of the trend.

The cyclic factors represent essential factors of which action changes in time, but at intervals much bigger comparing to the influence of the seasonal factors.

The factors inessentials determine irregular and unpredictable fluctuations. They do not have a permanent character and they do not lead to big phenomenon variations.

In order to predict the evolution of a phenomenon it is necessary to know the composition of its trend. In this way the elimination of the seasonal and cyclical composition of the model must be imposed. In consequence, it is needed to unseasoned and un-cylices the series in question.

We present in the table below the value of the grain obtained by an agricultural exploitation during 36 months period (the source of information is the monthly balance sheet).

The grain value obtained by an agricultural exploitation

Table 2

Year	Months	31,01	28,02	31,03	30,04	31,05	30,06
	2005		71,403.00	71,403.00	61,941.19	29,999.08	30,115.91
2006		84,491.00	97,086.35	41,769.62	26,501.79	17,130.00	15,723.96
2007		33,633.98	25,826.34	14,952.51	10,239.50	9,698.05	107,092.79
		31.07	31.08	30.09	31.10	30.11	31.12
2005		394,352.90	345,515.64	262,237.57	191,098.74	162,170.59	98,744.77
2006		329,584.92	253,032.98	266,921.20	116,529.21	73,557.70	71,636.91
2007		158,141.89	132,047.62	140,512.00	126,371.00	111,440.00	105,605.00

If we represent graphic the data from the table above, we will obtain:

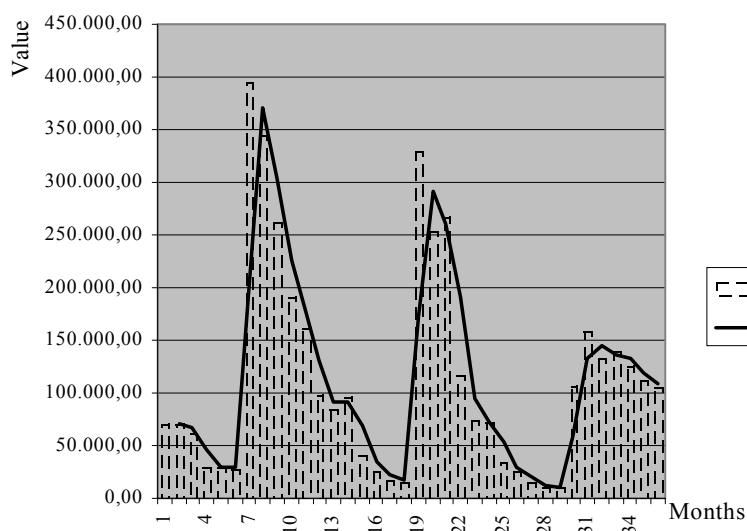


Figure 5. The evolution of the grain value during 36 months period of time

From the graphic we cannot deduce which is the trend of the grain production during the 3 years. The seasonal character in the agriculture determines the big variation

from the graphic. In order to eliminate the seasonal character we will process the dates from table 1 into the un-cyclical industry values below.

The values un-cyclical industry for the grain value

Table 3

Anul	Lunile	31,01	28,02	31,03	30,04	31,05	30,06
	2005		-	-	-	-	-
2006		142,036.58	135,484.47	131,826.18	128,914.26	122,115.00	117,293.30
2007		102,248.71	90,064.20	79,756.09	74,899.12	76,887.62	79,881.39
		31.07	31.08	30.09	31.10	30.11	31.12
2005		146,028.82	147,644.30	147,873.95	146,887.75	146,200.95	145,197.56
2006		114,044.76	108,956.55	104,870.00	103,075.03	102,087.77	105,585.14
2007		-	-	-	-	-	-

$$y'_{17} = \frac{\frac{71,403.00}{2} + 71,403.00 + 61,941.19 + \dots + 2,170.59 + 98,744.77 + \frac{84,491.00}{2}}{12} = 146,028.82$$

$$y'_{36} = \frac{\frac{71,636.91}{2} + 33,633.98 + 25,826.34 + \dots + 126,371.00 + 111,440.00 + \frac{105,605.00}{2}}{12} = 79,881.39$$

After the un-seasonal industry values applied and we obtained the values presented were determined, the TREND function was in the table, meaning the trend.

Trend

Table 4

Year \ Months	31.01	28.02	31.03	30.04	31.05	30.06
2005	-	-	-	-	-	-
2006	135,794.04	132,315.27	128,836.50	125,357.73	121,878.96	118,400.20
2007	94,048.82	90,570.05	87,091.28	83,612.51	80,133.75	76,654.98
	31.07	31.08	30.09	31.10	30.11	31.12
2005	156,666.65	153,187.88	149,709.11	146,230.34	142,751.57	139,272.81
2006	114,921.43	111,442.66	107,963.89	104,485.12	101,006.36	97,527.59
2007	-	-	-	-	-	-

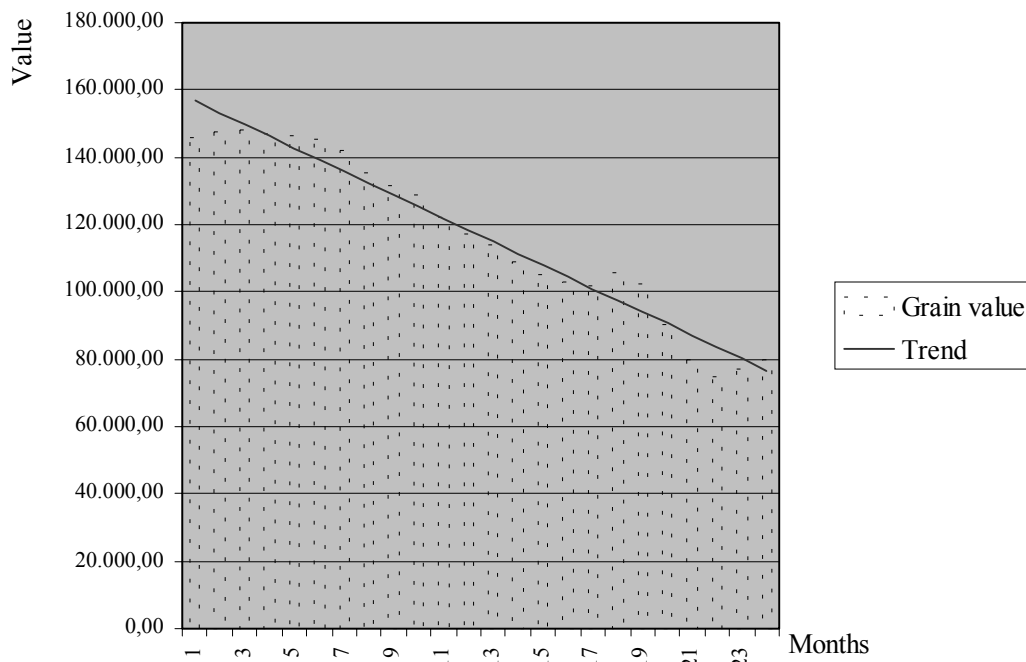


Figure 6. The evolution of the grain value according to the trend

Analysing the graphic of the un-seasonal industry values we find out that the trend of the grain value can be a straight line, namely:

$$T(t) = a + b \times t \quad (2)$$

The determination of the parameters “a” and “b” it is made by using the method of the smallest squares, based on the following equation system:

$$\begin{cases} a + b \times M(t) = M(y(t)) \\ a \times M(t) + b \times M(t^2) = M(y(t) \times t) \end{cases} \quad (3)$$

where:

$$M(t) = \frac{1+2+3+\dots+24}{24} = 12.5$$

$$M(t^2) = \frac{1^2 + 2^2 + 3^2 + \dots + 24^2}{24} = 204.16$$

$$M(y) = \frac{146,028.82 + 147,644.30 + 147,873.95 + \dots + 79,881.39}{24} = 116,660.81$$

$$M(y(t) \times t) = \frac{146,028.82 \times 1 + 147,644.30 \times 2 + \dots + 79,881.39 \times 24}{24} = 1,291,569.18$$

Replacing the data in the above system we obtain:

$$\begin{cases} a + 12.5 \times b = 160,660.81 \\ 12.5 \times a + 204.16 \times b = 1,291,569.18 \end{cases} \Rightarrow \begin{cases} a = 160,145.42 \\ b = -3,478.77 \end{cases} \Rightarrow$$

$$T(t) = 160,145.42 - 3,478.77 \times t$$

We find out that the “b” coefficient value is negative namely -3,478.77. This negative value reflects the fact that the grain value decreases during the analyzed period. In the situation in which the coefficient value is positive we have an increasing of the assets value during the analyzed period.

We can make a prevision of the grain value in the next periods if we use the extrapolation trend. If we want to make the previsions for the 37th month will make the next calculations:

$$T(25) = 160,145.42 - 3,478.77 \times 25 = 73,176.17$$

This value will be corrected with the medium seasonal coefficient previously determined:

$$T(25) = 73,176,17 \times 0,33 = 24,148,14$$

So, for January next year, the estimation for the grain production is 24,148.14 lei comparing to the same month of the last year, which was 33,633.98 lei. We notice that the estimated value is smaller and it fallows the trend previously determined, namely an involution of the grain production is registered. The same prevision can be made for the next months if there are not registered large variations of the natural factor (hail, drought, floods, etc.).

Conclusions

In this paper, we have made an analysis based on the un-seasonal industry model in the agriculture exploitations. Concrete, we concentrated in a chronological series the value of the grain during 3 years period of time. Based on those information's we made a graphic in order to see the evolution or the involution during that time. The graphic in question is not relevant because of its very big variations and it is practically impossible to see how the production develops during the last years. In this way we proceed to the un-cyclical industry of the initial series by specific remaking and calculations that led to the results presented in the table 3 of this paper. The un-seasonal values have

been represented with the trend (determined by applying the Trend function) and we obtained the graphic that shows the real state of the practical activity, without the influence of the seasonal activities. Concrete, we found out a decreasing evolution of the grain value obtained in the analyzed period. The decrease is expressed by the negative value of the "b" coefficient, determined by the method of the smallest squares or using the Linest function.

Goodman mentions that any type of research, in its final step "can bring new acknowledges, can contest the validity of what was previously accepted or can modify what it was previously accepted as being true. The research can and usually does ask new questions for the future researches to answer."

Notes

⁽¹⁾ The concept of patrimony is also used in the OPFM no. 1752/2005 even if in an exceptional way, namely at point 99 "the investment made for....by including in the exploitations' expenses in a period decided by the administration council". This fact reveals that the Romanian accounting writers are trying to give up to the notion of patrimony but we find out that the legislation has its lack. This is the reason that makes us believe that the concept in question will remain in use, at least when it comes to the accounting practicing, but also when it comes to the accounting theoreticians.

⁽²⁾ In the same legislative document are defined the next terms:

- the farmer represents the physical or legal person or a group of them no matter the legal status given by the national legislation to the them; the legal/physical person(s) in question have exploitations situated on a country territory.
- agriculture activity refers to the cultivation of the plants animals or land.

⁽³⁾ In case the exploitation has only one farm the two categories can be mixed up.

⁽⁴⁾ IASB elaborated a particular standard IAS 41 "Agriculture" in force for the financial situations

corresponding to the periods starting with 1st January 2003.

- ⁽⁵⁾ We specify that in the vision of the Romanian normalization expert, the protection and hunting dogs be considered fixed asset. This

aspect is foreseen in the Catalogue regarding the classification and normal functioning period of the fixed assets, code 2.4.1.5 Protection and hunting dogs, with a normal functioning period between 4 – 8 years.

References

- Alexander, D., Britton, A., Jorissen, A. (2003). *International Financial Reporting and Analysis*, Thomson Learning, London
- Călin, O., Ristea, M. (2000). *Bazele contabilității*, Editura Național, București
- Dobrotă, N. (1997). *Economie politică – o tratare unitară a problemelor vitale ale oamenilor*, Editura Economică, București
- Dona, I. (2000). *Economie rurală*, Editura Economică, București
- Florea, I. (1999). *Statistică descriptivă*, Editura Continental, Alba Iulia
- Halcrow, H. (1984). *Agricultural policy analysis*, McGraw-Hill, SUA
- Marian, M., Merce, E., Merce, E. (1994). *Introducere în managementul exploatațiilor agricole*, Editura Intelcredo, Deva
- Matiș, D., Pop, A. al. (2007). *Contabilitate financiară*, Editura Alma Mater, Cluj-Napoca
- Meigs, W., Meigs, R. (1986). *Accounting: The Basis for Business Decisions*, McGraw-Hill, SUA
- Pântea, I. P., „Costurile de producție. Este pregătită contabilitatea românească pentru a furniza informații pertinente cu privire la costurile de producție?”, *Revista Contabilitatea, expertiza și auditul afacerilor*, nr. 10, 2003, pp. 62 – 65
- Stere, M., „Activul la microscop. Relații cauzale în conceptul de activ”, *Revista Contabilitatea, expertiza și auditul afacerilor*, nr. 10, 2001, pp. 16 – 19
- Zahiu, L. (1999). *Management agricol*, Editura Economică, București
- Academia Română, Institutul de lingvistică „Iorgu Iordan” (1998). *Dicționar explicativ al limbii române-editia a II-a*, Editura Univers Enciclopedic, București
- Standardele Internaționale de Raportare Financiară incluzând Standardele Internaționale de Contabilitate și interpretările lor la 1 ianuarie 2006* (2006), Editura CECCAR, București
- Ordinul Ministerului Economiei și Finanțelor nr. 2374/2007 privind modificarea și completarea Ordinului ministrului finanțelor publice nr. 1752/2005 pentru aprobarea reglementărilor contabile conforme cu directivele europene*, Monitorul Oficial nr. 25/2008
- Legea contabilității republicată nr. 82/1991*, Monitorul Oficial nr. 48/2005
- Ordinul nr. 1752/2005 pentru aprobarea reglementărilor contabile conforme cu directivele europene*, Monitorul Oficial nr. 1080 bis/2005
- Ordinul nr. 302/2005 privind realizarea Registrului fermelor*, Monitorul Oficial nr. 401/2005
- Ordinul nr. 152/2004 privind stabilirea termenilor de referință pentru organizarea și funcționarea Sistemului integrat de administrare și control*, Monitorul Oficial nr. 186/2004
- Ordonanța de Urgență nr. 108/2001 privind exploatațiile agricole*, Monitorul Oficial nr. 352/2001

The Correlation between Fiscal Policy and Economic Growth

■

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***Abstract.** The analysis of the correlation between fiscal policy and economic growth represents an important and very debated topic in the theoretical and empirical literature. In this study we test the correlation between fiscal policy and economic growth in Romania, for the period 1990-2007. The correlation pattern between the real growth rate of the GDP and the categories of budgetary revenues reveals a link of negative causality between the economic growth and fiscal revenues.*

Key words: fiscal policy; economic growth; budgetary revenues; taxes.

■

JEL Codes: E62, H22, O11.

REL Codes: 8E, 8K, 18G.

1. Introduction

In order to stimulate the economic growth by means of the fiscal policy, the state has more instruments: (a) the financing of direct investments, which the private sector would not provide in adequate quantities; (b) the efficient supply of certain public services which are necessary to ensure the basic conditions to display the economic activity and the long-term investments; (c) the financing of public activities so as to minimize the distortions to come up with the decisions to spend and invest proper to the private sector.

In this paper we study the impact of the financing of public activities through fiscal revenues on the economic growth for Romania, in the period 1990-2007. This topic represents a very debated subject in the finance literature. There are many empirical studies that test this correlation in an empirical context. In the following table we present the most relevant studies regarding the effects of taxation on economic growth – not even one study concludes that higher taxation stimulates economic growth; most of the studies demonstrate that taxation has a significant negative effects on economic growth.

The impact of taxation on economic growth – empirical studies

Table 1

Authors	Econometrical methods	Results
Canto, Webb (1987)	pooled cross-section/time-series regression	Significant negative effect
Cashin (1995)	cross-section regression	Significant negative effect
Dowrick (1992)	cross-section regression	Significant negative effect
Easterly, Rebelo (1993)	cross-section regression	Non-concludent/no effect/complex effect
Easterly, Rebelo (1993)	pooled cross-section/time-series regression	Non-concludent/no effect/complex effect
Engen, Skinner (1992)	cross-section regression	Significant negative effect
Garrison, Lee (1995)	cross-section regression	Significant negative effect
Helms (1985)	pooled cross-section/time-series regression	Significant negative effect
Kocherlakota, Yi (1996)	time-series regression	Non-concludent/no effect/complex effect
Kocherlakota, Yi (1997)	time-series regression	Significant negative effect
Koester, Kormendi (1989)	cross-section regression	Non-concludent/no effect/complex effect
Koester, Kormendi (1989)	cross-section regression	Non-concludent/no effect/complex effect
Marsden (1983)	pairs comparison	Significant negative effect
Mendoza, Milesi-Ferretti, Asea (1996)	pooled cross-section/time-series regression	Non-concludent/no effect/complex effect
Skinner (1987)	cross-section regression	Significant negative effect
Yi, Kocherlakota (1996)	time-series regression	Significant negative effect
Yu, Wallace, Nardinelli (1991)	pooled cross-section/time-series regression	Significant negative effect

Empirical studies show that taxation has a negative effects on economic growth, but it is difficult to measure the effects of budgetary spending financed by fiscal

revenues – the overall effect of the distortionary revenues and the positive consequences of the budgetary spending could generate a better functioning of the private sector. The fiscal revenues are not necessary used for financing those spendings that lead to economic growth, perhaps because of the inefficiency of the political system or because of the redistribution policies, not reflected in the growth rate of GDP (Atkinson, 1995).

The budgetary revenues can be classified according to their effects over the

decisions of the private agents as regarding the distortionary fiscal income, non-distortionary fiscal income and other incomes. The correlation pattern between the real rate of growth of the GDP and the three categories of income reveals a link of positive causality between the economic growth and non-distorted taxes and negative between the distorted taxes and other incomes.

In order to test the impact of fiscal policy on economic growth, Barro, Sala-i-Martin (1995) suggest to analyze separately the categories of budgetary revenues:

Classification for budgetary revenues

Table 2

Budgetary revenues	Classification
Distortionary fiscal revenues	Personal Income taxes Corporate Income Taxes Social Security Contributions
Non-distortionary fiscal revenues	Property Taxes Value Added Tax Excise Duties
Other revenues	Other fiscal revenues Other non-fiscal revenues

This classification is very important because it allows to identify the influence of each category on economic growth, because the finance literature offers models that argue that distortionary fiscal revenues have a negative impact on economic growth, while non-distortionary fiscal revenues and other revenues have not significant effects.

2. Empirical study

For testing the impact of fiscal policy, measured by overall tax burden, on the economic growth we use:

- regression technique
- interval analysis.

The variables used in our study are:

(1) rate of real GDP growth, noted ECONOMIC_GROWTH, measuring economic growth;

(2) fiscal revenues on GDP, noted FISCAL_REVENUES, measuring fiscal policy;

(3) distortionary fiscal revenues, noted DISTORTIONARY_FISCAL_REVENUES, which contain personal income taxes, corporate income taxes, social security contributions, property taxes;

(4) non-distortionary fiscal revenues, noted NONDISTORTIONARY_FISCAL_REVENUES, which contain value added tax, excise duties;

(5) other revenues, noted OTHER_REVENUES, which contain other fiscal revenues and other non-fiscal revenues.

The data base contains annual values of the indicators in the period 1990-2007, for Romania.

Descriptive statistics for the variables

Table 3

	ECONOMIC_GROWTH	FISCAL_REVENUES	DISTORTIONARY_FISCAL_REVENUES	NONDISTORTIONARY_FISCAL_REVENUES	OTHER_REVENUES
Mean	1.022222	29.33944	17.13889	8.727778	6.494444
Median	3.900000	28.25500	16.50000	8.750000	6.550000
Maximum	8.400000	35.49000	23.20000	11.80000	10.70000
Minimum	-12.90000	26.49000	13.30000	6.200000	4.600000
Std. Dev.	6.120799	2.491377	2.991584	1.851170	1.455000
Skewness	-0.894812	1.191139	0.802036	0.109500	1.174762
Kurtosis	2.613983	3.418103	2.594797	1.757680	4.852636
Jarque-Bera	2.513824	4.387544	2.052927	1.193490	6.714395
Probability	0.284531	0.111495	0.358272	0.550601	0.034833
Sum	18.40000	528.1100	308.5000	157.1000	116.9000
Sum Sq. Dev.	636.8911	105.5183	152.1428	58.25611	35.98944

Source: authors' calculation.

In order to analyze the correlation between fiscal policy and macroeconomic variables we apply regression technique and interval analysis for the economic growth and fiscal policy variables.

We estimate the following regression:

$$ECONOMIC_GROWTH = c(1) + c(2) \times FISCAL_REVENUES \quad (1)$$

Using OLS for estimating the regression's coefficients for the period 1990-2007 we obtain the equation:

$$ECONOMIC_GROWTH = 46.645 - 1.5533 \times FISCAL_REVENUES$$

According to this equation, the relation between overall tax burden and economic growth rate is indirect: 1% change of fiscal revenues corresponds to a change of economic growth in the opposite direction by 1.5533%.

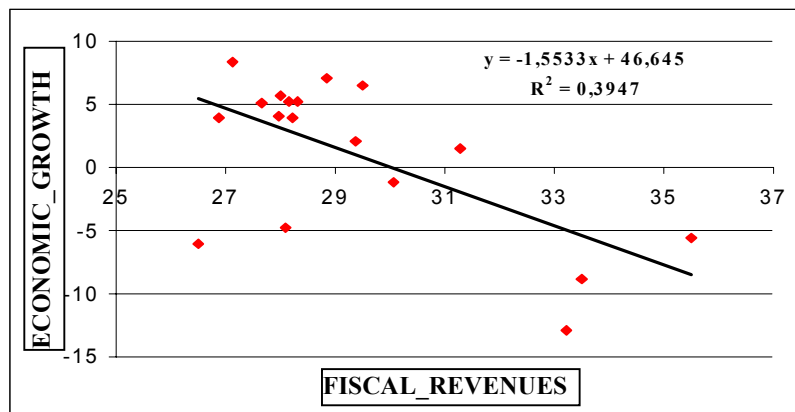


Figure 1. The regression equation between economic growth and overall tax burden

The R-squared measures the success of the regression in predicting the values of the dependent variable within the sample; it may be interpreted as the fraction of the variance of the dependent variable explained by the

independent variables. Our regression has $R^2=39.47\%$, so that 39.47% of the variance of economic growth rate's change is explained by the change of overall tax burden.

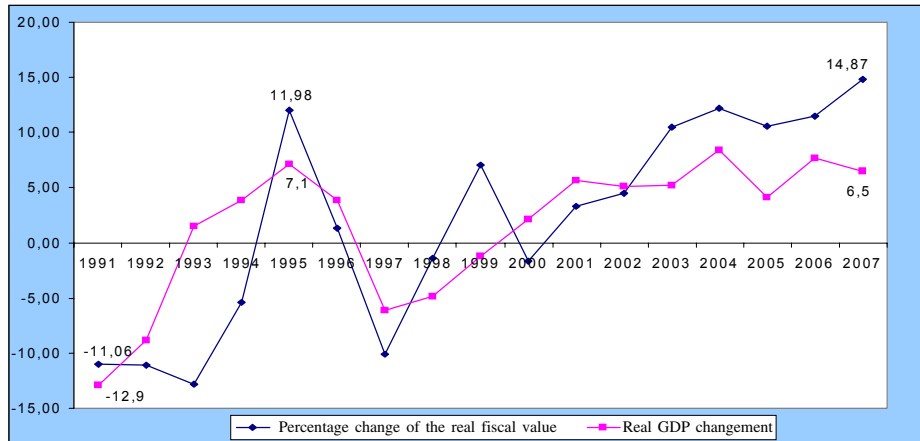


Figure 2. The correlation between relative changes of real fiscal revenues and changes of GDP

Using interval analysis we group into 3 intervals the annual values of both indicators. This technique shows that for the period 1990-1992 and for the year 1999, characterized by high level of tax burden,

the economic growth rate was negative. Notice that the highest rate of economic growth was obtained in 2004, a year with low level of tax burden.

Interval analysis for economic growth rate and overall tax burden

Table 4

		Economic growth rate		
		1 [-12.9; -1.2]	2 [1.5; 5.1]	3 [5.2; 8.4]
Tax burden	1 [26.49; 27.99]	1997	1996, 2002, 2005	2001, 2004
	2 [28.11; 29.37]	1998	1994, 2000	1995, 2003, 2006
	3 [29.5; 35.49]	1990, 1991, 1992, 1999	1993	2007

Source: authors' calculation.

In order to explore the effects of fiscal policy on economic growth, we group the budgetary revenues according to Barro, Sala-i-Martin (1995), depending on the theoretical impact of these revenues on economic growth, in: distorsionary fiscal revenues

(personal income taxes, corporate income taxes, social security contributions, property taxes), non-distorsionary fiscal revenues (value added tax, excise duties), and other revenues (other fiscal revenues and other non-fiscal revenues).

Correlation matrix – period: 1990-2007

Table 5

	ECONOMIC_GROWTH	DISTORTIONARY_FISCAL_REVENUES	NONDISTORTIONARY_FISCAL_REVENUES	OTHER_REVENUES
ECONOMIC_GROWTH	1.000000	-0.724916	0.205424	-0.734671
DISTORTIONARY_FISCAL_REVENUES	-0.724916	1.000000	-0.378029	0.686974
NONDISTORTIONARY_FISCAL_REVENUES	0.205424	-0.378029	1.000000	-0.578903
OTHER_REVENUES	-0.734671	0.686974	-0.578903	1.000000

The correlation matrix shows a negative relation between distortionary fiscal revenues and economic growth, while the nondistortionary fiscal revenues are directly correlated with real growth rate of GDP. The other revenues are negatively correlated with the economic growth.

We estimate the effect on economic growth of these categories of budgetary revenues by applying OLS regression for the following equation:

$$ECONOMIC_GROWTH = C(1) + C(2) \times DISTORTIONARY_FISCAL_REVENUES + C(3) \times NONDISTORTIONARY_FISCAL_REVENUES + C(4) \times OTHER_REVENUES \quad (2)$$

Regression results: economic growth depending on distortionary fiscal revenues, nondistortionary fiscal revenues and other revenues

Table 6

Dependent variable	ECONOMIC_GROWTH	
	Coefficient (ecuația 2)	Coefficient (ecuația 3)
CONSTANT	41.93573	27.89033
DISTORTIONARY_FISCAL_REVENUES	-0.828950	-0.853232
NONDISTORTIONARY_FISCAL_REVENUES	-1.053860	-----
OTHER_REVENUES	-2.695899	-1.885405
R ²	0.699046	0.631577

In the first regression, pvalue for nondistortionary fiscal revenues is greater than 5%, so that we estimate following regression:

$$ECONOMIC_GROWTH = C(1) + C(3) \times NONDISTORTIONARY_FISCAL_REVENUES + C(4) \times OTHER_REVENUES \quad (3)$$

In both regressions, the distortionary fiscal revenues have a negative impact on economic growth. The estimation of the impact of taxation on the economic growth ignores the interdependences between budgetary revenues, budgetary spending, deficit and economic growth. The theory of economic growth suggests that the changes in the budgetary revenues from the point of view of the forms of the distortionary taxes to the non-distortionary taxes have stimulating effects over the growth process, while the changes from the point of view of budgetary spending from productive categories to categories considered to be unproductive, they hinder the economic growth. A better approach is to estimate the effect on economic growth of budgetary revenues, budgetary expenses and fiscal deficit.

The impact of budgetary revenues and expenses on economic growth

Table 7

Financed by:		Budgetary expenses		Deficit
		Productive	Unproductive	
Taxes	Distortionary	Positive/negative (for high/low level)	Negative	?
	Nondistortionary	Positive	0	Negative
	Deficit	?	negative	-

In conclusion, even if all budgetary expenses are productive, financing them by distortionary fiscal revenues could have a negative effect on economic growth. If the Ricardian equivalence is not valid, the budgetary deficit has a negative impact on economic growth, because of the reducing effect on savings; Tanzi, Zee (1997) argue that if budgetary deficit is perceived as unsustainable, the changes of fiscal, budgetary and monetary policies were anticipated, leading to a decline in economic growth.

1. Concluding remarks

In order to analyze the impact of fiscal policy over the economic growth, we classified the budgetary revenues according to their effects over the decisions of the private agents as regarding the distortionary fiscal revenue, non-distortionary fiscal revenues and other incomes. The correlation pattern between the real growth rate of the GDP and the three categories of budgetary revenues reveals a link of negative causality between the economic growth and fiscal revenues.

Testing the effects of the fiscal policy on the economic growth using the regressive method leads us to the following conclusions: both the distortionary and nondistortionary fiscal revenues have a negative impact on the real growth rate of GDP.

But it is important to be sceptical regarding these equations - the estimation of the impact of taxation on the economic growth ignores the interdependences between budgetary revenues, budgetary spending, deficit and economic growth. The theory of economic growth suggests that the changes in the budgetary revenues from the point of view of the forms of the distortionary taxes to the non-distortionary taxes have stimulating effects over the growth process, while the changes from the point of view of budgetary spending from productive categories to categories considered to be unproductive, they hinder the economic growth.

Applying the regression technique for the period 1990-2007, we can conclude that in Romania the effects of the distortionary and nondistortionary taxes on economic growth are negative.

References

- Atkinson, A., "The Welfare State and Economic Performance", *National Tax Journal*, 1995
- Barro, R., Sala-i-Martin, X. (1995). *Economic Growth*, McGraw-Hill, Inc.
- Braşoveanu Obreja, Laura (2007). *Impactul politicii fiscale asupra creşterii economice*, Editura ASE, Bucureşti
- Cashin, P., "Government Spending, Taxes, and Economic Growth", *IMF Staff Papers*, 1995
- Dowrick, S., Nguyen, D., "OECD Comparative Economic Growth 1950-85: Catch-up and Convergence", *American Economic Review*, 1989
- Easterly, W., Rebelo, S., "Fiscal Policy and Economic Growth: An Empirical Investigation", *NBER working paper*, 1993
- Engen, E., Skinner, J., "Taxation and economic growth", *NBER working paper*, 1996
- Garrison, C., Lee, F., "The Effect of Macroeconomic Variables on Economic Growth Rates: A Cross-Country Study", *Journal of Macroeconomics*, 1995
- Kocherlakota, N., Yi, K., "Is There Endogenous Long-Run Growth? Evidence from the United States and the United Kingdom", *Journal of Money, Credit and Banking*, 1997
- Mendoza, E., Milesi-Ferretti, G., Asea, P., "On the Effectiveness of Tax Policy in Altering Long-Run Growth: Harberger's Superneutrality Conjecture", *Journal of Public Economics*, 1997
- Mendoza, E., Razin, A., Tesar, L., "Effective Tax Rates in Macroeconomics: Cross-Country Estimates of Tax Rates on Factor Incomes and Consumption", *Journal of Monetary Economics*, 1994
- Tanzi, V., Zee, H., "Tax Policy for Emerging Markets - Developing Countries," *IMF Working Papers*, 1997

The Analysis of the Potential Environmental Benefits by Investigating the Hedonistic Price

■

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***Abstract.** Consumers get some usefulness from the attributes of heterogeneous products and they adjust their acquisitions as a response to the existing differences. Producers or vendors confront with varying prices depending on the scale of attributes provided. A plan for balancing the prices is developed as a consequence of the market interaction between the consumers and suppliers (by analogy it happens in the case of the interaction between employees and employers on the labour market). Taking into consideration the late concepts regarding hedonistic price, the article presents a way of analysis of potential benefits that environment may offer to human communities by hedonistic price investigation, using regression as instrument.*

Key words: regression; environmental benefits; variation explanation; hedonism.

■

JEL Codes: Q11, Q57.

REL Codes: 10D, 15C.

The model of establishing the hedonistic prices usually applies to the heterogeneous products and services: occupational opportunities, real estate components, computers, and machines etc. The models explain the price variations using information about their attributes. For example, salaries determination is expected to include the characteristics of an employee (educational level, age) and the job characteristics (risk of on-job accidents).

The hedonistic price helps in measuring the marginal function of damages. Such a function measures the benefits to be received by an individual or group of individuals if a damaging phenomena is going to be reduced in a certain proportion.

Similar concepts: hedonistic salary and hedonistic property

The analysis of the hedonistic salary, known under the name of salary – risk analysis, starts from the pre-requisite that individuals choose jobs with a high occupational risk in exchange for some high salaries. Essentially, the jobs with a higher risk are paid with higher salaries. Such an analysis is made through the technique of statistical regression using the analysis model that takes into calculation the salary level as a dependent variable and the risk of the salary paid job as an independent variable.

The statistical model should allow the separation of the compensatory part associated with the risk of occupational health from other characteristics of the job

including the management responsibility, security of job etc. The salary level is also influenced by the sector/domain in which the individual is employed, by the zonal characteristics and by the employee's personal characteristics (age, education, experience). All these data are necessary to disentangle the effects of the employee's characteristics from the ones of the job's attributes in determining the payable salaries.

In an analysis of the hedonistic salary the most difficult issues to solve are:

- the necessary data;
- implications;
- how to determine risk;
- model for estimation.

The necessary data: the analyses in this category require huge quantities of information on the behaviour of market labour. The employee data and the job characteristics are generally collected through the statistical inquiry and the risk info is frequently taken over from published sources, existing at the companies' level or at the level of the business domain.

Implications: the high risky jobs tend to attract the least holdouts when assuming risk in question and they do not always ask for compensation adequate to facing risk.

How to determine risk: certain analyses use actual calculation algorithms to determine the risk levels that an employee confronts with, that are not limited to the occupational risks including the morbidity and mortality risks the individual faces with at job and out of job.

Model for estimation

This must contain a sufficiently great number of variables so that the estimation would be clear. The analysis for determining the value of the hedonistic real estate property are based on the fact that individuals perceive dwelling as lots of attributes and obtain various levels of usefulness from different combinations of those attributes. When transactional decisions are made, individuals exchange money and attributes. The exchanges reveal the marginal values of the attributes representing the nucleus of the hedonistic real estate property value. In such analyses the technique of the statistical regression on real estate market information are used to examine increases in the values of properties associated with the different attributes.

Structural attributes (number of bedrooms and the age of the house), the attributes of the surroundings (demographic structure of population, number of crimes, quality of school) and the environmental attributes (air quality and nearby places to divert waste) could influence the values of properties.

When assessing an environmental improvement it is essential to separate the effect on a real estate property of the relevant environmental attributes from the effects of the other attributes. The applications lay stress on the relationships between the real estate property values and the environmental attributes such as: air quality, water quality, location nearby places to divert waste and the landscape characteristics. Based on the data collected

for a cross-section of transactions, the price correlated with the observable attributes are analyzed with the help of the statistical regression and a hedonistic price function is estimated.

In such an analysis the most difficult issues to solve are:

- the necessary information;
- recording errors;
- measuring the environmental attributes;
- duration of effect on environments;
- model for estimation.

Necessary information: analyses require huge quantities of non-aggregated information. The prices of the market transactions for land surfaces or dwellings are preferred to the aggregated data (info obtained from the inventory of dwellings), as the aggregating problems can thus be avoided. Data on attributes can include: the characteristics of dwellings, seasonal sales, characteristics of surroundings (schools and parks) demographic characteristics and environmental quality.

Recording errors: there may appear errors in measuring the prices (aggregated data) and errors in measuring the statistical characteristics.

Measuring the environmental attributes: available information referring to the air or water quality is often used, and then is determined the way the info can be relevant also for the properties under study.

Duration of effect on environments: some effects on the environment manifest differently in time, and others can be understood differently in time depending on the available information.

Model for estimation: The selection of the function form, definition of the market size and identification the representative variables can create problems for the analysts.

Choosing the model of estimation: the regression models used in the statistical analysis of the environmental benefits through the technique of the hedonistic price are simple or multiple, linear or non-linear. The houses and land surfaces are the most commonly goods submitted to the statistical analysis through the technique of the hedonistic price.

Supposing there are two real estate properties with identical characteristics (built surface, land surface around the house, number of bedrooms etc.), except that one is near by a tip and the other farther away, the prices of the two louses are compared; and the price difference is assigned to the most expensive having the advantage of the environmental benefits.

If the real estate property nearby the tip is EUR 100,000 and the other is EUR 150,000, we could say that shutting down the tip would bring a benefit of EUR 50,000 to the owners of the cheaper house.

We will refer to a study that presented a mountain resort community. The existence of a tip at very close distance affects the quality of water from the lake, drinking water, air and soil and has different effects on community. The statistical observation period was: July-November 2007. The properties under study were those located at a distance of seven kilometres away from the tip at the most. The statistical characteristics are: the property price (C1),

distance to the tip (C2), the house surface (C3) and the property surface around the house (C4). The collected data are included in table 1.

Distribution of properties depending on the statistical variables

Table 1

C1 mii euro	C2 km	C3 m ²	C4 m ²	C1 mii euro	C2 km	C3 m ²	C4 m ²
100	1	78	350	120	1	100	1543
110	2	78	370	100	1	100	654
110	2	78	500	115	2	100	384
140	3	80	1000	200	4	100	1783
140	4	80	100	300	7	100	2900
145	5	80	119	250	3	107	1000
145	6	81	200	150	3	108	100
150	7	81	700	150	3	109	67
110	1	85	250	190	1	110	589
120	2	85	300	260	3	110	500
120	3	85	200	300	5	110	500
200	4	85	700	300	6	110	500
150	5	85	200	200	1	110	476
115	6	85	160	125	1	120	200
100	1	85	200	200	3	127	700
130	2	85	312	180	3	128	300
190	7	85	207	180	1	141	300
170	6	85	226	230	5	142	399
100	1	93	167	300	7	142	2000
115	2	94	243	200	3	150	1000
119	1	95	156	200	1	150	1000
119	1	95	678	180	6	150	200
200	7	95	987	130	3	150	350
110	2	98	468	210	1	170	2000
250	6	98	1678	260	7	180	300

The distance to the tip should have an influence on the price of the house. Simple regression is used when there is a linear dependency between the two characteristics; it can be used when dependency is non-linear, but through various transformations it can be turned into a link for which parameters can be expressed. In this model,

Y will be the price (dependent variable), and X the distance to the tip (explicative variable).

In the linear model, we will say that the dependent variable is expressed linear, depending on the independent variable. As variable Y is also influenced by a series of randomly, non-quantifiable factors, we are going to consider a probabilistic model of analyzing the dependency written in the form $Y = \alpha + \beta \times X + \varepsilon$, where ε is the random variable, and $\alpha, \beta \in R$ are the parameters of the regression model.

If, as a consequence of a statistical observation, for the two-dimensional random (X, Y) variable, the series of values $(x_i, y_i), i = \overline{1, n}$, has been obtained, then we could write $E(Y|X) = \alpha + \beta \times X$, and for each pair of values $Y_i = \alpha + \beta \times x_i + \varepsilon_i$, where $\varepsilon_i, i = \overline{1, n}$ are “achievements” of ε variable which satisfies the hypotheses, the regression model will write: $E(\varepsilon_i) = 0, V(\varepsilon_i) = \sigma_\varepsilon^2$ and $cov(\varepsilon_i, \varepsilon_j) = 0 (\forall) i, j = \overline{1, n}$ and $i \neq j$.

Observing these hypotheses, the regression model will write: $E(y_i|x_i) = \hat{y}_i = \hat{\alpha} + \hat{\beta} \times x_i$, where $\hat{\alpha}, \hat{\beta} \in R$ are the estimators of the two parameters.

More often the estimation of parameters is achieved through the method of the least squares based on determining the line of regression which should minimize the adjusting errors, $e_i = y_i - \hat{y}_i$. Thus, the estimators of the two parameters are given by the relations

$$\hat{\beta} = \frac{n \sum_i x_i \times y_i - \sum_i x_i \sum_i y_i}{n \sum_i x_i^2 - \left(\sum_i x_i \right)^2} \text{ and } \hat{\alpha} = \bar{y} - \hat{\beta} \times \bar{x}.$$

Through processing the parameters' values are obtained: $\hat{\alpha} = 118.235$ and $\hat{\beta} = 15.335$.

The parameter we are interested in for this analysis is the one corresponding to the distance between the real estate property and the tip. Therefore, if we were to move 1 km away from the tip, the value of our property would increase on average with EUR 15,335. Mention should be made that the results of the suggested model are conclusive only for certain distances up to the tip. The price difference between a real estate property located at 10 km and another one at 15 km away from the tip will not necessarily be of EUR 45,000. The results can only be conclusive just for the cases in which the environmental effects considered are felt.

In the case of the simple connection based on graphical representation, some hypothesis can be issued as regards the non-linear form of the dependency of price Y on the registered factor X. The testing of these two hypotheses may be achieved, for example, on the basis of the method of the least squares. In case the dependency is appreciated as a second degree parabola, the regression model has the form $Y_x = a_0 + a_1 \times x + a_2 \times x^2 + \varepsilon$. Considering from the test condition $\sum (y - \hat{a}_0 - \hat{a}_1 \times x - \hat{a}_2 \times x^2)^2 = 0$, the parameters of the function are determined. Through processing we get the values of the parameters $\hat{a}_0 = 121.4$; $\hat{a}_1 = 12.9$ and $\hat{a}_2 = 0.32$.

In case the dependency is appreciated as a hyperbola, the regression model has the form $Y_x = a_0 + \frac{a_1}{x} + \varepsilon$, and in case of a relation of a logarithmic type we have the form $Y_x = a_0 + a_1 \times \lg x$; in the case of a relation

of an exponential type, the form of the model is $Y_x = a_0 \times a_1^x$.

The values of the parameters of the regression functions are presented in table 2.

The estimated values of the parameters of the regression functions

Type of model	\hat{a}_0	\hat{a}_1
Hyperbolic model	207.76	-78.39
Logarithmic model	128.03	42.7
Exponential model	119.56	0.087

We go forward with the analysis in order to study the hedonistic price through the interaction between the distance of the real estate property up to the tip and the surface around the house, being obvious that the tip's environmental effects jeopardize the environment nearby. In this case, the regression model has the form $Y = a_0 + a_1 \times X_1 + a_2 \times X_2 + \varepsilon$. To determine a_0 , a_1 and a_2 the method of the least squares is recommended by minimizing the function

$$\sum_i^n (y_i - a_0 - a_1 \times x_{1i} - a_2 \times x_{2i})^2$$

where $((y_i, x_{1i}, x_{2i}), i = \overline{1, n})$ represents the series of values registered. Though processing, the parameters of the regression function have the following values: $a_0=99.5$; $a_1=13$ and $a_2=0.05$.

So, if we were to leave 1 km away from the tip, the value of the real estate property would rise by an average amount of EUR 13,000 as long as the courtyard surface is attractive.

We include the house surface as an independent variable in the analysis. Generally, the regression model is written

under the matrix form $Y = X \times \beta + \varepsilon$, where $Y \in M(T,1)$, $X \in M(T,p)$, $\beta \in M(p,1)$. In order to estimate the parameters, we introduce the following hypotheses:

H1: The exogenous variables are not co-linear. Thus, we can say there are not any non-null real numbers $\lambda_1, \lambda_2, \dots, \lambda_p$, for which

$$\sum_{t=1}^p \lambda_t \times x_{it} = 0, t = \overline{1, T}.$$

If the variables X_1, X_2, \dots, X_p are co-linear, then $[X \times X^T] = 0$.

In this case, matrix X is not reversible and the parameters of the model cannot be estimated.

H2: The random variable ε satisfies the hypotheses and $V(\varepsilon) = E(\varepsilon \times \varepsilon^T) = \sigma^2 \times I$. The variables $\varepsilon_t, t = \overline{1, T}$ have the same variance and are non-correlated. We are going to say there is homoscedasticity and the phenomenon of error self-correlation does not manifest itself. Moreover there is considered that ε follows a normal T dimensional distribution. If these hypotheses are satisfied, $\hat{Y} = X \times a$, applying the method of the least squares, we get $a = (X^T \times X)^{-1} X^T \times Y$. The matrix $(X \times X^T)^{-1}$ exists, because X_1, X_2, \dots, X_p are linearly independent. Thus,

$$\begin{aligned} a &= (X^T \times X)^{-1} X^T (X \times \beta + \varepsilon) = \\ &= \beta + (X^T \times X)^{-1} X^T \times \varepsilon \end{aligned}$$

The regression model may also have a multiplying form $Y_{x_1, x_2} = a_0 \times a_1^{x_1} \times a_2^{x_2} \times \dots \times a_n^{x_n}$ in which case through logarithm the additive form can be obtained.

Through processing, based on an additive model, the parameter of the interesting variable is 13.245, its interpretation being similar to the previous case.

The measurement of the direction of the established connection begins through the analysis of co-variation. It is used as a tool indicator in measuring the intensity of the linear connection between the two variables. It is given by the relation

$$cov(x, y) = \frac{1}{n} \sum_{i=1}^k \sum_{j=1}^p (x_i - \bar{x})(y_i - \bar{y}) \times n_{ij}$$

In case the majority of deviations $(x - \bar{x})$ and $(y - \bar{y})$ are of the same sign (direction), the co-variation is positive and it indicates a direct statistical connection, otherwise the co-variation is negative and it indicates an inverse statistical connection.

The analysis of co-variation has a series of insufficiencies as it is not a normalized indicator for which reason to measure the intensity of the connection, the correlation coefficient (r) is worked out. The bigger $|r|$ is, the stronger the intensity of the connection between the two variables is. If the two variables are independent, then $r = 0$, the reverse not being generally true. So, if $r = 0$, it does not implicitly result that the two variables are independent. For a series of the form $((x_i, y_i), i = \overline{1, n})$, the linear correlation coefficient is determined with the relation

$$r_{y/x} = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{[\sum (x_i - \bar{x})^2][\sum (y_i - \bar{y})^2]}}$$

Values of determination and correlation ratio in the case of simple connections

Table 3

Type of model	Value of determination ratio	Value of correlation ratio	Standard error of estimation
Linear model	0.303	0.551	50.377
Parabolic model	0.304	0.551	50.897
Hyperbolic model	0.202	0.449	53.918
Logarithmic model	0.269	0.519	51.602
Exponential model	0.312	0.558	0.281

The ratio of determination is worked out through comparing the price variation (Y) as a function of the (X) factorial variable modification, with the total variance of the price. Based on the contents of the two types of variances, we can write the relationship of measuring the intensity of connection

$$\text{between the two } R^2 = 1 - \frac{\sum_{i=1}^n (y_i - \hat{Y}_{xy})^2}{\sum_{i=1}^n (y_i - \bar{y})^2},$$

where \bar{y} is the average price and Y_{xy} is the theoretical measure of the price determined on the basis of the regression equality. The indicator has the advantage of being also used in the cases where multiple regressions is resorted to. Extracting the square root, we get the correlation ratio, which is one of the most adequately measuring indicators for the intensity of the statistical connection.

$$R_{y/x} = \sqrt{R^2} = \sqrt{1 - \frac{\sum_{i=1}^n (y_i - \hat{Y}_{xy})^2}{\sum_{i=1}^n (y_i - \bar{y})^2}}$$

The correlation ratio is analyzed similarly with to the coefficient of correlation. The sign of the correlation relationship is given by the sign of the coefficient of regression (Table 3)

The simple relations established between the price of the real estate property and its distance from the tip, irrespective of the model used, backed up the initial presupposition, the relationship not being very strong. The exponential model explains the most of the variations in the house prices (31%) depending on their distance from the tip. Actually, this proves to be the best model for estimating the simple connections analyzed, having the smaller estimating error.

In the case of the multiple models (table 4), the issue of measuring the intensity between variables can be approached as follows:

- dependence on all the independent variables;
- partial dependence.

The dependence on all the independent variables:

In order to determine the dependence degree of the price Y upon all the independent variables, we will calculate the multiple determination and correlation ratio based on

$$R^2 = 1 - \frac{\sum_{t=1}^T (y_t - \hat{y} \times \overline{x_1, x_2})^2}{\sum_{t=1}^T (y_t - \bar{y})^2}$$

Values for the determination and correlation ratio in the case of connections

Table 4

Model type	Values for the determination ratio	Values for the correlation ratio	Standard error of estimation
Bi-factorial model	0.486	0.697	43.739
Tri-factorial model	0.628	0.792	37.62

This implies the building up of the correlation matrix of the multiple model of regression:

$$R = \begin{pmatrix} \Gamma_{y/y} & \Gamma_{y/x_1} & \dots & \Gamma_{y/x_p} \\ \Gamma_{x_1/y} & \Gamma_{x_1/x_1} & \dots & \Gamma_{x_1/x_p} \\ \dots & \dots & \dots & \dots \\ \Gamma_{x_p/y} & \Gamma_{x_p/x_1} & \dots & \Gamma_{x_p/x_p} \end{pmatrix}$$

The main characteristics of the matrix are that each element is calculated following the formula of the linear coefficient of the variables correlation specified as the case may be and $\Gamma_{ij} \in [-1,1]$.

Partial dependence

Determining the partial correlation ratios, respectively the determinant

coefficients for measuring the variable depending on each of the dependency degree of the resulting factorials posted in (table 5):

Values for the relationship of determination and correlation

Table 5

Model type	Dependence on	Values for the partial correlation ratio
Bi-factorial model	distance to the tip	0.551
	land surface around the house	0.523
Tri-factorial model	distance to the tip	0.551
	land surface around the house	0.523
	House surface	0.480

The distance from the real estate property to the tip in interaction with the land surface around the house explains almost half of the price variations for the real estate properties analyzed, each of the two factors directly influencing the price increase with a weighted intensity.

The degree of explaining the increase in the real estate properties prices as we go away from the tip increases considering the house surface. That explains over 60% of the price variations for real estate properties. The rest is accounted for by the other characteristics of the real estate properties: the number of rooms and bathrooms, garages, utilities, the interior arrangements (tiles,

parquet, central heating, fireplace, air conditioning) and those in the courtyard (terraces, trees, flowers, swimming pool, alleys). The house surface would have been expected to be the most influencing factor of the real estate price. The values of the partial correlation ratio show that the distance from the tip represents the determining factor in the price variations of the real estate properties analyzed. Thus, the environmental benefits provided by shutting down the tip and neutralizing its effects are measured in monetary terms for each of the individuals who might benefit from the qualitative improvements of the surrounding environment nearby.

References

- Droesbeke, J.J., Fichet, B. (1992). *Modeles pour l'analyse des donnees multidimensionnelles*, Editura Economica, Paris
- Droesbeke, J.J., Fichet, B., Tassi, P. (1989). *Analyse statistique des donnees de survie*, ASU, Editura Economica, Paris, 1989
- Isaic-Maniu, Al., Grădinaru, A., Voineagu, V., Mitruț, C. (1994). *Statistică teoretică și economică*, Editura Tehnică, Chișinău
- Isaic-Maniu, Al., Korka, M., Voineagu, V., Mitruț, C. (1998). *Statistică*, Editura Independența Economică, Pitești
- Rojanschi, V., Bran, F., Diaconu, G. (2002). *Politici și strategii de mediu*, Editura Economică, București
- Vișan, S., Crețu, S., Alpopi, C. (1998). *Mediu înconjurător: poluare și protecție*, Editura Economică, București

New Trends for Re-design the IT Companies

■

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***Abstract.** As it is known, the management adaptability to the changes taking place in the environment where it is acting represents a key factor for survival and development of an organization. As a reaction to the external signals, the internal change may be superficial when it affects only the development of activity in different sectors, or might be profound, when it changes the main processes and rules of the business and even the philosophy of the company's existence. Speaking about structural changes, one of the most common approaches of the modern management is the re-design of the business architecture. The new architectural models such as Service Oriented Architecture (SOA), presented in this paper, come with important advantages, but their implementation is not always very easy.*

This paper tries to present some of the most common encountered contextual characteristics which are able to start the implementation of Service Oriented Architecture, some advantages of this concept as well as some practical approaches of implementing.

Key words: service oriented architecture; business process management (BPM); governance tools of service oriented architecture; OODA loop; service oriented architecture philosophy.

JEL Codes: C8, M15.

REL Codes: 5C, 14B, 14K.

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1. Organizational change

The change within an organization might be both an impartial process when it spontaneously occurs following to the development of the company external environment as well as following to its new position within the social-economic system, and a partial process when it has been occurred and controlled through managerial decisions. In fact, those two types of changes are correlated and interdependent between them. While the changes following to the evolution of the social-economic system tend to determine the loss of stability related to the organization objectives according its strategy, those changes that have been occurred due to the decisions of the management will annihilate the result of the first category of disturbances either by measures on short-term (tactical changes) as it is shown in figure 1, or by complying with the whole strategy with the new realities (strategic changes).

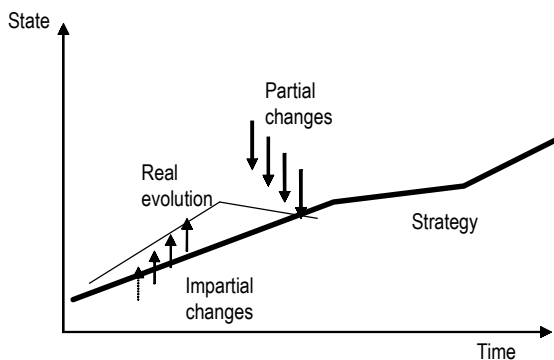


Figure 1. *Interactions between impartial and partial changes*

In category of partial changes, which are determined by external occurrences and further on they will be named external disturbances, are included several occurrences and situations following to the

evolution of the market, technology, complexity of superstructure, globalization, growth of external stakeholders power or due to political and social changes, such as the consolidation of the European framework. Speaking about IT&C field of activity, we might exemplify the above stated situations with the organizational changes that have been determined by the appearance and development of the electronic commerce, or related to software production, by the evolution of the well known company, Netscape, producer of Internet navigation applications which has followed the Microsoft decision to incorporate in its own products, free, its own browser, Internet Explorer.

Relating to the impartial or the internal changes, this process might imply either restricted changes, so called “made up changes”, or profound changes related to the working mode or working philosophy of the company or enterprise, in other words, its reorganization. If, in the case of “surface” changes, it is trying to modify the mode in which the organization manages its business processes (the effectiveness of some activities, reduction of costs, change of suppliers or the improvement of technology), the reorganization is a profound modification such as the extension or restriction of the field of activity, the change of strategy and re-designing of the main processes.

The main elements of a company’s activity that should be taken into consideration for determining the response to the significant external disturbances are:

- *Mission and objectives of the company.* They determine all subsequent options, organization’s strategy as well as all its undertaken actions. The specialists

recommend a periodical review of the mission which the company's proposed to be able to determine its feasibility in relation with the scheduled evolutions of the field of activity. In the same context, the company should establish its fundamental proposed objective (for example operational excellence or the leader on market of its products), as well as the derived objectives, if any.

- *Time scheduled taking into account.* It is considered that three distinct situations might be, namely: 1) development to take into account the obtaining of some results at present and in the near future; 2) providing measures on short term for increasing the company's attractiveness to be purchased by a competitor or through public offer of shares; 3) approach of durable development principle.

- *Management style.* The top management in order to define its undertaken politics should answer to the question if its team has in view to cause or to follow the change and when the optimal moment for the said change is. The IT&C companies are developing in a dynamic economical environment where sometimes the decisions should be undertaken under risk conditions and the opinion of its own customers is not always a certain solution. It is a notoriety the example of the well known IMB companies, Compacq and DEC, which failed a considerable chance to gain the market with a new product, a minicomputer at a low cost dedicated to some educational objectives. This failure was due to the fact that the questioned customers have not been aware by the necessity of a fundamental change related to products orientation of those

companies and they have not known the benefits of the new products and services offered. Consequently, the results of the questionnaires showed that the questioned customers have not agreed as those products to enter on market. On the other hand, Apple, a not significant company, has understood the moment and entering on the market with a product based on XEROX technology became in a short time one of the most significant actor on the international market related to computer equipment.

- *Stability and adaptability of the company.* A structural and procedural structure should be taken into consideration allowing a quick response to external disturbances, as well as a changeable infrastructure to ensure the possibility to make a change, without to be necessary the re-designing of the whole company's system. One of the most important elements that contribute to the stability of an organization refers to its relation with stakeholders and mainly with the customers. Therefore, their confidence, defined to be the belief of partners that any commitment of the company will be exactly fulfilled according to settled conditions by common agreement (explicit, implicit or induced), represents the support of a relationship on the long term, even if the environment where the both partners cooperate is turbulent. A modality to generate the confidence to partners is to determine and fulfil fair rules governing the relation supplier-beneficiary and to conclude a Protocol agreed by both parties as Terry Winograd and Fernando Flores proposed in 1993, whose scheme we present herein below in Figure 2.

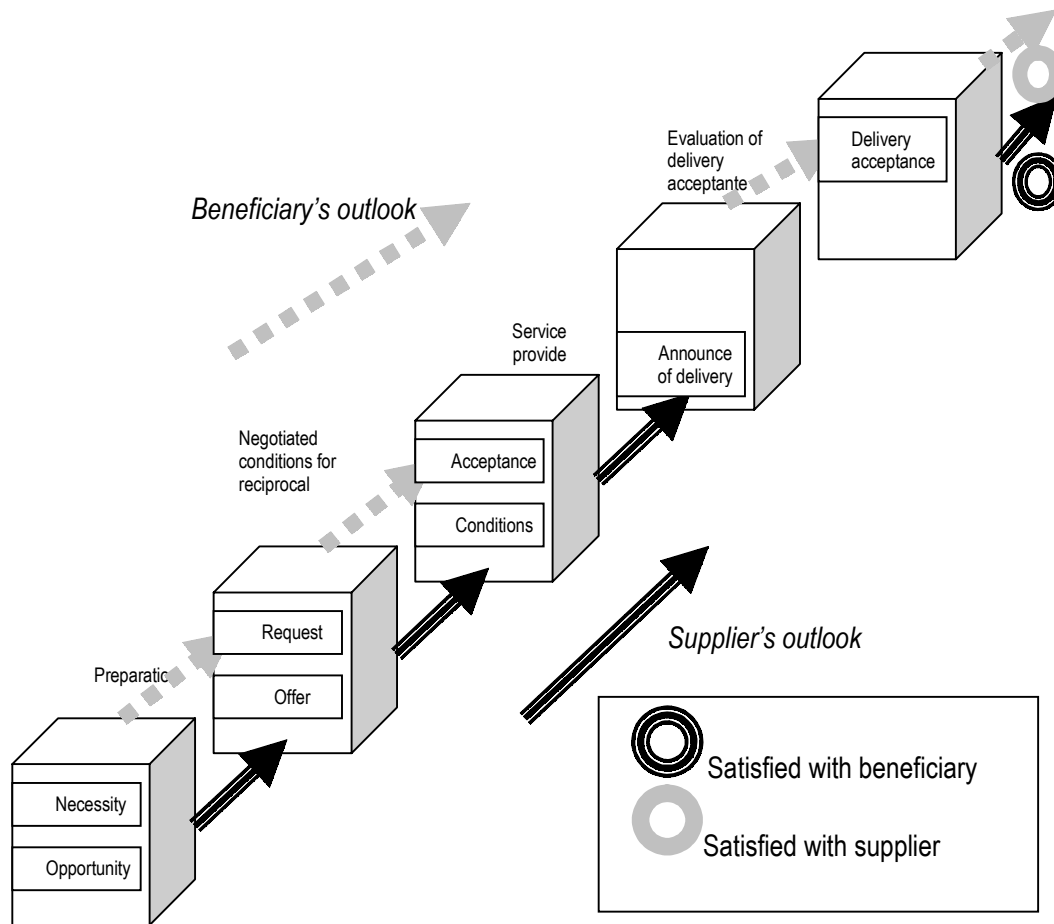


Figure 2. Management model of customer- related process

The presented approach includes several actions to be undertaken by supplier, respectively by beneficiary within all those five steps of the above management model. Those actions are the foundation for realizing and maintaining the equity in relation between supplier and beneficiary (customer) and are detailed presented in herein below Table 1.

- *Motivation of employees.* The level of motivation and specific organizational key motivation factors are very important elements determining in a certain way the organization's response to the occurred

disturbances within its field of activity. It must be taken into account that any good decision can reach its target only if it is applicable accordingly and, therefore, the carrying out an order or a decision is finally an executive task and it should be fulfilled by executive personnel of the company. The capability executive personnel to response to the management requirements as well as the quality of their work are determined in a great extent by the quality and control of their motivation which are very important elements of the present management.

Undertaken actions stated in Protocol between supplier – beneficiary

Table 1

Step of Protocol	Beneficiary (Customer)	Supplier
1. Preparation	-He determines the requirements; if and in what way he issues an order related to the required service/product (who, what, when, where, why, how) based on the previous experiences he had with supplier or depending on his reputation.	-He identifies or discerns the customer's requirement or the opportunity and decides if and how he supplies his services to customer (who, what, when, where, why, how) based on the previous experiences he had with customer or depending on his reputation.
2. Negotiation	-He issues the request (order). -He rejects the offer or accepts the initial proposal that will be the object of negotiation. -He negotiates the terms and conditions of co-operation, he accepts them or he takes away from negotiation. -His confidence in relation with supplier increases.	- He issues the offer. - He rejects the request or accepts the initial proposal that will be the object of negotiation. - He negotiates the terms and conditions of co-operation, he accepts them or he takes away from negotiation. - His confidence in relation with customer increases
3. Carrying out	-He follows how the supplier is carrying out the order according to the negotiated terms and conditions with him. -The confidence granted to relation with supplier increases or decreases.	-He supplies the services. -Communication with beneficiary. - He proposes finalization of delivery. - The confidence granted to relation with customer increases or decreases.
4. Estimation	- He analyses the received service and the interaction with supplier. - The confidence granted to relation with supplier increases or decreases.	- He follows the progress of customer analyze process. - The confidence granted to relation with customer increases or decreases.
5. Evaluation	-He evaluates the level of supplier's performance. -He evaluates the got confidence in relation with supplier for further possible interactions with him. - The confidence granted to relation with supplier increases or decreases.	- He evaluates the level of customer's performance. - He evaluates the got confidence in relation with beneficiary for further possible interactions with him. - The confidence granted to relation with customer increases or decreases.

The experience shows that, in the most of cases, the key motivation factors indifferently of their form are connected with the competence level and the decisional power granted to executive personnel. The results of those applicable key motivation factors are positive only when the employees may supervise the consequences of their work at the level of ways out from the company y (final products and services).

In addition, there are other aspects that should be taken into consideration when it

is talking about the response to the external changes, such as: kind of serving the customers and stakeholders, the attitude of personnel towards their work, their roles and job positions as well as the organization structure of the company, the mode and the level of knowledge's utilization within the work process and the integration extent of information. A significant category of changes within the organization is represented by the changes of macro level that influence the whole company.

In his work, Hines deals with the subject of these wide changes (Enterprise-Wide Change or EWC), showing that they have a wide impact towards the organization and they generally have a strategic, chaotic, complex and radical character and they can have into view (Hines et al., 2005, p. 11):

- Implementation of ERP system within organization.
- Creation of a new organizational culture of high performance.
- Orientation to business and to operational excellence.
- Achievement of fusions, procurements, alliances or joint ventures.
- Use of new technologies.
- Execution of strategic and business plans.
- Use of orientation to customer.
- Organization's globalization.
- Improvement of services supplied to customers.
- Settlement of development and expansion objectives.
- Reduction of activity and externalization of some activities.
- Improvement of 6 Sigma system application and introduction of quality management system.
- Modification in the distribution channel.
- Development and introduction on market of new representative products.
- Integral transformation of enterprise.
- Significant development of employees' creativity and innovation
- Reorganization and re-design of organization re-designing the business processes.

Further on, we shall deal with some aspects related to the new concept, Service Oriented Architecture (SOA), showing the importance of this concept for IT companies.

2. Service Oriented Architecture and its implementation within the modern IT organizations

Having a considerable organizational flexibility, high work productivity and a high technological level, the organizations with IT& C field of activity might be considered a real vector of change due to the fact that they offer ways to growth the performance of processes. At the same time, the rapid evolution of technologies used in self-acting data processing field of activity, variation of infrastructure's costs as well as the biting competition on the market requires a wide flexibility of such an entity which, without capability of rapid adaptability to the environment of its field of activity will be eliminated from the market.

Moving those above mentioned to the organizational chain-loops with informatics activity within other organizations with different fields of activity, we might say – and experience confirms – that those organizations should be adaptable and flexible and the mission of those chain-loops is to facilitate the change within the companies where they are taking part, if not, they will be externalized or included in bigger chain-loops.

Within organizational design context of companies, enterprises or organizational chain-loops with IT field of activity it is more and more talking about architecture to provide the above mentioned characteristics.

The main characteristic has in view the well-marked orientation towards third entities, or in case of directions or informatics services of companies with other field of activity, towards other chain-loops of the same organization. In specialized literature this is named Service Oriented Architecture (SOA).

Service Oriented Architecture (SOA) represents, according to⁽¹⁾, an organizational design style influencing all aspects related to creation and utilization of processes from the company, called services too, within the whole duration of their life. In addition, this style influences the defining and effective procurement of informatics and communications infrastructure allowing to some different applications to change information between them and to participate to the progress of some organizational processes, removing restrictions related to the operational system or software used for

those applications (Newcomer, Lomow, 2005).

The mentioned architecture could be considered a model too, where the global functionality of a system (an organization) is divided into elementary units that are able to combine each other in different ways, entering into the processes or applications which are specific to organization or its undertaken activity (Erl, 2005). The mentioned services communicate between them either by transfer of data, or by coordination of activity between two or more services, this concept being considered a new stage related to the evolution of terms for distributed processing or modular programming.

In Figure 3 it is presented synthetically the content of a Service Oriented Architecture which was defined by Dirk Krafzig, Karl Banke and Dirk Slama in their work “Enterprise SOA” (Krafzig et al., 2005).

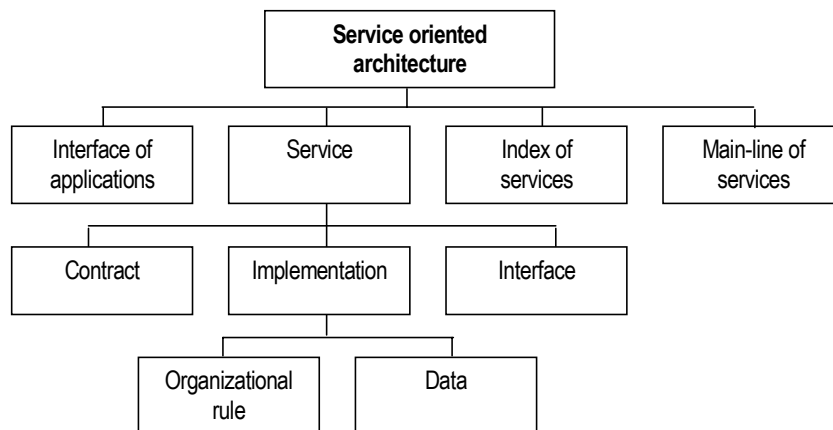


Figure 3. Structure of Service Oriented Architecture

Specialists show more main principles which defined design, development, usage and maintenance of the SOA system and herein below we mention some of them:

- re-use, granularity, modularity, composability, componentization and interoperability;
- compliance to standards;

- services identification and categorization, provisioning and delivery, monitoring and tracking.

In addition, the SOA philosophy includes the following architectural principles for design and service definition focus on specific themes that influence the intrinsic behaviour of a system and the style of its design.⁽¹⁾

- *Service encapsulation* – many web-services are consolidated to be used under the system, even if they have not been planned to be used in this purpose.
- *Service loose coupling* – services create a relation that minimizes dependencies and only requires that they maintain an awareness of each other.
- *Service contract* – services adhere to a communications agreement, as defined collectively by one or more service description documents.
- *Service abstraction* – Beyond what is described in the service contract, services hide logic from the outside world.
- *Service reusability* – business rules functionality and implementation is deliberately divided into services with the intention of promoting reuse the same services into different processes.
- *Service composability* – collections of services can be coordinated and assembled to form composite services.
- *Service autonomy* – services have full control over the logic they encapsulate.
- *Service optimization* – all else, high quality services are generally considered preferable to low-quality ones.

- *Service discoverability* – services are designed to be outwardly descriptive so that they can be found and assessed via available discovery mechanisms.

When it is going to re-design the organization under the SOA principles, the followings should be taken into account:

- Use of re-designing techniques and methods that are specific to Organizational Processes Management (Business Processes Management – BPM) correlated with SOA ensures a high flexibility and adaptability to the company. At the same time, this action conducts to create or underline some interdependencies between sub-systems, processes and component services. Under these circumstances, a proper management will be ensured in comply with the complexity of created system, implementation of a governance process from the beginning.

- The absolutely required measure that should be taken before to start the re-design process of organization under SOA principles is the integration of the IT system. For example, when the decision is taken to re-design the company and to introduce the SOA system within the organization, the IT system is composed of heterogeneous applications (either produced in the company by its own IT department, or procured from other producers). In this situation, the IT department should recommend to the top management to procure an integrated system from a software service supplier, SaaS-Software as a Service. After implementation of this system, the responsible of IT system should urgently extent and adapt the integrated solution within all business processes of the company as well as the integration of all used data in IT system.

3. Financing and governance of the Service Oriented Architecture

The implementation within an organization of Service Oriented Architecture is determined by the management belief that this approach has a potential value for the business in progress, and it should be supported by specialised companies or organizations providing organizational design or IT consultancy. When it was decided to implement the Service Oriented Architecture into the company, two aspects should be taken into consideration: the required financing and the effective management of the new system.

Related to financing, the IT companies use in a great extent a financing model concerning to the required funds (for passing to the new architectural system) which classify the services based on three main financing categories, depending on their specification (Figure 4). The first level, the basic one, is relating to the common IT services such as e-mail or network services. Such kind of services is financed by many companies based on subscriptions or other similar facilities. The second level relates to other IT services that might be used together with other several companies and they are paid by all the said companies. The third level includes specific services supplied to only one company which pay all the costs.

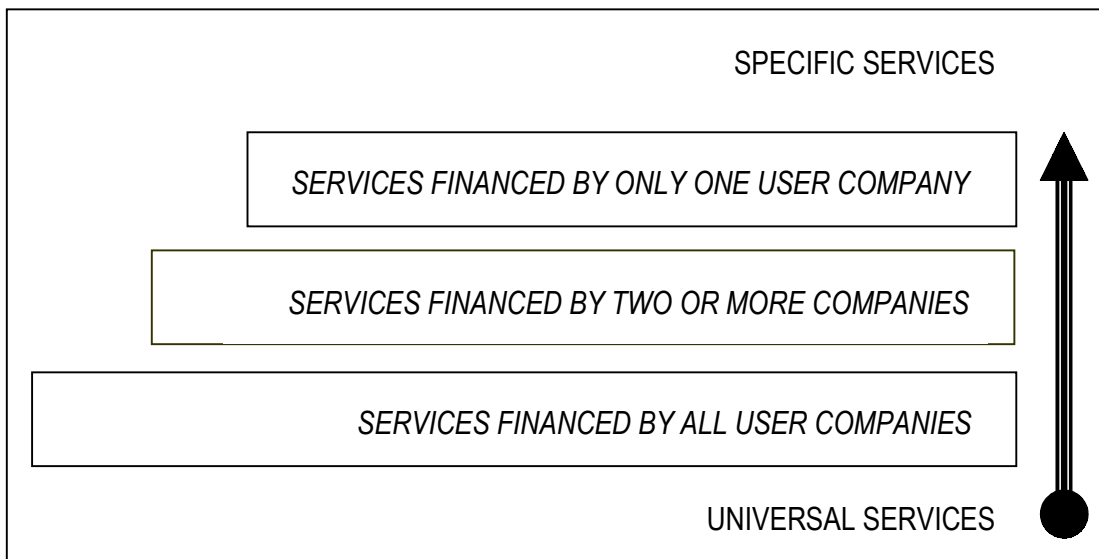


Figure 4. Services financing model of SOA system

The implementation and effective management of the SOA requires, as it is showed by experience of specialists and consulting IT companies that promoted this concept, to use some specific governance tools, such as Business Process Management or the Repository ones. The purpose to make use of those management techniques and

methods is to be able to accustom to the management processes of organization and to eliminate, as much as possible, the redundancy of used services. Most of the software suppliers provide the packages of governance tools for SOA, as well as guides to practice in this field of activity. Nevertheless, it is recommended to minimize

the use of those successful tools and networks in the first stage of design and further on each organization to accustom to use them during the development of the Service Oriented Architecture, depending on each field of activity.

There are some requirements which any system of SOA governance should fulfil. According to the specialists' opinion, one of the most important characteristic of such tools is the capacity to particularize the governance process based on the effective necessities and the field of activity of the company, the independence of the management methods towards the services to be manage, as well as the integration with financial-accounting applications and with the management system of applications' portfolio.

4. Observation – orientation – decision-actions – (OODA) cycle

The use of BI techniques in commercial activity of organizations has to carry out efficiently some planning objectives on short, medium and long-term using some modern decisional methods to allow both a complex analysis of the available data and the application of some anticipated performant methods.

More over, when it's about the durable development of a company, organizations or group of organizations, the right estimation of the future results relating to application of some decisions is a very important strategic element.

The activities performed by individual persons, companies or enterprises shall produce in a large or limited extent some

“reverberations” within the systems where they are developing. Therefore, if the whole range of secondary results caused by an undertaken action is not taken into consideration, is not correctly evaluated or is not integrated accordingly in the initial strategy, the response of the environment might be as more as complex than it has been anticipated at the beginning and the results will be rather negative than positive.

The history of politics, business, science and war or any other human activity shows several examples of disasters occurred due to the lack of analysis related to results based on previous planning strategy before to be implemented.

A lot of papers have been written in the specialised literature about the strategic decision and leadership, and the newspapers specialised in research furnished a wide range of scientifically considerations and clarifications related to those concepts. Nevertheless, the emphasizing of the main processes involved in taking decisions and leadership, settlement a rigorous analytical framework applicable in any situation and in any environment has been realised later. Such an approach made John Boyd, an eminent pilot mathematician, philosopher and analyst of the human character, who in 1984 proposed a method with a wide applicability in business, medicine, theory of conflicts and conflict management which is known as OODA Cycle (Observation - Orientation-Decision-Action) or as it is known in English-Saxon specialised literature, OODA Loop or Boyd's Loop.

The importance of this technique consists in the extended field of applicability

and in providing a general background for a wide range of decisional processes that refers both to undertake quick decision under complex environments which are in a continuous change and to the multidimensional analysis based on knowledge. Under these circumstances, the quality of decisional action depends on providing in due time decisions and right focused actions, whose execution determines both the rhythm and evolution direction of all environment.

The OODA Cycle concept consists of four consecutive phases such as:

- Observation
- Orientation
- Decision
- Action.

■ *Observation phase* is that one for picking up the information from internal and external sources towards the operational environment. The inputs inside of organization depend on the pertinent historical knowledge and represent the “static” support for the observation phase, and inputs outside of organization consist both of very recent information related to the general condition where the managed system is developing and of data which, even if apparently are not relevant in decisional process, contribute to realise a complete image of reality. Consequently, within the observation phase the gross information is provided from external environment and it is correlated both with minimum knowledge already existing in system, and with the evaluated knowledge.

The analysis of picked up information in this phase characterizes in due time the environment including the current events and

the performed actions into this environment, determining the critical level of *informational superiority*. This concept coming from the military theory and practice, consisting in relative capability of some known or unknown factors of operational framework (characterized as it is know, through the quantity of information).

■ *Orientation phase* is the most important one of the whole cycle, determining the evolution of the next actions. In this phase, information and knowledge obtained in the previous phase are finally analysed, which is a complex process whose quality is certainly influenced by impartial factors, such as: experience, cultural background and review capability. The scope is to determine what in military language is called penetration or point of maximum vulnerability of the enemy where the future action should concentrate to get a maximum efficiency and effectiveness. The approach in a partial and fair manner of all processes included in this stage of the cycle is critical related to the success of the further stages.

■ *Determination phase* defines the further actions, determining exactly both their kind and type of resources needed to successfully completion. Their concentration range shall be determined and, after that, the resources will be allocated and provided. Therefore, the Determination phase is a preparative one, pointing out the preparation grade for development of action through the level of all available resources, both the human and material resources needed to manage a complex event. At the level of this phase the previous processes which are cognitive will be transformed under a

tangible form, a logistic form for re-orientation and re-distribution of resources.

- *Action phase* completes the cycle and now the planning and prepared actions into the previous stages will be finalized. According to the military theory, the actions should be quickly, and firmly executed and focused on the penetration point, taking permanently into account the economic principle of forces as a large quantity of resources should be concentrated when the action is on the penetration point. The dissipate of forces in this phase might have catastrophic results, because it is known that lack of resources at the level of penetration point is the most encountered reason for failure.

The point for starting the next OODA cycle coincides with the completion point of Action phase. At this moment, the consequences of all previous executed actions will be identified and correlated with the recent information and in this way each stage of the cycle has a direct influence upon the next ones until the final objective is fulfilled and all activities are completed.

Thinking based on cycled processes is advantageous for planning successful strategies in different field of activity as reality shows and it supports the competitiveness creating an effective and effectiveness background for anticipation, evaluation, and control of critical situations.

Note

⁽¹⁾ According to www.wikipedia.org

References

- Erl, T. (2005). *Service-Oriented Architecture: Concepts, Technology, and Design*, Upper Saddle River: Prentice Hall PTR
- Haines, S.G., Aller-Stead, G., McKinlay, J. (2005). *Enterprise-Wide Change: superior results thru systems thinking*, John Wiley&Sons
- Krafzig, D., Banke, K., Slama, D. (2005). *Enterprise SOA*. Prentice Hall
- Newcomer, E., Lomow, G. (2005). *Understanding SOA with Web Services*. Addison Wesley
- Winograd, T., Flores, F. (1993). *Understanding Computers and Cognition: A New Foundation for Design* Addison-Wesley
- www.wikipedia.org

The Dividend – a Source for the Development of Companies or for the Growth of Market Value?

■

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***Abstract.** Usually the dividend policy is seen as a way to approach the distribution of profit on the two classical directions. But the dividend policy influences the market value of a company, and if those who decide over this problem do not have an ethical behaviour, but pursue to distribute a great part of the profit as dividends under the form of free shares, contributes to the decrease in the current price of the company's shares. The conclusion drawn from the present study is that the market value of a company will grow only if the distributed dividend is situated on a continuous upward curve. This fact imposes to resort sometimes to accumulated dividends and other times to the reduction of the part from the profit meant for investments in order to complete the dividends so that they are greater than in the previous year.*

Key words: the dividend policy; the company's market value; the invested profit; the rate of dividend per share; the residual dividends; the accumulated dividends; the free shares; the company's market image; the subscription rights.

■

JEL Codes: G11, G32.

REL Codes: 11E, 14K.

The dividend policy of a company involves a sum of problems and interests that reveal, for example, the quality of the management. It also reveals the relationship between manager and administrators, how rational is the strategy of development of the company and the loyalty program for the employees. In the same time, it provides profound explanations of the evolution of the market value of shares and the company's public image. Therefore we believe that the development and implementation of a dividend policy appropriate to the characteristics of each company must be the main concern of management tasks and not the fulfillment by each employee of its work tasks, problem that can be left on the hands of a manager from inside. And a competent analysis and maybe an authorized public debate of the dividend policies of companies listed on the stock exchange is today the more necessary as they are expected to obtain in the same time, high economic performances and distribute constant high dividends. If these targets are not achieved concurrently, the company is sanctioned by a drop in the price of its shares on the exchange, through increased costs of alternative sources of financing, because some investors do not understand that businesses which, for example, waive for a few years to pay dividends or reduce their size – in order to survive through their own means – give proof of good sense and concern for the preservation of the capital invested by shareholders in the company.

It became common the recognition of the fact that, by increasing the proportion of profits distributed as a dividend, decreases the part of it accumulated in that year and

that, together with it, there are reduced also the amounts available for investments. To not waive, for this reason, some profitable investment projects, the company will have to resort to a greater extent on external funds. When they reach appreciable dimensions and when they are associated with significant cash flows in the form of paid interests, the profits and the future possibilities to reward the shareholders will fall at least significantly. So the dividend policy, oriented to satisfy the shareholders' desire for gains – in the form of dividends – has a contradictory effect on their objectives in this plan, on short-term and long-term.

Firstly, this effect accentuates as the number of shares that exist at holders increases, because it is reduced the increase rate of the dividend per share. Secondly, as a market is more volatile, it also boosts the effect to which we refer, because in such circumstances it is given a greater value to a leu obtained from dividends than to the one resulted from capital gains (from price difference on the stock exchange), because of the differences in the risk levels of the two sources of financial advantages. The difference we talk about is favorable to the dividends.

The major objective pursued by the shareholders is increasing the market value of the company. It is obtained if the price of the shares in question increases on the market they are traded, or if the number of shares – issued by the company and held by the shareholders – increases to such an extent that they annihilate any further decreases in the price of those shares. But the market price of the shares is in a fragile balance with the dividend policy.

If the investors in a security estimate that the company that issued that security would ensure an increase of the dividend with a certain percentage, and it increased just as expected, the market price for the share does not change after the date of this announcement. In such cases, the dividend increase was anticipated by the market and it was included in the price before the confirmation of the anticipation's accuracy. Things happen in a diametrically opposed manner when the dividend achieves a lower growth than the estimated one. In such circumstances, the market price falls even if it has exceeded the planned profit, the respective difference does not cover the additional risk that threatens the obtainment of the anticipated dividend.

Finding the direct correlation, existent between the evolution of the dividend per share and its price, led some researchers to believe that it is determined by the investors' interest in dividends rather than in capital gains.

But two famous economists, M. Miller and F. Modigliani, support a different point of view, extremely useful to the decision makers, confirmed very frequently in practice. They start with the common asserting that the management of companies always expresses an appreciable dose of concern when they must reduce the level of dividends from one year to another and, therefore, increase the amount of dividends per share only when they are convinced that the profits that allow such a reward are stable, meaning they can be obtained also in the future. Miller and Modigliani expressed their belief that higher dividends than those estimated by investors represent a signal to

them that the company is in extended favorable circumstances, while a reduction of dividends points to a forecast of lower earnings. Starting with this point of view, there is just a single step to the fact that the perception we mentioned influences the market price of the shares of that company in the logical direction of the meaning of the informational content of the deciphered sums.

The practice, inclusively in our country, confirmed what economic theory argued with logical arguments about the dividend policy. It is not so important the size of the distributed dividends or their proportion in the obtained profit, as the continuous upward trend of their size. In time, investors get to realize the relationship that exists between the profitability of an investment and the risk assumed by who invests, as well as the additional benefits brought by capital gains against those from dividends. Or vice versa. As a result, some will be attracted by the companies that distribute large dividends, others by those which allocate the profit giving priority to investments. There are shareholders who need current annual incomes, and they do not want to complicate themselves with obtaining them by selling their shares, even if their price has increased as a result of the capitalization of a large part of the profit. So a pertinent analysis of investors' preferences reveals that each company creates for itself, in time, a certain clientele, who prefers the features of the dividend policy practiced by the company.

Nevertheless, we draw attention on the effect of an unexpected change in this policy on the price of the company's shares. If the company retains and re-invests the obtained

profit and does not pay the dividends expected even by the permanent shareholders, they will cover their needs of current income from loans or, more frequently, on account of capital gains by selling a part of the held shares. If the number of such operations is high, no other argument will stop the price from a vigorous correction.

The policy of residual dividends. The size of the dividends to be distributed to the shareholders can be specified only after the deduction from the net profit of the necessary fund for the investment budget. This kind of procedure is preferred by those shareholders which prefer that the company keeps and reinvests the profit rather than distributing it as dividends. Their choice is not necessarily determined by a reduced need for current incomes but by the conviction, fortified by the company's previous performances, that this way – by reinvesting the profit – they can obtain a profitability rate greater than that offered by other investments with the same degree of risk. If the opportunity cost of the accumulated profit is given by the profitability rate of the investments available for the shareholders, then the size of the owned capital and their knowledge in this area condition the acceptance degree of this variant of dividend policy. As a conclusion, the policy of residual dividends can be successfully applied by companies where the shares are concentrated in the hands of a few investors with great financial power and strong knowledge in the business domain.

After a company reached the optimum size and it keeps relatively easy the medium cost at a minimum level, it can afford to

apply a policy of constant dividends. But remunerating the invested capital with set sums per share signifies a decreasing compensation when the inflation rate increases. This drawback, that can generate the desire to sell the respective shares, can be eliminated if the dividends are established to progressively increase with a rate equal at least with that of inflation. Because nowadays there are no more problems with des-inflation, it is recommendable that the companies never reduce the annual dividend per share. But anyone can realize that this becomes feasible on long-term just when (1) the profit increases with a rate identical with that of the dividends or (2) it is accepted to decrease the part of the profit meant for investments.

It is well known the anxiety reaction caused to the shareholders by fluctuating dividends, as well as the decreasing tendency of the market price of a company's shares, company that resorts to inconstant annual payments from profit. The big investors in shares listed on the stock exchange, the pension funds and the insurance companies avoid introducing in their portfolios securities with incomes from variable dividends. They appreciate the risk of investing in companies rather by the fluctuation in time of dividends than of profits, because it is taken into consideration the premise that the size of these can be influenced through appropriate accounting registrations.

The companies can avoid the problems associated with instable dividends through measures more or less accepted, like postponing to realize some foreseen investments, the reduction of profit

distributed for accommodation, the issuing of new shares, the distribution of a sure dividend of reduced value to which there are made variable additions, named extra-dividend, depending on the size of the profit obtained in the previous year. Acting this way, the shareholders manage to know the minimum sum from dividends that they will certainly receive and on which they can count on. In the same time, they inform themselves indirectly about the company's performances situated above the planned ones. The drawback of this policy comes from a possibly regular payment of the extra-dividend. The cashing of this can become a usage so that its nonpayment at a certain moment generates similar effects with those created by the modification of the size of the regular dividend paid to the shareholders. But the relation of determination can be extended and, so, we identified a modality to annihilate this insufficiency: it is established as objective the dividend to distribute as average for a few years. Thus, the decrease of the size of the source from which the dividend payment for one year is realized can be supplemented by its increase in another year. In order to apply this variant of the dividend policy, the management of the company has to use important resources to inform the shareholders about its connotations, otherwise it cannot avoid the decrease of the market price for its own shares when the profit or the dividend decreases.

No repetitive issuing of new shares can be easily managed, even if the company uses this modality to finance its investment projects. When choosing the financing modality there have to be considered the

issuing costs and the possibility to pay the dividends not only from the current profits, but also from those accumulated in the previous years; when the issuing costs of the new shares are reduced, it is recommended the variant of dividends representing a big part of the profit. If these costs are big, it is more economical the financing from profit than from the sums cashed through the selling of the new shares. By investing a big part of the profit, the value of the company increases, but it is possible that over the years – maybe even before the investment under implementation can reach its projected parameters – the profit and the dividends will not increase. And as between the size of the dividends and the market price of shares there is usually an undeniable and paradoxical relation, the shares' market price drops. This drop we did not manage to explain it in any other way than by the lack of economic knowledge of many investors. Another explanation, unconfirmed by practice, would be the appearance of some investment variants more advantageous or with more rapid profitableness, which determined the investors to reorient their investments towards other securities.

The securities generally tradable, but especially the stocks, have an interval of optimum price. When the price is in its interior, the value of the company is maximized. If the possibilities to reward the shareholders with dividends manage to become too big, in a year, probably because of obtaining an exceptional profit, the shares' price increases a lot, exiting the optimum interval. In these circumstances it is recommendable that a part of the profit to not be distributed as dividends, but to be

accumulated in order to be paid in the following years. How many shareholders accept this solution? I think that many will adhere to this variant of the dividend policy, but just after they once endured the consequences of rejecting it.

The distribution of dividends as shares, named free shares, followed by the issuing of new ones, payable in cash, can lead to the alteration of the market's possibilities to self regulation, and as a consequence to the dramatic decrease of the shares' individual price. The investors, even the devoted ones, use – some until exhaustion – their available funds to buy the subscription rights. If then the market price of the shares drops, becoming attractive for buying operations, they cannot buy because they used their capital for underwriting. The decrease in the

number of potential buyers through numerous issues with subscription rights advantageous for the shares reduces a lot the possibility of the price to stabilize itself through natural means of the market.

I think there can be accepted the thesis, which are real axioms, that through the increase of dividend it is transmitted an information referring to the future gains, and the decrease of the paid dividend represents a new information, sometimes unexpected, which contributes in a big way to the decrease of the shares' market price. The same happens when new shares are issued from dividends if this issue is not followed by the payment of some cash dividends with a greater value: the price of the share will drop, because the new information is not anything else than an anticipation of the future gains.

References

- Boardman, A.E. ș.a. (2004). *Analiza cost-beneficiu*, Editura Arc, Chișinău
- Brezianu, P. ș.a. (2002). *Gestiunea financiară a portofoliului*, Editura Economică, București
- Halpern, P. ș.a. (1998). *Finanțe manageriale*, Editura Economică, București
- Hardwick Ph. ș.a. (2002). *Introducere în economia politică modernă*, Editura Polirom, Iași
- Toma, M., Alexandru, F. (1998). *Finanțe și gestiunea financiară a întreprinderii*, Editura Economică, București

Geometrical Methods in the Study of Some Dynamical Systems with Applications in Economy

■

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***Abstract.** In this paper dynamical patterns of some economical processes are being analysed. Starting from the system of differential equations the stability of the system is being analysed. The study of the stability of some dynamical systems has been a constant interest for the author in the last fifteen years.*

Key words: stability; Leapunov function; dynamic system the phase plan.

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JEL Codes: C02, C62.

REL Codes: 5C, 10A.

1. Introductions

The phenomena of the economical systems are often described with the help of the fields. In the mathematical physics, by field we often mean a function of time t and position x . The field is vectorial if its values are vectors. When the fields don't depend on x , they become functions only of time. Their set is associated to the dynamic that takes place in the dynamic system. The dynamic is described by the position vectors $x_i(t^*)$ and speed $v_i(t^*)$, $i = \overline{1, N}$. The set $\{x_i(t^*), v_i(t^*)\}_{i=\overline{1, N}}$ it is called the state (phase) where it is situated at the moment t^* .

This way, the dynamic was modelled by a continuous order, in proportion with the time parameter of the states of the system. From the physical point of view, the space of phases is the set of all the possible states of a dynamic system. The functions that compose a state are called functions or (variables) of state. The short and synthetic characterization of the evolution of an economical system can be done with the help of some concepts that model properties corresponding to the dynamic associated system: stability, attractivity, bifurcation, stability chart and bifurcation chart.

The stability is a property of a dynamic system that characterizes the phase portrait from the vicinity of an invariant set (and not that of an arbitrary set from the phase space) compared to little perturbations of some or of all the dates of the system. By dates we mean all the variables that on which depends the function dynamic system except for the variable independent of time. The most studied stability type is the Leapunov stability, where the perturbations refer only at the initial date. There are stability charts that refer to the change of the cardinal of the stationary set while the last

regard only the general qualitative changes of the phase space.

The supermathematical functions are widely discussed in the paper of Şelariu (2007). Any periodical function can describe, obviously, an oscillatory movement. The centric circular functions (FCC) cosine ($\cos\alpha$) and sine ($\sin\alpha$) centric describe, without any difficulty, the oscillatory movements of the liniar systems; the centric mathematics (MC) being the mathematic of the ideal systems, perfect, liniar, while the excentric mathematic (ME) is the mathematic of the real, imperfect, nonliniar systems (Şelariu, 2007). Their reunion represent supermathematics (SM).

Some supermathematical circular excentric functions, of centric variable $cex\theta$ and $sex\theta$ and those of centric variable $Cex\alpha$ and $Sex\alpha$, are already proven as solutions of some vibrant systems of elastic static nonlinear characteristics. And the quadrilobic functions have proved to be solutions of some oscillatory nonlinear systems, similar with the static, elastic characteristics of the systems of Duffing ($a \times x \pm b \times x^3$), that represent a serial power development, but the quadrilobic vibrations offer a term ($\pm c \times x^5$) of the plus development.

The supermathematical functions realise a vast extension (farther) of the periodical functions, without replacing the unit/trigonometrical circle with closed curves, as we know a lot of tests in the centric mathematic (MC) shortly described in the cited paper. The new periodical functions, component of the mathematical objects and of the eccentric mathematic (ME), which reunited with MC form what we called the supermathematic (SM = MC \cap ME), have already proved as solutions of the description of some periodical movements of some nonliniar vibrant systems, more difficult to describe with the existant functions in MC.

2. Trajectories in the phase plane

In ME it is operated with three angles or variables: at the centre α , at the ex-center θ and the angle β with the centre on the unit circle, in the point W, if the direction ε of expulsion of the ex-center $S(s,\varepsilon)$ of the center $O(0,0)$ is on the direction of the axis of abscissa $\varepsilon = 0$, as it will be possible from now on. The angle β can be expressed depending on the centric variable $\beta(\alpha)$ or the ex-centric variable $\beta(\theta)$. In the present paper there are considered the functions of ex-centric variable θ and the oscillatory system will be called $\beta(\theta)$ and it will be noted with $(SO\beta)$.

We have the angular oscillations of the angle $\beta(\theta) = \text{bex}\theta$ given by FSM-CE

$$\begin{cases} x = \beta \times \text{cex}\theta = \arcsin(s, \cos \theta) \\ y = \beta \times \text{sex}\theta = \arcsin(s, \sin \theta) \end{cases}$$

$$s \in [-1,+1] \Rightarrow x, y : R \rightarrow \left[-\frac{\pi}{2}, +\frac{\pi}{2}\right] \quad (1)$$

Of the same fix ex-center $S\{s,\varepsilon\}$, so that $s = \varepsilon = \text{constant}$, where the half-line d^+ rotates around the ex-center $S(s,0)$ with the constant angular speed $\Omega = 1 \text{ rad/s}$, meaning $\theta = \Omega \times t$ and $\dot{\theta} = \Omega = 1$ and $\ddot{\theta} = 0$.

The oscillation speeds of the angles $x, y = f[\beta(\Omega \times t)]$ are:

$$\begin{cases} \dot{x} = \frac{d(\beta \times \text{cex}\theta)}{dt} = \frac{d\theta}{dt} \frac{d(\text{bex}(\theta - \frac{\pi}{2}))}{d\theta} = \\ = \Omega \frac{d(\arcsin(s \times \cos \theta))}{d\theta} = \\ = -\Omega \frac{s \times \sin \theta}{\sqrt{1-s^2 \times \cos^2 \theta}} = -\Omega \times s \times \text{siq}\theta \\ \dot{y} = \frac{d(\beta \times \text{sex}\theta)}{dt} = \frac{d\theta}{dt} \frac{d(\text{bex}\theta)}{d\theta} = \\ = \Omega \frac{d(\arcsin(s \times \sin \theta))}{d\theta} = \\ = \Omega \frac{s \times \cos \theta}{\sqrt{1-s^2 \times \sin^2 \theta}} = \Omega \times s \times \text{coq}\theta \end{cases} \quad (2)$$

In the expressions of the derivatives/speeds are distinguished FSM-CE cosine ($\text{coq}\theta$) and sine ($\text{siq}\theta$) quadrilobe, introduced in mathematics and widely presented in the paper of Şelariu (2007), together with the closed curves called trilobe, quadrilobe and n-lobe or polilobe.

The accelerations of the oscillatory movements are obtained as the second derivative of the oscillatory angles or prime derivative of the oscillatory speeds, this way:

$$\begin{cases} \ddot{x} = -\frac{\Omega^2 \times s(1-s^2) \cos \theta}{(1-s^2 \times \cos^2 \theta)^{1.5}} \\ \ddot{y} = -\frac{\Omega^2 \times s(1-s^2) \sin \theta}{(1-s^2 \times \sin^2 \theta)^{1.5}} \end{cases} \quad (3)$$

The dynamic of the system is given by the differential equation:

$$\ddot{z}(t) = -\Omega^2 \times s(1-s^2) \times \left[C_1 \frac{\cos \theta}{(1-s^2 \times \cos^2 \theta)^{1.5}} + C_2 \frac{\sin \theta}{(1-s^2 \times \sin^2 \theta)^{1.5}} \right] \quad (4)$$

Because the elongations differ pregnantly of the movements from the circular excentric movement (MCE), the integral curves from the phase plan that are expressed depending on the elongations differ pregnantly from those of the circular ex centric movement (MCE).

In the chart 1 are presented curves from the phase plan, but for the solution $z = C_1 \times x + C_2 \times y$, with $C_1 = C_2 = 1$, and in figure 3 are presented CES which, as it can be noticed, are very much non-linear for amplitudes of the large elongations, passing into branches with negative rigidity.

From the figure 1.b where the integrale curves from the phase plane are represented in 3D, it can be noticed that they are the same both for $s \in [-1, 0]$ and for $s \in [0, +1]$.

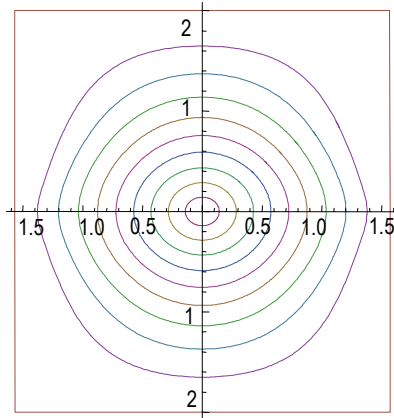


Figure.1.a. *Integrale curves in the phase plane*
Trajectories of phase $\dot{x}(x)$ și $\dot{y}(y)$, $C_1=C_2=1$

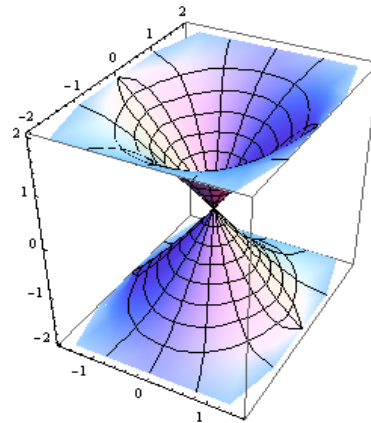
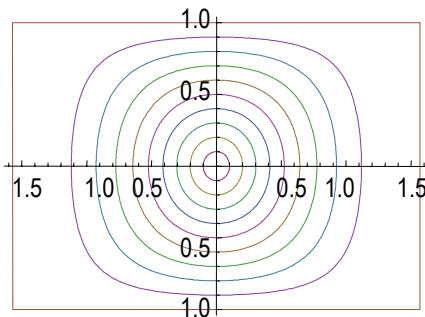


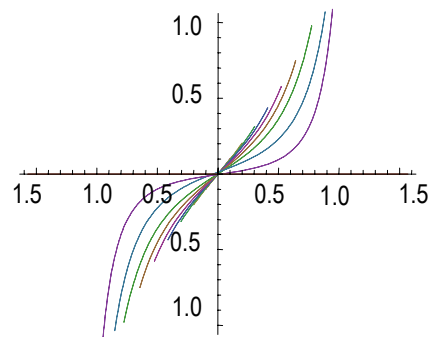
Figure 1.b. *Integrale curves in the phase plane*
Trajectories of phase $\dot{x}(x)$ și $\dot{y}(y)$ in 3D, $s \in [-1,1]$

In figure 2 are restored the integrale curves from the phase plane for each oscillation and x and y separately, their curves being identical. From the figure 1.a it can be noticed that for the excentricity $s = e = 0$ the oscillation stops, and for low values of the s excentricity or e integrale curves from

the phase plane approach the circle, meaning linear oscillations, while for high values of the eccentric numeric s or the real one e the oscillations are strongly non-linear, what can be better noticed in the figure 2b directly on CES that are, for $SO\beta$, CES strong or progressive.



a) Trajectories of phase



b) Elastic static characteristics

Figura 2. *The speeds (trajectories of phase) and the accelerations (elastic static characteristics (CES))*
As functions of oscillation elongation $x(t)$ and, respectively, $y(t)$

The importance of the oscillation study $SO\beta$ consists in their resemblance with free vibrations of the systems with CES Duffing ($Fel = k \times x - \beta \times x^3$), for $\beta < 0$.

Developing in power series one of the functions that express the elongation $SO\beta$, as an example, $y = \arcsin u = \arcsin[s \times \sin\theta]$ is obtained:

$$y = \arcsin u = u + \frac{1}{2 \times 3} u^3 + \frac{1 \times 3}{2 \times 4 \times 5} u^5 + \frac{1 \times 3 \times 5}{2 \times 4 \times 6 \times 7} u^7 + \dots = \quad (5)$$

$$= u + 0.166666u^3 + 0.00297619u^7 + \dots$$

And it is noticed that the first two terms are identical with those of CES Duffing for $k = 1 (x + \beta \times x^3)$.

Replacing u with the expression $u = s \times \sin\theta = \sin\beta(\theta)$ it is noticed that if $s \in [-1,+1], \theta \in [0, 2\pi] \rightarrow \beta(\theta) \in [-\pi/2, +\pi/2]$

$\rightarrow u \in [-1, +1]$ and it is assumed that the vibration takes place for subunitary u amplitudes.

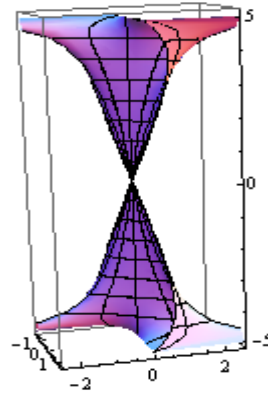
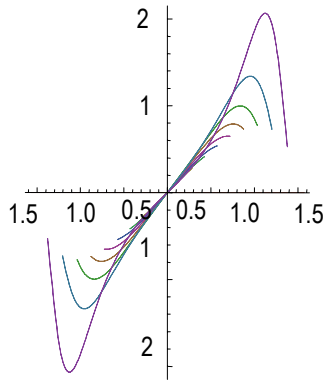


Figure 3. The acceleration depending on the z oscillation $\rightarrow -\ddot{Z}(Z)$, for $C_1 = C_2 = 1$, in 2D and in 3D

Further on are presented three dynamic systems with applications in economy for which the stability can be studied with the help of the method of the Leapunov function.

1. The model of urban dynamic of type Lorenz is described by the system of differential equations (5).

$$\begin{cases} \frac{dx_1}{dt} = a_1(a_2 \times x_2 - a_3 \times x_1) \\ \frac{dx_2}{dt} = c_1(c_2 \times x_1 - c_3 \times x_2) - c_4 \times x_1 \times x_3 \\ \frac{dx_3}{dt} = d_1 \times x_1 \times x_2 - d_2 \times x_3 \end{cases} \quad (5)$$

The economical measures that appear are: x_1 - the production of the urban system, x_2 - the number of residents, x_3 - the rent land and a_i, c_i, d_i are positive parameters.

2. The evolution model of the capital of a firm is described by the system of differential equations (6).

$$\begin{cases} \frac{dx_1}{dt} = c \times x_1^2 \times x_2 + b \times x_1 \\ \frac{dx_2}{dt} = x_1 + a \times x_2 - 1 \end{cases} \quad (6)$$

$$x_1 = x_1(t), x_2 = x_2(t)$$

$$x_1 = x_1(t), x_2 = x_2(t)$$

The economical measures that appear are: x_1 - the capital of the firm and x_2 - the volume of the work force.

3. The simple model of Ramsey type is described by the differential equation (7).

$$\frac{d^2 z}{dt^2} = \frac{dz}{dt} \frac{dq}{dt} + \left(\frac{dq}{dt} - p \right) \frac{U'}{U''} \quad (7)$$

The economical measures that appear are: U - utility of the consumption, c - the consumption, z - the proportion capital-work, $\frac{dz}{dt}$ - the installment of the capital accumulation, p - the decided installment of the discount, $p \geq 0$. We use the following notations:

$$c = q(z) - \frac{dz}{dt}$$

$$U' = \frac{dU}{dt}, U' > 0$$

$$U'' = \frac{d^2 U}{dt^2}, U'' < 0$$

For the study of the stability of the systems of differential equations given by (5), (6) and (7) can be successfully used original methods of the author presented by Bălă (2004).

References

- Bălă, Dtru (2004). *Metode geometrice în studiul mișcărilor sistemelor vibrante și vibropercutante*, Editura Universitaria, Craiova
- Mircea, Gabriela, Neamțu, Mihaela, Opreș, Dumitru (2004). *Bifurcația Hopf pentru sisteme dinamice cu argument întârziat și aplicații*, Editura Mirton, Timișoara
- Șelariu, M. (2007). *Supermatematica. Fundamente*, Editura Politehnica, Timișoara
- Udriște, Ctin (2000). *Geometric Dynamics*, Kluwer Academic Publishers
- Udriște, Ctin, Postolache, M. (2001). *Atlas of Magnetic Geometric Dynamics*, Geometry Balkan Press, Bucharest
- Udriște, Ctin, Ferrara, M., Opreș, Dtru (2004). *Economic Geometric Dynamics*, Geometry Balkan Press, Bucharest
- Ungureanu, Laura, Ungureanu, L. (2000). *Elemente de dinamică economică*, Editura Universității din Pitești, Pitești