THE CONCEPT OF TIME IN THE PHYSICAL WAY OF THINKING, AND ITS IMPACT ON KNOWLEDGE AND THE EVALUATION OF INFLATION AS AN ECONOMIC PHENOMENON

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Abstract. *The concept of time in physics has evolved from the statutes of absolute time to that of a space-time object, omnipresent and exclusive, in the generalized theory of relativity. Physical thinking has attracted under its influence imaginary time as well, decomposing it in three senses: the entropic sense, the psychological sense, and the cosmological sense. Physical thinking has personalized itself within a space of the expanding universe, and the analogy with the economic phenomenon, particularly with inflation, is only natural. From the analytical overlapping of the concepts there emerge similarities between the space-time of the theory of relativity, and economic time. Which are the similarities of physical and economic thinking about time and inflation? An attempt to define what is the meaning of time, time series, indices time series and physical correspondences a brief historical background of a hundred years of inflation in Romania, some significant graphical resemblances, together with the specific method used in physics to analyze economic data and economic processes and finally a short review of major results and new domains in refereed literature are the principal themes or the major content of this paper, which remains nothing else but a modest contribution for starting a debate about the concept of time in physics as a remarkable start point inflation analysis.*

Keywords: *Time, Space-Time Object, Imaginary Time, Entropic Time, Psychological and Cosmological Time, Time Series, Indices of Inflation, Equilibrium of Development, Non-equilibrium of contraction.*

1. INTRODUCTION

Of course Brâncuşi was right when saying that we cease to exist the moment when we are no longer children. Consequently, we forget that actually those children who, during childhood, used to exist inside everyone's inner being, though not possessing enough information to ask questions considered "important", besides the permanent "why?", would quite often pose into discussion, in a natural manner, the things the adults considered complete, durable and incontestable realities. We all remember asking, when we were children, various questions such as where the sun comes from, if the hands of a clock can move backwards, and time elapse in a reverse way, why the trajectory of a glass to the floor can only end in its final breaking, though the reverse path is no longer possible (intuiting or not the existence of the double sense from chaos to order, but also from order or negentropy towards disorder or entropy), or where the necessity appeared of assigning order in our apparently stable and eternal world, etc.

Adults permanently correlate time and space, while children enjoy the apparent infinity of day and the horizon, the grown-ups complain about the narrowness of the two dimensions, getting absolutely scared by the mere idea that the lapse of time could be reversed from effect to cause, the effect preceding the cause and, suddenly, instead of the cause, we would suddenly remember the effect…

2. FROM THE ABSOLUTE TIME OF CLASSICAL PHUSICS TO THE SPACE-TIME OF THE THEORYOF RELATIVITY

From Aristotle, with his spherical world proved by the arguments of the circularity of the moon and the eclipses ("*On the skies*") and Ptolemy, where the Earth could only be the centre of the universe, an assertion apparently demonstrated through the perfection of the circular motion of the Sun round the Earth, up to the formation of the classical concept due to Copernicus', Kepler's and Newton's contributions, no scientist or learned man suggested at least that the universe is expanding; the time was considered a god or a divinity (i.e. the illustrious Chronus), something absolute and divine. Classical time in physics did not allow any kind of ambiguity, save perhaps that connected with the imperfection of timepieces, which man wanted to measure its perfect course... Classical time in physics was completely separated from space. Although Newton considered that, in proportion to a light impulse sent from one place to another, the time needed for the travel was unique and absolute, generating the accord of all the observers with respect to its duration, it was just that unanimous opinion that was to lead to the disagreement of the same observers with respect to the distance the light travelled. But as the speed of light represented the ratio of the distance (in disagreement) and time (in unanimous accord), all the observers obtaining different distances of the light, a fundamental paradox of Newtonian or classical physics was thus generated…

In the theory of relativity or relativistic physics, absolute time is no longer present. [1] The demise of absolute time in classical physics coincides with the birth of an object called "space-time". The process of that event or expected natality is complex. To make it easier to understand, let us return to the fundamental paradox of Newtonian or classical physics. While in the theory of classical physics, the observers were in complete disagreement with respect to the speed of light, they become completely disagreeable with respect to the uniqueness of the value of light, in accordance with the theory of relativity. Reanalyzing the calculation of that speed, i.e. the speed declared and now recognized as a constant, but in the context of distances considered as different by the observers, can only "kill"

the unique or absolute time, and generate the different time of the observers or shortly the observed time. Finally, in the theory of relativity, each observer has their own time or their own measure for time. Thus, the absolute time of classical physics is disobjectived and becomes subjective or relative... [2]

Any observer can know or precisely determine both the time and the position (the space) of the event attributed by any other observer, on condition they know the relative speed of the other observer. A meter, as a unit used to determine space, becomes the distance travelled by light in 0.000000003335640952 seconds, measured with a Cessium timepiece. A new standard measuring unit appears nearly instantaneously, called a second-light [3]

In the modern spatial and temporal connection, in keeping with the theory of relativity the contents of classical time and space is essentially modified, and the concept or the physical "object" called space-time is accepted exclusively (from that moment on, time is no longer separated from space), and the positioning of a number of phenomena and processes (event or observers) is done in four coordinates, respectively, three spatial, and one temporal. The new positioning according to the theory of relativity is virtually quadri-dimensional. Einstein, through his generalized theory of relativity, starting from the finding that gravity is not a force, but rather a consequence of the fact that the object space-time is not plane but "curved" ("wrapped") by the distribution of the mass or energy it contains ($E = mc^2$), proposes and rigorously defines the "geodesic line" to be the shortest (or the longest) trajectory between two neighbouring points.

The final conclusion of the generalized theory of relativity underlines the special dynamism of the space-time object; when a given body is moving, or a force acts, it affects the curving line of space-time and the structure of that modified object space-time affects the manner in which the bodies move, and acts on the forces through which matter and energy manifest themselves.

Relativized and modern space and time in physics are affected by everything happens in the universe. It becomes practically pointless to talk about space and time outside the universe, a dynamic universe, in expansion between a past finite moment and another, future, moment, which is completely uncertain… but even under those circumstances physical thought can only speculate on time: the universe must have had a beginning, in the same manner as it must have an end, as Roger Penrose and Stephen Hawking actually state [2].

1. PHYSICAL TIME AND ECONOMIC TIME

The time of modern physics (in fact, the space-time object), presents a few important characteristic features, which can represent guiding points in thinking modern economic time.

The theory of generalized relativity redefines the relationship between the energy of light and its frequency (the number of lightwaves per second):

A. **The greater the energy, the higher its frequency**.

When the light propagates upwards in the Earth's gravitational field, it loses energy, and so the frequency goes down while the time between a peak of the lightwave and the next increases.

B. For someone who is located at a higher place, everything happening below looks as if needing a longer (greater) time.

The paradox of the twins emphasiyes, in the theory of physices, what can happen in an irreal way, when the physical thinking of a classical type of the absolute (Newtonian) time intertwines with the thinking of the relativistic physics of space and time. If, out of two twins, one travels into an interplanetary space, he will grow older faster, while the one remained on Earth will remain much younger. In the thinking of the theory of generalized relativity, each of the twins will have his own personalized time, at the level of the observer, his own time measure, which would irretrievably depend on space (location) and the speed they move, and the twins will grow old in the same manner.

C. There exists a contracted, and a dilated cycle of life, in keeping with the location or space, and speed.

Stephen Hawking, in his attempt to unify the theory of generalized relativity and quantum physics, introduces a new concept concerning time, i.e. imaginary time, which does not differ from the directions of space. In the same manner the going direction north has a return direction south, also imaginary time possesses both directions, from the past towards the future ("forward" from a temporal standpoint), and from the future towards the past ("backwards" in the sense of the temporal course). [1]

The laws of science, Stephen Hawking states, make no difference between the past and the future, and do not change when combining the operations or symmetries called C, P and T:

C = change of the particle for its antiparticle;

P = change for the mirror image;

T = inversion of the movement direction of all the particles (the "backward" motion)

Physical thinking has attracted under its influence imaginary time as well, decomposing it into three directions: the entropic sense, the psychological sense, and the cosmological sense. The increase in disorder (entropy) is the most often invoked sense of time, from the past to future, and translates as from less to more entropy). The psychological or the sense felt by the human being is the one that makes us remember the past and not the future in keeping with the entropic (thermodynamic) sense, and the cosmological sense is the sense given in the universe that expand rather than contracting.

D. The universe itself must have begun immediately after the Big Bang with a period of exponential "inflationist" expansion, when it increased in size by a very great factor.

During that expansion, the fluctuations in the density of the universe should have remained small at the beginning, and then begun to increase.

E. A greater density of the universe is correlated with a smaller fluctuation, made slower by universal attraction.

Obviously, there exist regions of the universe having a higher or smaller density, and some of them should have stopped their expansion and suffered a collapse, forming galaxies, stars, and, why not, even human beings…

F. The universe thus begins in a homogenous, and hence ordered state, which gradually becomes heterogeneous or disordered, as "time passes", in all its senses…

Physical time was personalized in a space of the universe in expansion, and analogy with the economic phenomenon, in particular with inflation, is only natural.

In a synthesis, a lot of questions can appear, partially synthesized in the table below:

The antinomies and synonymies of time in a physical and economic context

Table no. 1

TEMPORAL QUESTIONS ABOUT THE UNIVERSE	TEMPORAL QUESTIONS ABOUT THE INFLATION
PHYSICAL TIME	**ECONOMIC TIME**
1. What do we know about the time of the universe, and how was that information come by?	1. What do we know about inflationary economic time, and how did we know about it?
2. From what direction of time does the universe come, and where is it heading?	2. Where does the time of inflation come from, and where is it heading?
3. Does the universe have a temporal beginning, and if so, what happened before the Big Bang?	3. Does inflation have a temporal inception, and if so, what happened before the first inflationary moment?
4. What is the nature of physical time?	4. What is the nature of inflationary economic time?
5.Will physical time reach at a final time (Big Crunch)?	5. Will the time of economic inflation reach an ending moment?

Still, the answers are not, as we are going to see below, so different in the economic subuniverse as compared with the physical one. To do that, the investigation of inflation, considered practically the specific temporality of all the economies, and its measuring instruments, especially in Romania, constitutes a good example for the analysis conducted, and the ideas formulated at the beginning and, respectively, at the end of the present article.

4. SOME IMPORTANT ASPECTS OF THE INFLATION

Inflation is an evolution perceived as a diminution of the value or buying power of a national currency, defined either as an imbalance between the steeper rise of the domestic/national prices, and the increase in the external / international prices, or as a major macro-economic imbalance of a monetary-material nature, and seen, in the practical field, as a general, sustained rise of the prices; it appeared long before the science of economics. The climactic periods, or the inflationary "critical moments" were typically defined by the end of the 3rd century, the begining of the 16th century, the whole of the 17th century, and the 20th century. The end of the 3rd century is marked by inflation through the currency, i.e. excessively issuing uncovered currency/coins in the Roman Empire, which was vainly and non-economically treated by emperor Diocletian's "famous" AD 301 decree of maximal prices, which sanctioned death penalty for the "offence" of raising prices. The western Roman Empire collapsed, and the eastern Roman Empire, reformed by emperor Constantine the Great, imposed the imperial coin called "solidus" or "nomisma", after AD 306, for another nearly 1,000 years. The beginning of the 16th century brings in, as a result of the great geographical discoveries, accompanied by massive amounts of gold and silver from the "new world", price rising more than tenfold, generating problem for the whole of Europe, through the excess of precious metal in Spain and Portugal, materialized in sapping the buying power of the national currencies of those tow nations, and, eventually, of all the money in Europe. If the 17th century was a century of the inflationary "princes", who would fuel wars by issuing counterfeited coins, coins of diminished or oscillating value, the 20th century was marked by waves of inflation, such as the one occurring during the "great Slump/Depression", and of the 1930 economic crisis, by hidden inflation via the imposed, controlled and artificial prices of the "great Planning", the inflation generated by the evolution of the price of the oil barrel, or the occasionally galloping inflation of the transition of the East-European countries to market economy. Neither the "decrees", nor the "assignates" of Catherine II, as financial guaranties of the currency, nor the imposed or controlled prices represented lasting solutions in fighting inflation. Inflation was determined *par excellence* by the term "excess", be it excess of currency issuing, or inflation through currency/coins, excess of creditworthy demand, or inflation through demand, excess of nominal demand, i.e. credit, or inflation through credit, excess in costs, or inflation through costs, and only seldom by the term scarcity, as was the case of insufficient production, when there was no corresponding excess, or inflation through supply. Measuring the phenomenon of general, steep increase in prices, an operation which was initiated by bishop William Fleetwood in 1707, by estimating to about 500% the value of the inflation occurring in the English economy, between 1440 and 1707, devolves upon the science of statistics, and is substantiated in multifarious specific assessment instruments, all daubed price indices, which originated in interpret indices. The modern range of issues and ideas in the domain requires new techniques, from econophysical modelling to modelling based on the new fuzzy numbers resulting from the fuzzy logic.

5. THE INDEX NUMBERS AS MAJOR INFLATION INSTRUMENTS

Defining a statistical index, in as concise, simple and accurate a manner as possible, is a difficult undertaking. The etymological root of the concept of index is the Latin word *index*, variously meaning "index finger, indicator, title, inscription list". The above senses have been maintained, and were even diversified with those of "clue, indication, hint, sign". Indices are accepted as method, system, proportion, ratio (comparison), size or relative indicator, average weighted value of relative dimensions, or average relative variation, instrument or measure of relative change, *pure* number, adimensional numeric

expression, simplified representation through substituting rough data, mathematical function, or value specific to the axiomatic theory of indices", etc.

Defined as a *pure* number, or as an adimensional numerical expression, the idex is a particular form of "numeric purity", i.e. of independence as to the measuring unit of compared values. The term of index initially applied to the data of dynamic series, and it is expressed in the shape of relative numbers. To this day it is considered, in statistical terms, a dimensionless number, obtained either through putting in proportion of two values of the same simple variable, which correspond to two different time or space periods, or of two values of a complex indicator, whose simple values are nonhomogeneous, thus being unable to be directly summed up. The first category is that of individual, particular or elementary indexes, while the second one – in fact, the most important one – is known as the category of synthetic or group indexes. Seen as the scheme of variation of one or several values or phenomena, an index is a simplified representation, through substituting the rough data by their ratio (and comparison), and aiming at restoring the temporal and spatial evolution of the values under observation. Whenever a variable modifies its level, in time or space, a statistical index is generated (Henri Guitton). Aproahed as a statistical-mathematical function, the index has generated an entire axiomatic theory, which redefines it as an economic measure, a function F :D→ R, which projects, on the ne hand, a group, or a set D of objectives (informatin and data) bearing economic interest, onto a group, or set R of real numbers, and which satisfies, on the other hand, a system of relevant economic conditions – for instance, the properties of monotonousness, of homogeneity, or of homotethicity, or relative identity (Wolfgang Eichhorn).

Consequently, the concep of index is revealed via a general method of decomposition and factorial analysis, and prevalently used in practical matters as a system. Indexes are defined either as a ratio, or raio comparison that yields a characteristic number, or as a relative synthetic value, or a relative indicator in an adimensional numeric expression, or in its capacity as a pure number, or in the most condensed defining variant, as an average weighted values of relative values, or as a measure of the relative average variation of a number of variables at various moments in time, in different locations, or in different categories, and, last but not least, as a manner of simplified mathematical representation via substituting rough data for their proprotion/ratio through the agency of a function bearing the same name –the index function – i.e. $F:D\rightarrow R$, where $F(z_1,z_2,\ldots,z_k) = z_1/z_2$, with z representing the specific variable and D is the set of the objectives, items of information and data of (an economic) interest, and R remains the set of the real numbers.Constructed in the multifarious world of prices, the first index was an *interpret* index. In the present context, the term has the signification of the original Latin terms maing it up, i.e. *inter* "between (implicit mediation)", and, respectively, *pretium* "price". The evolution in time of indices needed, over more than tree centuries, solving numerous theoretical and methodological problems concerning the calculation method used, including the formula, choosing the base and the system of weighting/balancing, and, more especially, the practice way of construing. The process of optimizing the range of issues having to do with the construction is far from being finished even today, although the history of its enunciation was a troubled one[5].

Emerged, like modern statistics itself, as a by-result of the *school of political arithmeticians*, the index was fathered by an Anglican bishop, called William Fleetwood. The date of birth of the first interpreter index is 1707, and it is recorded by the study of the evolution of prices in England, between 1440 and 1707, a record known by the name of "Chronicon Preciosum". The value of this first index was 30/5, or 600.0%, and it was construed based on the simple arithmetical mean value of eight products: wheat, barley, beans, clothes, beer, beef, mutton and ham. As a matter of fact, the world of prices, which is hard to approach due to the specific ampleness of its scope, to its sui-generis heterogeneity, and to its tendency to apparent infinity, was translated onto a homogenized population through the agency of the interpreter indices. In 1738, C. Dutot conducts a research into the decrease of the buying power of the French currency, between 1515 and 1735, through the agency of another interpreter index, more extended, having the following formula:

(1) *Dutot* index: $\frac{p_1 + p_2 + \ldots + p_n}{\mathrm{P}_1 + \mathrm{P}_2 + \ldots + \mathrm{P}_n} = \frac{\sum_{i=1}^{n} p_i}{\sum_{i=1}^{n} \mathrm{P}_i}$, where: p_i and P_i = the prices of the current, and base periods

If the numerator and the denominator of the index are multiplied by (1/n), the calculus formula of the *Dutot* index becomes a ratio of mean values, i.e. $(\sum_{i=1}^{n} p_i /n):(\sum_{i=1}^{n} \mathrm{P}_i /n)$. In order to quantify the effect of the precious metal brought to Europe after America was discovered, the Italian astronomer and economist Gian Rinaldo Carli used, in 1764, the simple arithmetical mean value for three products, namely wheat, wine and oil, in construing a similar interpreter index, determined for the period 1500 to 1750:

(2) *Carli* index: $\frac{1}{n}\left(\frac{p_1}{\mathrm{P}_1} + \frac{p_2}{\mathrm{P}_2} + \ldots + \frac{p_n}{\mathrm{P}_n}\right) = \frac{1}{n}\sum_{i=1}^{n}\frac{p_i}{\mathrm{P}_i}$

While William Fleetwood's merit was that of being the first to homogenize heterogeneous variables, through putting them in proportion, and utilizing the results thus obtained to secure the necessary comparisons, Dutot and Carli are laudable for generating the problem of adimensionality, i.e. transforming absolute values into relative values, generally non-comparable, or by no means reductible to a central, essential or typical value (which has a variation coefficient that is admissible from a statistical point of view). But the most important improvement to the construction of the index and to *fluidifying* its processing belongs to the Englishman Arthur Young, who introduced *weighting*, that is a number of coefficients, meant of underline the *relative importance of the various articles that make up the index*.Young used two weighting formulae, having as a starting point either *Dutot*:

(3) *Young* index (1): $\frac{p_1k_1 + p_2k_2 + ... + p_nk_n}{P_1K_1 + P_2K_2 + ... + P_nK_n} = \frac{\sum_{i=1}^{n} p_ik_i}{\sum_{i=1}^{n} P_iK_i}$,

where k_i=coefficient of importance of the product *i*,

or *Carli*:

(4) *Young* index (2):

$$\frac{1}{\sum_{i=1}^{n} C_i}\left(\frac{p_1}{P_1}C_1 + \frac{p_2}{P_2} + C_2 ... + \frac{p_n}{Pn}C_n\right) = \frac{1}{\sum_{i=1}^{n} C_i} \times \sum_{i=1}^{n} \frac{p_i}{P_i} \times C_i =$$

$$\sum_{i=1}^{n} \frac{p_i}{P_i} \times \frac{C_i}{\sum_{i=1}^{n} C_i}, \text{ where } \frac{C_i}{\sum_{i=1}^{n} C_i} = \text{ weighting coefficient}$$

(w.c.) and $\sum_{i=1}^{n} (w.c.)_i = 1$.

After the 1812 *Young solution*, the new problem of projecting indices was to become the effect of the variation of weights. Sir George Shuckburgh Evelyn introduced, in the year 1798, the notion of base year, and thus anticipated the dilemma of *the selection of the base, and the construction of the weighting system.* In 1863, through an index calculated as the geometric mean value of the individual indices, Stanley Jevons extends the range of the issues discussed to the formula, and especially to the mean value to be used:

(5) *Jevons* index: $\sqrt[n]{\prod_{i=1}^{n} \frac{p_i}{P_i}}$

Jevons was not going to differentiate the individual indices, as he gave them the same importance.

Two indices imposed by the German school of statistics remain to this day, like the two poles of the Earth, the limits of construction along the axis of the *weighting systems*. The first one is Etienne Laspeyres's index, construed in 1864 by using weighting with he base period, and the second is Hermann Paasche's index, elaborated in 1874, which uses the current period as a criterion of weighting.

(6) *Laspeyres* index: $\frac{\sum p_{i1}q_{i0}}{\sum p_{i0}q_{i0}}$ or $\frac{\sum p_{i0}q_{i1}}{\sum p_{i0}q_{i0}}$ and

(7) *Paasche* index: $\frac{\sum p_{i1}q_{i1}}{\sum p_{i0}q_{i1}}$ or $\frac{\sum p_{i1}q_{i1}}{\sum p_{i1}q_{i0}}$, where:

p_{i0} and p_{i1} = prices of the base period (0), and current prices (1)

q_{i0} and q_{i1} = quantities of the base period (0), and current quantities (1).

Although the above-mentioned indices verify only the condition of identity ($I_{1/1}^{X}$=X_1/X_1 =1), out of all Fisher's tests for elementary indices, they are yet the most frequently used in practical matters, owing to the economic contents of either of them. Within the difference between the Laspeyres and Paasche indices, yet accompanied by the loss of their specific economic contents, and outside Ladislaus von Bortkiewicz's relation, were placed many "theoretical" indices. The latter can be unreservedly called *indices of a "mesonic"* type, starting from their authors' wish for the values to be situated within the difference (P – L), in order to supply an equilibrium solution between the two limit values from the angle of choosing the base. At the same time as the two systems of balancing were to e generated, successively, the issue ranges of the constancy, but also of the lack of constancy of the balancing, and also that of the linking/connecting of the bases as they grow out of date or obsolescent. Out the formulae of the indices of the "mesonic" type, the best-known are the constructions which use common, usual statistical mean values. The simple arithmetic mean value of the Laspeyres and Paasche indices is known as *Sidgwik–Drobisch* index.

(8) *Sidgwig-Drobisch* index: $\frac{L+P}{2}$

The arithmetical mean value of the quantities in the two periods, which has thus become a balance, generates the *Marshall-Edgeworth*, or *Bowley-Edgeworth* index (1885-1887).

(9) *Marshall-Edgeworth* index: $\frac{\sum p_{i1}(q_{i0}+q_{i1})}{\sum p_{i0}(q_{i0}+q_{i1})}$

The geometrical mean value of the quantities in the two periods, turned into a balance, entirely describes a *Walsh* index (1901).

(10) *Walsh* index: $\frac{\sum p_{i1}\sqrt{(q_{i1} \times q_{i0})}}{\sum p_{i0}\sqrt{(q_{i1} \times q_{i0})}}$

The simple geometrical mean value of the Laspeyres and Paasche index is nothing else but the reputed *Fisher* index (1922).

(11) *Fisher* index: $\sqrt{(L \times P)}$

This is the index that verifies three out of the four author tests, or Irving Fisher tests: the test of identity, the test of symmetry, or the test of reversibility in time, and the test of completeness, or the test of factor reversibility. The only test that is not entirely satisfied is the test of linking (or circularity). The advantage created by the reversibility of the Fisher index:

(12) $F_{0/1} = \sqrt{(L_{1/0} \times P_{1/0})} = \frac{1}{\sqrt{(L_{1/0} \times P_{1/0})}} = \frac{1}{F_{1/0}}$

is, unfortunately, counterpoised by the disadvantage caused by its lack of *real economic* contents.

A construction endowed with real practical power is that of *R.H.I. Palgrave* (1886), who proposed a calculus formula for an arithmetical mean index, balanced by the total value of the goods in keeping with the current period ($v_{1i} = p_{1i} \cdot q_{1i}$) :

(13) *Palgrave* index: $\frac{\sum i_{1/0} \times (p_{1i}q_{i1})}{\sum p_{i1}q_{i1}} = \frac{\sum i_{1/0} \times (v_{1i})}{\sum v_{1i}}$.

The series of the purely theoretical or generalized indices is unpredictable and characterized by abundant originality.

The *Cobb-Douglas* solution (1928) is a generalization of the Jevons index, which uses unequal balance values, and satisfies three Fisher tests (except for completeness, or the reversibility of the factors):

(14) *Cobb-Douglas* index: $\prod_{i=1}^{n}\left(\frac{p_i}{P_i}\right)^{\alpha_i}$, where $\alpha_i > 0$ and $\sum_{i=1}^{n}\alpha_i = 1$

Stuvel's variant, an index combined between a Laspeyres "of the price factor" (L^P), and a Laspeyres "of the quantity factor" (L^q), realized in 1957, satisfies, like its source, exclusively the condition of identity:

(15) *Stuvel* index: $\frac{L^p - P^q}{2} + \sqrt{\frac{\left(L^p - P^q\right)^2}{4} + I^{(p\times q)}}$

(where $I^{(pxq)}$ = index of total variation)

Another construction, this time inspired from the method of "experimental" projection, centred on the factorial conception, but lacking operational powers from an economic standpoint, as it lacks this kind of signification, is R.S. Banerjee's index (1961), again a combination of indices of the Laspeyres and Paasche type:

(16) *Banerjee* index: $\frac{L+1}{\frac{1}{P}+1} = \frac{P\left(L+1\right)}{\left(P+1\right)}$

A real limit point of classic theorization in the field of index theory is represented by the *autoregressive* index.

(17) AUTOREGRESSIVE index : $\frac{\sum\left(p_i P_i a_i^2\right)}{\sum\left(P_i\right)^2 \times a_i^2}$,

Here a_i stands for quantities of products or coefficients of balancing (importance). It only verifies the condition of identity, though it is construed in a conditioned manner, namely $\sum\left[p_i - P_i \times I_{AUTOREGRESIV}\right]^2 =$ minimum.

The *Torngvist* (1936) and *Divisia* (1925) indices are the result of the generalizations of a mathematic type, and are defined by the following relations:

(18) ln (Torngvist index)$= \sum\frac{1}{2}\left[\frac{p_i q_i}{\sum p_i q_i} + \frac{P_i Q_i}{\sum P_i Q_i}\right] \times \ln\frac{p_i}{P_i}$,

where: $\frac{p_i q_i}{\sum p_i q_i}$ and $\frac{P_i Q_i}{\sum P_i Q_i}$ are weights of the value of the specific transactions p_iq_i and P_iQ_i.

The usual form the *Divisia* index can be found in is:

(19) $P_{0t}\,Q_{0t} = \frac{\sum p_{it} q_{it}}{\sum p_{i0} q_{i0}}$ as a mean value resulting from a determinating relationship of the individual price indices, namely $P\left(i_{p1} + i_{p2} + \ldots + i_{pn}\right) = i_{pi}$.

Nowadays, the processes of multiplication of the calculus formulae for the indices see two tendencies, *one already visible, namely extreme axiomatization and mathematization*, following the patterns of the *Torngvist* and *Divisia indices*, which culminated in the school of axiomatic indices, and a second one, which resumes the logical vein of economic signification of the index constructions, specific to the latest construction worldwide at the end of the 20th century, i.e. variants of integrating the additive, or the mixed additive–multiplicative models of construction, which come closer to the signification of real phenomena. In that respect, a summary presentation will be in order of the index of the said comparative advantage, or the David Neven index (1895)

(20) *David Neven* index: $\left(\frac{x_k}{\sum x_k} - \frac{m_k}{\sum m_k}\right) \times 100$, where x and m are values of the export, and, respectively, of the import on the level of industry k. The index belongs to the interval of values (-100%; 100%), but it seldom reaches, in real practice, values higher than 10%, or smaller than –10%, etc.

The definitive instauration in the language of a sign, even it is gradual, remains a long process, where the sign (the representation, or the signifying element) replaces, at a given time, the represented entity (i.e. the signified). The sign substitutes an object, and is able to express either a quality (qualisemn), or its current existence (synsign), or a general law (legisign). Thus, the index appears as a sign by the side of the icon (e.g. the table, the graph), the symbol (e.g. the currency / the coins), the rheme (e.g. the mere possibility), the dicent (e.g. the action/deed), the argument (e.g. the syllogism), etc. The *index* of semiotics, or the *indicator* can be defined as a sign that loses its character of a sign, as soon as the object disappears or is destroyed, but does not lose that character if there is no interpreter. The index can therefore easily become its own sign-interpreter. Currency, as a sign, assumes nearly all the forms semiotics presents in detail, from the qualisign, or the quality of hard currency, to the symbol of a broad range of sciences, or the legisigns specific to the monetary or banking world. In the same manner world history is marked by inflation, and, implicitly, by the use of currency – as briefly shown in the previous part of this article– likewise the favourite index of the inflationist phenomenon is the interpret index.

The family of the index numbers and its "demographic" evolution constitute a lesson in statistical history as far the practical construction of price indices is concerned. In general the usual characteristic values of two series of data cannot be compared. The main reason for it is represented by heterogeneity, in point of both level of variation, and the measuring unit used. Making comparisons, in a heterogeneous universe like the one of prices in the world of economy and economics, can be still done through a mere ratio, or a ratio comparison, quick and easy, generating a specific, and obviously adimensional, index. Therefore, the need to homogenize and "adimensionalize" heterogeneous variables (prices and various values) through a process of turning absolute values into relative values, combined with both the requirement to eliminate the effect of the differences of quantity through a process of weighting or co-measuring, and the obligation of doing away with the effect of variation, and even of obsolescence of the weights, through the diversification of the systems of weighting used, and their periodic connection, all the above requirements taken as a whole have led to the emergence and evolution of the concept of statistical interpreter index. The alteration of the level of the prices is the main object of reflection. In its synthetic or "composite" form, the interpret index is in the main the result of processing the chronological price series, and it expresses a functional relationship y = f(x), where: x - is the explanatory, independent variable (time, space, etc.), and y – is the

resultative, dependent variable (the level of the price, or, as a result of the difference from the stationary index, the alteration of the price level). The dependency is not causal, nor is the time, and neither is space, which are by no means the determining elements of price variation.

As instruments of measuring inflation, the interpret indices use quantity (q_i) as a co-measurer, or weight/balance, starting from the total amount of transactions $T_i = p_i q_i$. The quality factor is, permanently, the price (p_i). An interpreter index comes in the classic form given by expression: $P=\frac{\sum q_{ai}p_{1i}}{\sum q_{ai}p_{ai}}$, where a=0 or a=1. Sometimes q_{ai} can be the result of a simple mediation of a geometric type $\left(\sqrt{q_1 \cdot q_2}\right)$, or arithmetic one $\boxed{1/2(q_1+q_2)}$, etc. With slight modifications, the calculus formula of the Dutot index, known by the name of *Bradstreet index*, in the expression: $\left(\sum_{i=1}^{n} p_i / n\right):\left(\sum_{i=1}^{n} P_i / n\right)$, is the solution used in England, starting with the year 1895 – and published in the journal of the same name. The main shortcoming of the Bradstreet index is the failure to fulfill the comensurability axiom, as it is not independent of the measuring unit. Gian Rinaldo Carli's interpret index has long been utilized in calculating the index of the wholesale prices for 45 commodities, in keeping with a relation of the following type: $\frac{1}{45}\left(\frac{p_1}{P_1}+\frac{p_2}{P_2}+\ldots+\frac{p_{45}}{P_{45}}\right)=\frac{1}{45}\sum_{i=1}^{45}\frac{p_i}{P_i}$

William Newmarch's interpret index, constructed and published in 1859, in *Journal of Statistical Society*, was called by its author *Index Number*. The index number "applies to the series in which a given/selected term (the base) is written in the form "100", and the other terms are expressed as percentage values compared to it". An index number is a "number which shows, through its variation, either the increase, or the decrease in a value that is hardly likely to enjoy an (extremely) accurate measurement. This is the definition Edgeworth provides in *Economic Journal*, in 1925, while "The index number is used to measure the change of a quantitative nature, which cannot be directly observed…" is another definition of the *Index Number*, given by Bowley in *Elements of Statistics*, in 1920. The *Index-Number* has remained typical of English-speaking nations, and it was subsequently taken over by the French statistical literature as *nombre-indice*, or by the German literature in the field, as *Indexziffer*. *Index Number* is in fact synonymous to the Romanian term *indice*. The evolution of the batch of the indices is demonstrated by the very specific classifications. An early clasification of the interpret indices was that of *budget* interpret indices, and *monetary* interpret indices. The first category represents the indices constructed with a view to emphasize the variations of a given budget (of goods exchange), due to the mobility of the prices, and the best-known such index is the cost of life index, or the ICV interpret index (in Romania). The category of the monetary indices was introduced as a result of the manner in which the notion of price is regarded. "If the commodity "comes cheaper" its price, as expressed in a number of monetary units decreases, and the price as expressed in commodity-units per currency unit, goes up. The thing, if considered from this latter angle, entitles us to say that the currency has grown "more expensive".A process of currency "reduction" would consequently trigger a "rise in the price" of the goods, and the other way round." (Nicolae Georgescu–Roegen, in *The Statistical Method*). It follows that the monetary index is an interpreter index construed such a way as to measure the variation of the whole set of prices due not only to the variation in the value of the currency, as the best-known of all the indices in that class is the interpret index of the consumer goods prices (of the IPC type), whose reversed value represents the evolution of the buying power of the national currency. The geometric mean is the appropriate solution, both in point of form, and also statistically, in calculating the individual indices, and it is imperative for the interpret index of a monetary type to be construed in accordance with the Laspeyres model, which largely satisfies the monetary standpoint. This is in fact the pragmatic conclusion of the classical theory of the indices. The second classification of the interpret indices is that of the *domestic* interpret indices, the *regional* interpret indices, and the *international* interpret indices. In the first category are included the interpret indices of the domestic type, or those reflecting the evolution of the prices within the national economic space, in the second one – the interpret index of the community harmonized type (HIPC), which reflects the evolution of the prices within the community economic space, and in the last one – the interpret indices of an international type (the best-known being the index of the unitary value, used in keeping with the UNO methodology). The third classification of the interpret indices distinguishes between the interpret indices of the *stock exchange* type (dealing with products in stock exchanges, or of quotations of the shares), the interpret indices of the *banking* type (the index resulting from taking into account the interest rate, or its evolution, of the dynamics of the exchange rate, etc.), the interpret indices of the *specific to other markets* (the index of the nominal income, or that of the real income for the labour market, the interpret index of the rent for the land market, etc.). The diversity of the indices of the stock exchange type, from Dow Jones (n =65), Financial Times, Ordinary Share Index (n =30), Nikkei (n=225), CAC 40 (n =40), Moody (n =15), Reuter (n =21), HWWA (n = 47), to BET, BET-C, BET-FI (n =10) or ROTX (n = 6), the last ones being examples of indices of the Stock Exchange in Bucharest, expresses only to a small extent the exponential demographic growth of the interpret index population.

Distinct definitions, occurring in various national and community statistics, attributed to the variegated types of price, validate, through synthetization, the statement that the interpret index has the following characteristic features as constantly identical elements:

- a measuring instrument that provides an *estimate* of the evolution of the prices (consumer goods in CPI, industrial goods in IPPI, or regarding import/export, tariffs and rents, costs in building activities, etc.);
- *alienation* of goods/commodities, and services (i.e. *actually used* prices and tariffs);

-*modification of prices within a fixed period* (called the base, or reference period), and *a variable period* (called the current period).

The most widely used interpret indices are the following:

- CPI – the index of the prices (of consumer goods) for the consumption of the population, which measures the overall evolution of the prices for the goods bought, and of the tariffs for the services used, being considered the main tool for evaluating inflation;
- IPPI – the index of the industrial production prices, which synthetically expresses the evolution or the average changes in the prices of the products manufactured and delivered by the domestic producers, which are actually practised in the first stage of their trading; it is used both in deflating industrial production evaluated in current prices, and in determining inflation in the sphere of "producer prices". This index is one of the few such indices endowed with a kind of "premonition", a real Cassandra in the so populous world of the instruments measuring inflation. Thus, IPPI anticipates the evolution of CPI. From analysing the past 17 years, a parallel dynamics could be noticed of the evolution of the two statistical instruments for inflation assessment, revealing the prediction capacity of the dynamics of CPI, starting from the evolution of IPPI;
- UVI – the index of the unitary value of the export/import characterizes the dynamics of the prices in the contracts of export/import, the extension of the variation of the commodity prices considered as representative finally ensuring a rate of maximal coverage of the products of 92%, which allows deflating, through its agency, the indicators that characterizes the external exchanges, and even calculating the exchange rate;
- CLI – the cost of living index, which shows which is the cost of the market prices in the current period, meant to maintain he living standards reached during the base period; it is calculated as a proportion of this hypothetical cost and the actual (consumption) cost of the base period, the necessity of this type of interpreter index being obvious especially in determining real income and real salary;
- IRP – the index of the retail prices, which establishes the modification of the prices for all the goods sold in the retail commerce network; its importance as a measuring instrument for inflation in the sphere of the *retail prices* is self-evident;
- CBAI – the index of the cost of the building activities, which assesses the modification of prices in civil engineering business, serving to index the numerous rents, irrespective of the calculation method chosen; it can be used both independently, but also as part of CPI;
- PA-FPI – the index of the prices of the agricultural and food produce, which measures the evolution of the price of agricultural and food produce on the *farmer's market* (the market of the individual or associate agricultural producers), supplying important information about the inflation on that special market;
- The deflating index of the GDP, or the *implicit deflator of the* GDP is the index of the prices of the gross national product that is not calculated directly through measuring the modification of the prices, but as a result of the proportion between the nominal GDP, or in current prices, and the GDP as expressed in comparable prices (after the separate deflating of each component of that macro-economic indicator);.

The instrumental and applied description of the price index of the consumer goods has the following guidelines: defining, advantages and disadvantages of its use, the scope, the source of the data, the samples used in constructing it, the weighting system, the actual calculus, the inflation calculated as the rhythm of CPI, the specific indicators of inflation, uses of CPI, and the index of the buying power of the national currency.

6. A TRADITIONAL PRICE INDEX FOR THE INFLATION'S MEASUREMENT IN ROMANIA

Three constructions of price indices mark the remarkable tradition of Romanian statistics. One of them belongs to an endeavor coming from outside the national statistical institution, and is known as the *index according to Argus*, being a product of the early economic thought, and the first interpret index ever published in this country:

Table no. 3.

The Index according to ARGUS (1916 - 1926) %						
1916	**1921**	**1922**	**1923**	**1924**	**1925**	**1926**
100	1500	2170	3162	3954	4557	5100

Source: *Everyone's Yearbook*, "*Cultura Poporului*" Publishing House, Bucharest, 1929.

The second one is the interpret index of the cost-of-living type compiled by the Central Statistics Institute, more precisely by the price department led by none other than N. Georgescu – Roegen as an index of the unitary value. The theory concerning the cost-of-living (i.e. the cost-of-living index theory) dominated the inter-war period, being developed, independently, by both the Russian mathematician A.A. Konüs, and most of the English-speaking economists of the thirties (whose solutions were synthetized by R. Frisch, in 1936, in an article, as famous as that index "bible" authored by Irving Fisher (*The Making of Index Numbers*. *A Study of Their Varieties, Tests, and Reliability*, published in 1922). This explains why the CLI put forward as an interpret solution, generating a Paasche index, was used by Georgescu-Roegen in constructing the Romanian index. Comparability and the wish of instrumental confrontation are prevalent in the inter-war age of statistics. Culling prices, processing the data and publishing them position Romania in a high-class, prominent context of the price statistics that are comparable internationally:

Table no. 2.

The cost-of-living index in various countries (1932-1938)						
1932	**1933**	**1934**	**1935**	**1936**	**1937**	**1938**
62,2	56,7	53,4	55,6	57,9	66,1	74,6

Source: *Romania's statistical summary,* vol. II -1939, ICS, Bucharest, 1939

Since 1990 up to the present, the National Institute of Statistics has undertaken an effort quite comparable to that in the period following the year 1910. Compiled in a very short period – in December 1990 the first type PCI interpret index had already been published – and based on the French method of NISSE, adapted, in view of the great number of assortments (2551), to the relative „penury" of the Romanian market, the interpret index planned holds a

special significance in the statistical practice. The system of balancing used in constructing the index for commodity price index is of CPI Laspeyres type CPI = $\frac{\sum I^{p}(p_0q_0)}{\sum(p_0q_0)}$,

where: $\frac{(p_0q_0)}{\sum(p_0q_0)} = C_p$ and: I^p = price index of the level of aggregation specific to the post, or group of commodities and services, C_p = coefficient of balancing specific to the post, or group of commodities and services. This new interpret index, constructed by the statistician V.V. Dumitrescu, is published in the first number of the *Bulletin of public information* of CNS, in December 1990:

Table no. 4.

Index of prices for public consumption in November, as compared to October 1990 (on the aggregate, and per categories of expenses)	
General total	*123.4*
Food goods	120.4
Non-food goods	124.7
Services	127.0

Source: *Statistical Bulletin of Prices,* no. 1/ 1990, Ed. DCS, Bucharest, 1990

The remarkable instrumental comparability must be underlined, no less than the tradition of Romanian statistics as compared to that of French extraction, represented by the famous *l'indice des 34 articles*, constructed starting in 1914, or the equally well-known *l'indice des 13 articles*, published constantly since 1916. It is to the same 1914-1916, period of the American price interpret indices, or those of the overwhelming majority of the European economies belong.

In the practical, actual construction there were quite a lot of obstacles, starting from the essential differences of conception and de evaluation between the principal systems of balancing of the price interpret indices (of the Paasche and Laspeyres types), which underlie the constructions belonging to the CLI and CPI standards, and maybe ending with the solution of the ratio between the nominal and real wages in *Romania's Statistical Yearbook* for the period 1952-1989, where the administration of the single prices tried to conceal inflation – actually, a rather moderate one, yet considered to be an economic term incompatible with planned economy. Although the statistical effort of the sequencings is outstanding, while the theory of the chronological index series apparently contributes to further complicate any attempt at making a long-term index construction through imposing periodical relational reassessments (generated by the changes occurring in the balancing coefficients), be it for the impressive effort of the Romanian statistical and economic school, a centennial construction of a Romanian interpret index of inflation was in order. The main bibliographical and methodological landmarks of the construction proposed are:

- *Anuarul pentru toți* (INDEX ARGUS), Tipografia "Cultura poporului" Bucureşti, 1929;
- N. Georgescu-Roegen (coord.), *Statistica prețurilor pe anii 1928 şi 1929* (*The Price Statistics for the Years 1928 and 1929*), Ed. ICS, Bucureşti, 1930;
- N. Georgescu-Roegen (coord.), *Statistica prețurilor pe anul 1937* (*The Price Statistics for the Year 1937*), Ed. ICS Bucureşti, 1939;
- *Breviarul statistic al României* (*Romania's Statistical Summary*), vol. II-1939, Ed. ICS Bucureşti, 1939;
- *Enciclopedia României* (*Romania's Encyclopaedia*), vol. IV, Bucureşti, Ed. Monitorul Oficial şi Imprimeriile Statului, Imprimeria Națională, Bucureşti, 1943;
- *Anuarul statistic al României* (*Romania's Statistical Yearbook*), Ed DCS, INS, Bucureşti, the 1960-2008 collection, and
- *Buletinul statistic de prețuri* (*The Statistical Price Bulletin*), the December 1990 - March 2009 collection, INS, Bucureşti.

Methodologically, not every aspect could be solved, which was specific to the theory of the construction of Schumpeterian statistical indices, but a few original solutions of redressing and "intrapolation" were attempted. The result of that simultaneous historical, economic and statistical investigation is presented below, by the name of Romanian centennial interpret index:

The evolution of the Romanian centennial interpret index of the CPI type (Instrumental proposal) [20]

Table no. 5.

Year	Interpret index of the CPI type		Year	Interpret index of the CPI type		Year	Interpret index of the CPI type	
1913	1,000	100,0	1947	243588,800	24358880,0	1980	41,509	4150,9
1914	0,820	82,0	15.08. 1947	A doua mare reformă monetară		1981		43,312
1915	-	-	1947	12,179	1217,9	1982	51,022	5102,2
1916	0,755	75,0	1948	-	-	1983	53,062	5306,2
1917	-	-	1949	-	-	1984	53,593	5359,3
1918	-	-	1950	-	-	1985	54,713	5471,3
1919	-	-	1951	-	-	1986	55,687	5568,7
1920	-	-	1952	24,360	2436,0	1987	57,027	5702,7
1921	11,330	1133,0	1953*	25,651	2565,1	1988	58,610	5861,0
1922	16,390	1639,0	1954*	27,015	2701,5	1989	59,682	5968,2
1923	23,880	2388,0	1955	28,452	2845,2	1990	62,727	6272,7

1924	29,850	2985,0	1956	29,451	2945,1	1991	169,497	16949,7
1925	32,500	3250,0	1957	29,524	2952,4	1992	526,079	52607,9
1926	35,520	3552,0	1958	31,497	3149,7	1993	1873,381	187338,1
1927	38,550	3855,0	1959	31,205	3120,5	1994	4434,275	443427,5
1928	39,640	3964,0	1960	30,669	3066,9	1995	5866,546	586654,6
7.02. 1929	Prima mare reformă monetară		1961	31,400	3140,0	1996	8142,768	814276,8
1929	39,030	3903,0	1962	31,540	3154,0	1997	20747,802	2074780,2
1930	34,500	3450,0	1963	31,058	3205,8	1998	33009,749	3300974,9
1931	28,370	2837,0	1964	32,715	3271,5	1999	48128,214	4812821,4
1932	24,280	2428,0	1965	32,886	3288,6	2000	70122,808	7012280,8
1933	22,130	2213,0	1966	32,959	3295,9	2001	94315,176	9431517,6
1934	20,840	2084,0	1967	32,789	3278,9	2002	115536,091	11553609,1
1935	21,700	2170,0	1968	33,641	3364,1	2003	133213,113	13321311,3
1936	22,600	2260,0	1969	34,323	3432,3	2004	149065,474	14906547,4
1937	25,800	2580,0	1970	34,348	3434,8	2005***	162481,366	16248136,6
1938	29,120	2912,0	1971**	33,714	3371,4	2006	173140,144	17314014,4
1939	30,400	3040,0	1972**	33,739	3373,9	2007	181520,127	18152012,7
1940	43,130	4313,0	1973**	34,104	3410,4	2008	195769,457	19576945,7
1941	-	-	1974**	34,737	3473,7	2009	206732,547	20673254,7
1942	-	-	1975	35,444	3544,4	1.04.2010	211083,502	21108350,2
1943	-	-	1976	35,858	3585,8	2011	*	*
1944	364,800	36480,0	1977	35,980	3598,0	2012	*	*
1945	-	-	1978	36,808	3680,8	2013	*	*
1946	-	-	1979	37,758	3775,8	2014	*	*

Note* - = data missing * = Useful data în the future till the moment of cmonetary convergeance RON - EURO

7. SIMILARITIES OF PHYSICAL TIME-SPACE IN PROPORTION TO THE ECONOMIC TIME OF INFLATION

Starting from the example of inflation in Romania, the time series of the inflationary phenomenon conduce to a set of conclusions similar to those formulated in section 3 of this article.

To illustrate this aspect, one can consider again, comparatively:

A. **The greater the energy, the higher its frequency**.

A. The higher the degree of economic development, the higher the frequency of the apparition of the price rises.

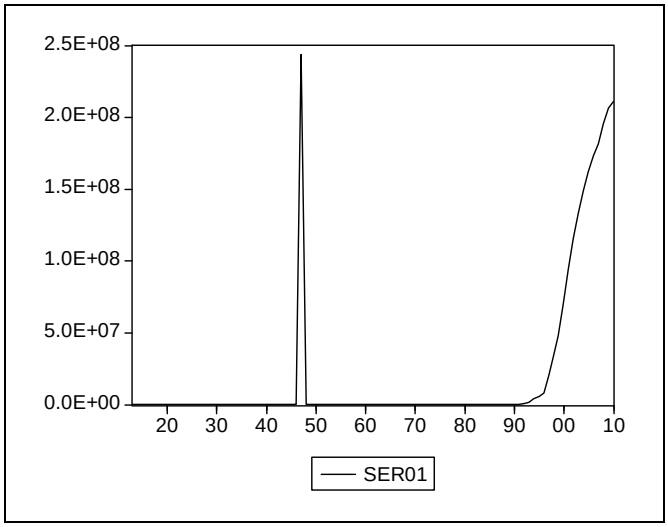
B. For someone who is located at a higher place, everything happening below looks as if needing a longer (greater) time.

B. For the developed economies or located at the North Pole, in the figurative economic sense, economic development is greater, economic time flows faster, inflation evolves coherently and with a much greater degree of coverage, whereas for the economies located at the South Pole economic time elapses more slowly.

C. There exists a contracted, and a dilated cycle of life, in keeping with the location or space, and speed.

C. There is cyclicity, as shown in the very inflationary economic time in Romania, with graphically expansion and contraction.

Graph no.1



D. The universe itself must have begun immediately after the Big Bang with a period of exponential "inflationist" expansion, when it increased in size by a very great factor.

D. Inflation in Romanian economy flows after a time of the balance of expansion different from that of the imbalance of economic contraction *(different times of Equilibrium of Development and Non-equilibrium of contraction)*. It is the fluctuations of inflationary density that denote the aspects expounded.

E. A greater density of the universe is correlated with a smaller fluctuation, made slower by universal attraction.

E. The fluctuations mentioned unde letter D is amplified or contracted through the inflation imported or exported from the world economy. There are nations or regions in

the world having a greater inflation, which export their own inflation to other countries once with the products, thus diminishing its level.

F. The universe thus begins in a homogenous, and hence ordered state, which gradually becomes heterogeneous or disordered, as "time passes", in all its senses…

F. The graph of the Romanian economic inflation implicitly describes the phenomenon amplified by uncertainty and disorder, or enhanced non-equilibrium generated by inflation over the period of the second world war, and the prolonged transition after 1989.

8. A FINAL REMARK

The physical space-time is to be found during economic inflation, as the thinking of modern physics provides a manner of interpretation in Romania's market economy, but also in the economy of all the countries having freely competitional economies, and implicitly inflationary non-equilibria. The universe has a beginning in the real time through Big Bang, and modern economy – through the inflationary time. Still there exists an imaginary time specific to the general physical or economic theoretical approaches, perpendicularly on the real time, which has neither beginning nor end, as every one of us sees it intuitively, as a representative of the kind of Homo Oeconomicus...

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